Attachment E

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

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Your ref:
Our ref: LTR-EHS-14-15

Cc: Carl Snyder, Wayne Sepitko, Diana Joyner

Date: February 26, 2014

Subject: Assessment of Public Radiological Dose from Liquid and Gaseous Effluents for Calendar Year 2013

Effluents released from plant operations are monitored to determine the quantities of radio nuclides discharged into the environment. The cumulative effluent for the period starting 1-1-2013 and ending 12-31-2013 were summarized and input into dose models developed by the NRC/EPA to estimate the dose to the public via the following pathways:

- Air Effluents by Direct Inhalation – Estimated by running EPA's COMPLY Code at level 2 complexity. The organ dose was estimated by calculating the X/Q factor using the results of the COMPLY analysis for stack number 12, the measured release quantity, and the dose conversion factors from Federal Guidance Report No 11, "Limiting Values of Radionuclide Intake and Air concentration Factors for Inhalation, Submersion, and Ingestion"(FGR 11).
- Liquid Effluents by Ingestion of Potable Water – Estimated from formulas and recommended values in Regulatory Guide 1.109, Doses from Liquid Effluent Pathways (RG1.109). Dose conversion factors were taken from FGR 11.
- Liquid Effluents by Ingestion of Fish – Estimated from formulas and recommended values in RG 1.109. Dose conversion factors where taken from FGR 11.
- Liquid Effluents by Irradiation from Shoreline Deposition – Estimated from formulas and recommended values in RG 1.109. Dose conversion factors where taken from Federal Guidance report No 12, "External Exposure to Radionuclides in Air, Water, and Soil"

The radiological impacts were assessed by calculating the maximum total body dose and selected organ doses at the nearest site boundary.

- The inhalation dose is determined at the nearest site boundary at a distance of 595 meters.
- The ingestion dose from liquid and external dose from sediment deposition is determined at the point at which the liquid effluent leaves the diffuser in the Congaree River.

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The release rates for gaseous effluent used in all of the calculations are taken from measured values obtained from daily air samples, one per stack for 47 stacks, measured for gross alpha. The release rates for liquid effluent, used in all of the calculations, are taken from monthly composite liquid effluent samples which are sent to an off-site lab for isotopic analysis. There is potential for technetium in our feed material and the liquid effluent is also tested for this isotope. Air samples were also tested for Tc-99 and no detectable quantities were found.

The total activities measured and /or estimated for calendar year 2013 were:

454.9 μCi of Uranium released as gaseous effluent
5.2 mCi of Uranium released in liquid effluent
9.3 mCi of Technetium released in liquid effluent

For airborne effluents released into the environment, the pathways considered for the individual dose calculations included direct inhalation and an estimate of the dose to the maximally exposed organ (lung and bone). For liquid effluent releases, the pathways included potable water, aquatic food (fish) and shoreline deposition. The models and various assumptions used in the liquid effluent environmental pathways are taken from Regulatory guide 1.109 and the details of both the gaseous and liquid dose calculations are documented in the attached spreadsheets listed below:

Attachment 1:	2013 Gaseous Effluent Discharges
Attachment 2:	Lung/Bone Organ Dose from Gaseous Effluent
Attachment 3:	2013 Liquid Effluent Discharges
Attachment 4:	Total Dose from Liquid Effluent Pathways - Potable Water
Attachment 5:	Dose to the Bone Surface from Liquid Effluent Pathways - Potable Water
Attachment 6:	Total Dose from Liquid Effluent Pathways - Aquatic Foods
Attachment 7:	Dose to the Bone Surface from Liquid Effluent Pathways - Aquatic Foods
Attachment 8:	Total Dose from Liquid Effluent Pathways – Shoreline Deposits
Attachment 9:	2013 Isotopic Fractions

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The results summarized in the table below indicate that the critical pathway is due to inhalation resulting in a maximum whole body dose of 0.160 mRem/yr and a lung dose of 1.64 mRem/yr. These doses are well below both the 25 mrem annual dose limit as well as the 10 mrem ALARA limit.

	Whole Body Dose (mrem/yr)	**Organ Dose - Bone (mrem/yr)**	**Organ Dose - Lung (mrem/yr)**
Air Effluents			
Direct inhalation*	0.16	6.22-03	1.64
Liquid Effluents			
Potable Water	1.26E-04	1.83E-03	-
Aquatic Food(Fish)	7.66E-06	1.06E-04	-
Shoreline Deposition	4.19E-09	-	-
Total (mrem/yr)	*0.16*	*8.16E-03*	*1.64*

* 80 % residence time

David Wagoner
Radiation Safety Engineer
EH&S Operations

Reviewed by Anna Pearson
Manager, RSO
EH&S Operations

2013 GASEOUS EFFLUENT DISCHARGES

	STACK IDENTIFICATION	Stack Height (m)	Flow Rate (m/s)	1st half (Jan-Jun) uCi Uranium Released	2nd half (Jul-Dec) uCi Uranium Released	Total uCi Released*	Release Rate (Ci/s) U234	U235	U238
1	FURNACE EX LINE 1	13	2.78	3.43	3.64	7.07	1.91E-13	7.38E-15	2.57E-14
2	FURNACE EX LINE 2	13	2.78	3.43	3.53	6.96	1.88E-13	7.26E-15	2.53E-14
3	FURNACE EX LINE 3	13	2.78	3.43	3.53	6.96	1.88E-13	7.26E-15	2.53E-14
4	FURNACE EX LINE 4	13	2.78	3.43	3.53	6.96	1.88E-13	7.26E-15	2.53E-14
5	FURNACE EX LINE 5	13	2.78	3.43	3.62	7.05	1.90E-13	7.35E-15	2.56E-14
6	NEW DECON RM	13	1.64	4.65	2.84	7.49	2.02E-13	7.81E-15	2.72E-14
7	MET LAB EX	10	0.56	1.25	3.09	4.34	1.17E-13	4.53E-15	1.58E-14
8	INCINER EX	13	1.89	5.33	8.22	13.55	3.66E-13	1.41E-14	4.92E-14
9	SUPPL INC EX	13	0.94	3.01	3.85	6.86	1.85E-13	7.16E-15	2.49E-14
10	CONVERS 1-A EX	16	4.17	6.19	5.65	11.84	3.20E-13	1.24E-14	4.30E-14
11	CONVERSION 1-B	16	4.17	0	0	0.00	0.00E+00	0.00E+00	0.00E+00
12	S-1030-A	16	7.56	103.64	9.98	113.62	3.07E-12	1.19E-13	4.13E-13
13	S-1030-B	16	7.56	1.33	2.76	4.09	1.10E-13	4.27E-15	1.49E-14
14	MAINT ENCL 4B	13	3.89	0	0	0.00	0.00E+00	0.00E+00	0.00E+00
15	CONV ENCL EX 4C	13	3.89	6.83	9.91	16.74	4.52E-13	1.75E-14	6.08E-14
16	CONV ENCL EX 4D	13	3.89	0	0	0.00	0.00E+00	0.00E+00	0.00E+00
17	CONV EMERG EX 4E	13	3.89	0.7	1.29	1.99	5.37E-14	2.08E-15	7.23E-15
18	CHEM LAB FILTERED EX	17	5.56	7.4	8.82	16.22	4.38E-13	1.69E-14	5.89E-14
19	DECON ROOM EX	13	1.42	2.09	2.49	4.58	1.24E-13	4.78E-15	1.66E-14
20	CAL COMBGAS LN 1	12	0.16	0.58	0.59	1.17	3.16E-14	1.22E-15	4.25E-15
21	CAL COMBGAS LN 2	12	0.16	0.35	0.75	1.10	2.97E-14	1.15E-15	4.00E-15
22	CAL COMBGAS LN 3	12	0.16	0.4	0.53	0.93	2.51E-14	9.70E-16	3.38E-15
23	CAL COMBGAS LN 4	12	0.16	0.32	0.49	0.81	2.19E-14	8.45E-16	2.94E-15
24	CAL COMBGAS LN 5	12	0.16	0.48	0.54	1.02	2.75E-14	1.06E-15	3.71E-15
25	CHEM LAB # 2	16	0.58	2.49	4	6.49	1.75E-13	6.77E-15	2.36E-14
26	CHEM LAB #3	12	0.64	0.61	1.03	1.64	4.43E-14	1.71E-15	5.96E-15
27	HP LAB EX	15	0.58	0.76	0.99	1.75	4.72E-14	1.83E-15	6.36E-15
28	DEV LAB 1 EX	13	0.94	2.66	4.47	7.13	1.92E-13	7.44E-15	2.59E-14
29	DEV LAB 2 EX	12	0.94	3.92	6.95	10.87	2.93E-13	1.13E-14	3.95E-14
30	PELLET COMBINED	13	4.72	6.42	6.39	12.81	3.46E-13	1.34E-14	4.66E-14
31	SOLV X N	13	3.33	3.7	4.06	7.76	2.09E-13	8.10E-15	2.82E-14
32	SOLV X S	13	3.33	1.8	3.06	4.86	1.31E-13	5.07E-15	1.77E-14
34	MAP COMBINED	15	2.78	0	0	0.00	0.00E+00	0.00E+00	0.00E+00
35	ABF HOOD TORIT EX	12	1.42	2.61	2.61	5.22	1.41E-13	5.45E-15	1.90E-14
36	IFBA EX	10	4.72	5.91	6.92	12.83	3.46E-13	1.34E-14	4.66E-14
37	MAINT WELD EX	11	0.94	3.02	5.62	8.64	2.33E-13	9.01E-15	3.14E-14
38	AC-3	15	3.78	4.78	5.03	9.81	2.65E-13	1.02E-14	3.56E-14
39	PELLET LINE 6	12	2.78	3.53	4.13	7.66	2.07E-13	7.99E-15	2.78E-14
40	AC-5	17	3.78	5.18	4.78	9.96	2.69E-13	1.04E-14	3.62E-14
41	AC-8	11	3.78	4.73	6.02	10.75	2.90E-13	1.12E-14	3.91E-14
42	AMMONIA FUME SC 1008-A	17	1.89	2.72	2.93	5.65	1.52E-13	5.89E-15	2.05E-14
43	AMMONIA FUME SC 1008-B	17	1.89	0	0	0.00	0.00E+00	0.00E+00	0.00E+00
44	AC-4	15	3.89	5.14	11.85	16.99	4.59E-13	1.77E-14	6.17E-14
45	HOT OIL RM EX	12	3.89	12.92	22.34	35.26	9.52E-13	3.68E-14	1.28E-13
46	ERBIA FURNACE EX	18	8.17	10.42	10.38	20.80	5.61E-13	2.17E-14	7.56E-14
47	ERBIA SCRUBBER EX	18	4.33	5.41	5.7	11.11	3.00E-13	1.16E-14	4.04E-14
48	ERBIA CHANGE ROOM	18	1.90	2.54	3.01	5.55	1.50E-13	5.79E-15	2.02E-14
						454.89	**1.23E-11**	**4.75E-13**	**1.65E-12**

Sum of Offsite Dose using COMPLY	
0.20	**mRem/yr**
0.16	80% residence time
Result is substantially less than 10 mRem/yr	

*Concentration LLD is 8E-14 uCi/mL

Lung/Bone Organ Dose due to Gaseous Effluents

		1st half (Jan-Jun)	2nd half (Jul-Dec)	Total	EPA			
	STACK IDENTIFICATION	uCi Uranium	uCi Uranium	uCi released	Comply Run Results			
12	S-1030-A	103.64	9.98	113.62	Dose (mrem/yr)	6.10E-02		
	use highest release for year to calculate X/Q used by COMPLY				Stack height (m)	16		
					Release Rate (Ci/s)	U-234	U-235	U-238
	Dose from comply	0.06100	mrem/yr			3.07E-12	1.19E-13	4.13E-13
	release quantity	113.62	uCi/yr					
	Inhalation from RG1.109	1.14E-04	Ci/yr					
	App E table E-5	8000.00	m3/yr					
	Effective Dose conversion							
	EPA FGR 11 p150-151							
	U-234	3.58E-05	Sv/Bq	85%				
	U-235	3.32E-05	Sv/Bq	3%				
	U-238	3.20E-05	Sv/Bq	11%				
	weighted dose conversion	3.49E-05	Sv/Bq					
	conversion factor	3700.00	mrem/pCi= factor* Sv/Bq					
	weighted dose conversion	0.1293	mrem/pCi					
				equations				
	Dose (mrem/yr) = R(a)*3.17e4*Q*(X/Q)*effective Dose conversion			see RG1.109-25				
	Dose (mrem/yr)/(R(a)*3.17e4*Q*effective Dose conversion)=(X/Q)							
		1.64E-05	X/Q					
	Estimate Lung Dose using X/Q and total released for 2013				Estimate Bone Dose using X/Q and total released for 2013			
	App E table E-5							
	Lung Organ Dose conversion							
	EPA FGR 11 p150-151							
	U-234	2.98E-04	Sv/Bq	85%		1.13E-06	Sv/Bq	
	U-235	2.76E-04	Sv/Bq	3%		1.05E-06	Sv/Bq	
	U-238	2.66E-04	Sv/Bq	11%		1.01E-06	Sv/Bq	
	weighted dose conversion	2.93E-04	Sv/Bq			1.11E-06	Sv/Bq	
	conversion factor	3700.00	mrem/pCi= factor* Sv/Bq			3700.00	mrem/pCi= factor* Sv/Bq	
	weighted dose conversion	1.0847	mrem/pCi			4.11E-03	mrem/pCi	
	release quantity	454.89	uCi/yr			454.89	uCi/yr	
		4.55E-04	Ci/yr			4.55E-04	Ci/yr	
	Lung *	**1.64**	**mrem/yr**	**Bone ***		**6.22E-03**	**mrem/yr**	
	assume 80% residence							

Attachment 3

First Half Liquid Discharges

Radionuclide	Volume(ml)	uCi/ml		Error	LLD,uCi/ml	Quantity Released, uCi	Ci	
	7.156E+10							
U234		4.407E-08	+/-	3.48E-09	6.00E-10	3154	3.15E-03	
U235		1.555E-09	+/-	7.97E-10	6.00E-10	111	1.11E-04	
U238		6.222E-09	+/-	1.33E-09	6.00E-10	445	4.45E-04	
Tc-99		4.436E-08	+/-	1.14E-07	6.00E-10	**3174**	**3.17E-03**	**Subtotal Tc99**
						3710	**3.71E-03**	**Subtotal U**

Second Half Liquid Discharges

Radionuclide	Volume(ml)	uCi/ml		Error	LLD,uCi/ml	Quantity Released, uCi	Ci	
	7.447E+10							
U234		1.703E-08	+/-	2.25E-09	6.00E-10	1269	1.27E-03	
U235		6.012E-10	+/-	5.25E-10	6.00E-10	45	4.48E-05	
U238		2.405E-09	+/-	9.25E-10	6.00E-10	179	1.79E-04	
Tc-99		8.154E-08	+/-	3.703E-09	6.00E-10	**6073**	**6.07E-03**	**Subtotal Tc99**
						1492	**1.49E-03**	**Subtotal U**

Total Liquid Discharges

Radionuclide	Volume(ml)	uCi/ml			Quantity Released, uCi	Ci
	1.460E+11					
U234		3.028E-08			4422	4.42E-03
U235		1.069E-09			156	1.56E-04
U238		4.275E-09			624	6.24E-04
Tc-99		6.332E-08			9247	9.25E-03
				Total U	**5.20E+03**	**5.20E-03**
				Total Tc99	**9.25E+03**	**9.25E-03**

Radionuclide	% Activity	Ci
U234	0.8511	4.43E-03
U235	0.0329	1.71E-04
U236	0.0015	7.80E-06
U238	0.1146	5.96E-04
Tc-99	1	9.25E-03

Total Dose from Liquid Effluent Pathways - Potable Water																				
		Whole Body-Ingestion																		
730	liters	Usage by adult	U	10CFR20	7.3×10^5 (ml) which is the annual water intake of "Reference Man."															
31293	mixing - dilution	Dilution at difuser	M																	
				Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985											
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec													
									effective	bone	effective	bone								
2.83E-04	U-234	mRem/pCi	D	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi								
2.66E-04	U-235	mRem/pCi	D	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03								
2.69E-04	U-236	mRem/pCi	D	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03								
2.55E-04	U-238	mRem/pCi	D					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03								
1.46E-06	Tc-99	mRem/pCi	D					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03								
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07								
12	hrs	transit time	t-p	reg guide 1.109	table E-15															
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ												
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10												
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13												
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12			for comaprison only									
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14												
				TC-99		2.13E+05	1.87E+09	3.71E-10			Part 20 table 2		soluble forms							
0.9999999961	U-234	exp(-λt-p)									Dose Conversion									
1.0000000000	U-235	exp(-λt-p)										uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi			
1.0000000000	U-236	exp(-λt-p)									U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04			
1.0000000000	U-238	exp(-λt-p)									U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04			
0.9999999955	Tc-99	exp(-λt-p)									U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04			
											U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04			
Annual Release rate											Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06			
5.2026E-03	**total uranium(Ci)**	**Q**		summation of liquid effluent alpha activity for 2012 **(see Total Liq tab)**																
				% of activity based on current nominal uranium isotopic **(see U activity tab)**							ICRP 69	Comparison								
4.4279E-03	U-234 release fraction	Ci		URANIUM234	85.11%	0.851						Sv/Bq	Rem/Bq	mRem/pCi						
1.7117E-04	U-235 release fraction	Ci		URANIUM235	3.29%	0.033														
7.8039E-06	U-236 release fraction	Ci		URANIUM236	0.15%	0.002					adult	5.00E-08	0.005	1.85E-04						
5.9622E-04	U-238 release fraction	Ci		URANIUM238	11.46%	0.115					infant	3.70E-07	0.037	1.37E-03						
9.2469E-03	Tc-99 release fraction	Ci		TC-99							bone-adult	7.90E-07	0.079	2.92E-03						
check U sum	0.00520																			
1.25E-06	U-234	release fraction *dose factor*exp(-λ*tp)																		
4.55E-08	U-235	release fraction *dose factor*exp(-λ*tp)																		
2.10E-09	U-236	release fraction *dose factor*exp(-λ*tp)																		
1.52E-07	U-238	release fraction *dose factor*exp(-λ*tp)																		
1.35E-08	Tc-99	release fraction *dose factor*exp(-λ*tp)																		
1.47E-06	all nuclides	sum of nuclides																		
85.53473	usage	1100*(usage*dilution)/flow																		
1.26E-04	**mRem/yr**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.																		

Dose to the Bone Surface from Liquid Effluent Pathways - Potable Water

Bone Surface-Ingestion

730	liters	Usage by adult	U	10CFR20	7.3×10^5 (ml) which is the annual water intake of "Reference Man."												
31293	mixing - dilution	Dilution at difuser	M														
				Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985								
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec										
									effective	bone	effective	bone					
4.18E-03	U-234	mRem/pCi	D-bone	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi					
3.88E-03	U-235	mRem/pCi	D-bone	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03					
3.96E-03	U-236	mRem/pCi	D-bone	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03					
3.74E-03	U-238	mRem/pCi	D-bone					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03					
2.23E-07	Tc-99	mRem/pCi	D-bone					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03					
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07					
12	hrs	transit time	t-p	reg guide 1	table E-15												
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ									
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10									
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13			Part 20 table 2		soluble forms				
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12			Dose Conversion						
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14				uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi
				TC-99		2.13E+05	1.87E+09	3.71E-10			U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
0.9999999961	U-234	exp(-λt-p)									U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.0000000000	U-235	exp(-λt-p)									U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.0000000000	U-236	exp(-λt-p)									U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.0000000000	U-238	exp(-λt-p)									Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06
0.9999999955	Tc-99	exp(-λt-p)															
											ICRP 69	Comparison					
Annual Release rate																	
5.2026E-03	**total uranium(Ci)**	**Q**		summation of liquid effluent alpha activity for 2012 **(see Total Liq tab)**								Sv/Bq	Rem/Bq	mRem/pCi			
				% of activity based on current nominal uranium isotopic **(see U activity tab)**													
4.4279E-03	U-234 release fraction	Ci		URANIUM234	85.11%						adult	5.00E-08	0.005	1.85E-04			
1.7117E-04	U-235 release fraction	Ci		URANIUM235	3.29%						infant	3.70E-07	0.037	1.37E-03			
7.8039E-06	U-236 release fraction	Ci		URANIUM236	0.15%						bone-adult	7.90E-07	0.079	2.92E-03			
5.9622E-04	U-238 release fraction	Ci		URANIUM238	11.46%												
9.2469E-03	Tc-99 release fraction	Ci		TC-99													
check U sum	0.00520																
1.85E-05	U-234	release fraction *dose factor*exp(-λ*tp)															
6.65E-07	U-235	release fraction *dose factor*exp(-λ*tp)															
3.09E-08	U-236	release fraction *dose factor*exp(-λ*tp)															
2.23E-06	U-238	release fraction *dose factor*exp(-λ*tp)															
2.07E-09	Tc-99	release fraction *dose factor*exp(-λ*tp)															
2.14E-05	all nuclides	sum of nuclides															
85.53473	usage	1100*(usage*dilution)/flow															
1.83E-03	**mRem/yr**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.															

Total Dose from Liquid Effluent Pathways - Aquatic Foods																		
		Whole Body																
21	Kg	Usage by adult	U	see regulatory guide 1.109 page 1.109-40 table E-5, Recommended Values for U(ap)														
31293	mixing - dilution	Dilution at difuser	M	Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985									
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec											
									effective	bone	effective	bone						
2.83E-04	U-234	mRem/pCi	D	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi						
2.66E-04	U-235	mRem/pCi	D	FRG no 11 1988				U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03						
2.69E-04	U-236	mRem/pCi	D	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03						
2.55E-04	U-238	mRem/pCi	D					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03						
1.46E-06	Tc-99	mRem/pCi	D					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03						
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07						
24	hrs	transit time	t-p	reg guide 1table E-15														
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ				for comaprison only						
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10										
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13										
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12				Part 20 table 2		soluble forms				
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14				Dose Conversion						
				TC-99		2.13E+05	1.87E+09	3.71E-10					uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi
0.99999999223	U-234	exp(-λt-p)										U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.00000000000	U-235	exp(-λt-p)										U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
0.99999999992	U-236	exp(-λt-p)										U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.00000000000	U-238	exp(-λt-p)										U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
0.99999999109	Tc-99	exp(-λt-p)										Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06
Annual Release rate												ICRP 69	Comparison					
5.2026E-03	**total uranium(Ci)**	**Q**	summation of liquid effluent alpha activity for 2012 **(see Total Liq tab)**															
			% of activity based on current nominal uranium isotopic **(see U activity tab)**										Sv/Bq	Rem/Bq	mRem/pCi			
4.4279E-03	U-234 release fraction	Ci	URANIUM234	85.11%														
1.7117E-04	U-235 release fraction	Ci	URANIUM235	3.29%								adult	5.00E-08	0.005	1.85E-04			
7.8039E-06	U-236 release fraction	Ci	URANIUM236	0.15%								infant	3.70E-07	0.037	1.37E-03			
5.9622E-04	U-238 release fraction	Ci	URANIUM238	11.46%								bone-adult	7.90E-07	0.079	2.92E-03			
9.2469E-03	Tc-99 release fraction	Ci	TC-99															
check U sum	0.00520																	
							bioaccumulation factor			BNWL-2075								
2.51E-06	U-234	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2			UC-11								
9.11E-08	U-235	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2			Methodology for Calculation of Radiation Doses								
4.19E-09	U-236	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2			in the Environs from Nuclear Fuel								
3.04E-07	U-238	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2			Cycle Facilities								
2.03E-07	Tc-99	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					15											
3.11E-06	all nuclides	sum of nuclides																
2.46059	usage	1100*(usage*dilution)/flow																
7.66E-06	**mRem/yr**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.																

Dose to the Bone Surface from Liquid Effluent Pathways - Aquatic Foods

Bone Surface

21	Kg	Usage by adult	U	see regulatory guide 1.109 page 1.109-40 table E-5, Recommended Values for U(ap)																
31293	mixing - dilution	Dilution at difuser	M	Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985											
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec													
									effective	bone	effective	bone								
4.18E-03	U-234	mRem/pCi	D	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi								
3.88E-03	U-235	mRem/pCi	D	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03								
3.96E-03	U-236	mRem/pCi	D	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03								
3.74E-03	U-238	mRem/pCi	D					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03								
2.23E-07	Tc-99	mRem/pCi	D					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03								
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07								
24	hrs	transit time	t-p	reg guide 1.109	table E-15															
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ				for comaprison only								
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10												
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13				Part 20 table 2		soluble forms						
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12				Dose Conversion								
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14					uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi		
				TC-99		2.13E+05	1.87E+09	3.71E-10				U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04		
0.99999999223	U-234	exp(-λt-p)										U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04		
1.00000000000	U-235	exp(-λt-p)										U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04		
0.99999999992	U-236	exp(-λt-p)										U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04		
1.00000000000	U-238	exp(-λt-p)										Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06		
0.99999999109	Tc-99	exp(-λt-p)																		
												ICRP 69	Comparison							
Annual Release rate													Sv/Bq	Rem/Bq	mRem/pCi					
5.2026E-03	**total uranium(C**	**Q**		summation of liquid effluent alpha activity for 2012 **(see Total Liq tab)**																
				% of activity based on current nominal uranium isotopic **(see U activity tab)**																
4.4279E-03	U-234 release fra	Ci		URANIUM234	85.11%							adult	5.00E-08	0.005	1.85E-04					
1.7117E-04	U-235 release fra	Ci		URANIUM235	3.29%							infant	3.70E-07	0.037	1.37E-03					
7.8039E-06	U-236 release fra	Ci		URANIUM236	0.15%							bone-adult	7.90E-07	0.079	2.92E-03					
5.9622E-04	U-238 release fra	Ci		URANIUM238	11.46%															
9.2469E-03	Tc-99 release fra	Ci		TC-99																
check U sum	0.00520																			
							bioaccumulation factor		BNWL-2075											
3.70E-05	U-234	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		UC-11											
1.33E-06	U-235	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		Methodology for Calculation of Radiation Doses											
6.18E-08	U-236	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		in the Environs from Nuclear Fuel											
4.46E-06	U-238	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		Cycle Facilities											
3.10E-08	Tc-99	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					15													
4.29E-05	all nuclides	sum of nuclides																		
2.46059	usage	1100*(usage*dilution)/flow																		
1.06E-04	**mRem/yr**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.																		

Total Dose from Liquid Effluent Pathways - Shoreline Deposits															
		Whole Body													
12	hr	Usage by adult	U	see regulatory guide 1.109 page 1.109-40 table E-5, Recommended Values for U(ap)											
31293	mixing - dilution	Dilution at difuser	M												
				Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 19						
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec								
					Sv/s:Bq/m^2	mrem/hr:pCi/m^2									
9.86E-12	U-234	mRem*m^2/pCi*hr	D	U-234	7.40E-19	9.86E-12	EPA FRG 12		Dose Coeff for exposure to contaminated ground surface						
1.97E-09	U-235	mRem*m^2/pCi*hr	D	U-235	1.48E-16	1.97E-09									
8.66E-12	U-236	mRem*m^2/pCi*hr	D	U-236	6.50E-19	8.66E-12									
7.34E-12	U-238	mRem*m^2/pCi*hr	D	U-238	5.51E-19	7.34E-12									
1.04E-12	Tc-99	mRem*m^2/pCi*hr	D	Tc-99	7.80E-20	1.04E-12									
12	hrs	transit time	t-p	see regulatory guide 1.109 page 1.109-69 table E-15, Recommended Values ...									t-i		
131040	hrs	xposure time of sedime	t-b	page 1.109-68			Nuclide		T(1/2) yr	T(1/2) hr	λ	T(1/2) day			
3.23557E-10	U-234	decay const	λ				URANIUM234		2.45E+05	2.14E+09	3.24E-10	8.90E+07			
1.12404E-13	U-235	decay const	λ				URANIUM235		7.04E+08	6.17E+12	1.12E-13	2.56E+11			
3.38075E-12	U-236	decay const	λ				URANIUM236		2.34E+07	2.05E+11	3.38E-12	8.52E+09			
1.77058E-14	U-238	decay const	λ				URANIUM238		4.47E+09	3.91E+13	1.77E-14	1.63E+12			
3.71407E-10	Tc-99	decay const	λ				TC-99		2.13E+05	1.87E+09	3.71E-10	7.75E+07			
0.0000423980	U-234	exp(-λt-p)*[1-exp(-λt-b)]													
0.0000000147	U-235	exp(-λt-p)*[1-exp(-λt-b)]													
0.0000004430	U-236	exp(-λt-p)*[1-exp(-λt-b)]													
0.0000000023	U-238	exp(-λt-p)*[1-exp(-λt-b)]													
0.0000486679	Tc-99	exp(-λt-p)*[1-exp(-λt-b)]													
Annual Release rate															
5.2026E-03	**total uranium(Ci)**	**Q**	summation of liquid effluent alpha activity for 2012(**see Total Liq tab**)												
			% of activity based on current nominal uranium isotopic(**see U activity tab**)												
4.4279E-03	U-234 release fraction	Ci	URANIUM234	85.11%											
1.7117E-04	U-235 release fraction	Ci	URANIUM235	3.29%											
7.8039E-06	U-236 release fraction	Ci	URANIUM236	0.15%											
5.9622E-04	U-238 release fraction	Ci	URANIUM238	11.46%											
9.2469E-03	Tc-99 release fraction	Ci	TC-99												
check U sum	0.00520														
1.65E-10	U-234	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
1.27E-09	U-235	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
2.55E-13	U-236	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
1.65E-11	U-238	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
3.63E-11	Tc-99	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
1.49E-09	all nuclides	sum of nuclides													
2.812101	usage	11000*(usage*dilution*shore width factor)/flow		see regulatory guide 1.109 page 1.109-40 table A-2,Shore width...											
4.19E-09	**mRem/yr**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.													

2013 Isotopic Fractions

Based on measured isotopics of pellets produced in 2013

Nuclide	Average wt%	Specific Activity Ci/g	Weighted Activity	% Activity
U-234	0.038	6.220E-03	2.388E-04	85.11
U-235	4.270	2.160E-06	9.223E-06	3.29
U-236	0.006	6.470E-05	4.076E-07	0.15
U-238	95.685	3.360E-07	3.215E-05	11.46
Total	100.000		2.806E-04	100.000

Attachment F

Westinghouse Electric Company
Nuclear Fuel
Columbia Fuel Site
5801 Bluff Rd
Hopkins, South Carolina 29061
USA

To: Cynthia Logsdon

Direct tel: 803-647-1919
Direct fax: 803-695-4158
e-mail: wagoneda@westinghouse.com

Your ref:
Our ref: LTR-EHS-15-14

Cc: John Howell, Carl Snyder, Nancy Parr, Anna Pearson, Sherrie Culler

February 23, 2015

Annual Assessment of Public Dose from Liquid and Gaseous Effluents

Effluents released from plant operations are monitored to determine the quantities of radionuclides discharged into the environment. The cumulative radioactivity released is summarized semi-annually and annually and input into dose models developed by the NRC and EPA to estimate the dose to the public.

The whole body and organ dose via the following pathways were determined in this assessment:

- Dose due to Gaseous Effluents by Direct Inhalation
  - The whole body dose was estimated using the EPA's COMPLY Code at level 2 complexity. The organ dose was estimated using the calculated X/Q factor for stack number 1247, the measured release quantity, and the dose conversion factors from Federal Guidance Report No 11, "Limiting Values of Radionuclide Intake and Air concentration Factors for Inhalation, Submersion, and Ingestion" (FGR 11).
- Dose due to Liquid Effluents by Ingestion of Potable Water
  - Estimated using equations and recommended values in Regulatory Guide 1.109, Doses from Liquid Effluent Pathways (RG1.109). Dose conversion factors were taken from FGR 11.
- Dose due to Liquid Effluents by Ingestion of Fish
  - Estimated using equations and recommended values in RG 1.109. Dose conversion factors were taken from FGR 11.
- Dose due to Liquid Effluents by Irradiation from Shoreline Deposition
  - Estimated using equations and recommended values in RG 1.109. Dose conversion factors were taken from Federal Guidance report No 12, "External Exposure to Radionuclides in Air, Water, and Soil"

The inhalation dose is determined at the nearest site boundary at a distance of 595 meters. The ingestion dose from liquid effluent and external dose from sediment deposition is determined at the point where the liquid effluent leaves the diffuser in the Congaree River.

Westinghouse Electric Company
Nuclear Fuel
Columbia Fuel Site
5801 Bluff Rd
Hopkins, South Carolina 29061
USA

The release rates for gaseous effluent are determined by gross alpha measurements performed on daily air samples, one per stack for 47 stacks (Attachment 1). The release rates for liquid effluent are determined by isotopic analysis of liquid effluent samples taken monthly (Attachment 3). Based on these results, the following quantities were released in calendar year 2014:

- 394.9 μCi of Uranium in gaseous effluent
- 3.8 mCi of Uranium in liquid effluent
- 10.1 mCi of Technetium in liquid effluent

Using these results and the methods previously mentioned the whole body dose, dose to the bone, and dose to the lung were determined for an individual present at the nearest site boundary. Table 1 provides a summary of the results for each pathway. The gaseous and liquid effluents released during 2014 resulted in a potential whole body dose of 0.16 mrem and a lung dose of 1.4 mrem to an individual present at the nearest site boundary. The dose to the bone is negligible. These doses are well below the 25 mrem annual dose limit and the 10 mrem annual ALARA limit for a member of the public.

Table 1. 2014 Annual Dose to the Public from Liquid and Gaseous Effluents

	Whole Body Dose (mrem/yr)	**Organ Dose - Bone (mrem/yr)**	**Organ Dose - Lung (mrem/yr)**
Gaseous Effluents			
Direct inhalation*	0.16	5.3E-03	1.4
Liquid Effluents			
Potable Water	9.2E-05	1.3E-03	-
Aquatic Food (Fish)	5.7E-06	7.7E-05	-
Shoreline Deposition	3.1E-09	-	-
Total (mrem)	*0.16*	*6.7E-03*	*1.4*

* Assumes 80 % residence time

There were no significant changes in source material, chemical form, or release points during 2014. The attachments below illustrate the method used to calculate each result listed in Table 1.

Westinghouse Electric Company
Nuclear Fuel
Columbia Fuel Site
5801 Bluff Rd
Hopkins, South Carolina 29061
USA

Attachment 1:	2014 Gaseous Effluent Discharges
Attachment 2:	Lung/Bone Organ Dose due to Gaseous Effluent
Attachment 3:	2014 Liquid Effluent Discharges
Attachment 4:	Whole Body Dose from Liquid Effluent Pathways - Potable Water
Attachment 5:	Dose to the Bone Surface from Liquid Effluent Pathways - Potable Water
Attachment 6:	Whole Body Dose from Liquid Effluent Pathways - Aquatic Foods
Attachment 7:	Dose to the Bone Surface from Liquid Effluent Pathways - Aquatic Foods
Attachment 8:	Whole Body Dose from Liquid Effluent Pathways – Shoreline Deposits
Attachment 9:	2014 Isotopic Fractions
Attachment 10:	Comply Results

David Wagoner
Radiation Safety Engineer
EH&S Operations

Review by: Anna Pearson
Manager, RSO
EH&S Operations

Attachment 1
2014 Gaseous Effluent Discharges

Sampling Station	Location Description	Stack Height (m)	Flow Rate (m/s)	1st half (Jan-Jun) uCi Uranium Released	2nd half (Jul-Dec) uCi Uranium Released	Total uCi Released*	Release Rate (Ci/s) U234	U235	U238
1207	MET LAB EXHAUST	10	0.56	1.69	3.84	5.53	1.49E-13	5.77E-15	2.01E-14
1238	IFBA EXHAUST	10	4.72	6.03	6.10	12.13	3.27E-13	1.27E-14	4.41E-14
1239	MAINT WELD EX	11	0.94	3.22	4.47	7.69	2.08E-13	8.02E-15	2.79E-14
1243	AC-8	11	3.78	5.20	6.32	11.52	3.11E-13	1.20E-14	4.19E-14
1222	CALC COMB GAS LN 1	12	0.16	0.68	0.73	1.41	3.81E-14	1.47E-15	5.12E-15
1223	CALC COMB GAS LN 2	12	0.16	0.97	1.89	2.86	7.72E-14	2.98E-15	1.04E-14
1224	CALC COMB GAS LN 3	12	0.16	0.35	0.59	0.94	2.54E-14	9.81E-16	3.42E-15
1225	CALC COMB GAS LN 4	12	0.16	0.36	0.58	0.94	2.54E-14	9.81E-16	3.42E-15
1226	CALC COMB GAS LN 5	12	0.16	0.41	0.78	1.19	3.21E-14	1.24E-15	4.32E-15
1228	CHEM LAB EX #3	12	0.64	1.93	0.53	2.46	6.64E-14	2.57E-15	8.94E-15
1231	DEV LAB EX #2	12	0.94	3.77	6.40	10.17	2.74E-13	1.06E-14	3.70E-14
1237	ABF HOOD TORIT EX	12	1.42	1.86	1.97	3.83	1.03E-13	4.00E-15	1.39E-14
1241	PELLET LINE 6	12	2.78	3.51	3.72	7.23	1.95E-13	7.54E-15	2.63E-14
1247	HOT OIL RM EX	12	3.89	28.48	14.77	43.25	1.17E-12	4.51E-14	1.57E-13
1201	FURNACE EX LINE 1	13	2.78	3.48	3.58	7.06	1.91E-13	7.37E-15	2.57E-14
1202	FURNACE EX LINE 2	13	2.78	3.45	3.66	7.11	1.92E-13	7.42E-15	2.58E-14
1203	FURNACE EX LINE 3	13	2.78	3.45	3.53	6.98	1.88E-13	7.28E-15	2.54E-14
1204	FURNACE EX LINE 4	13	2.78	3.45	3.58	7.03	1.90E-13	7.33E-15	2.55E-14
1205	FURNACE EX LINE 5	13	2.78	3.45	3.53	6.98	1.88E-13	7.28E-15	2.54E-14
1206	NEW DECON ROOM	13	1.64	14.53	2.61	17.14	4.63E-13	1.79E-14	6.23E-14
1208	INCINERATOR EX	13	1.89	5.24	6.07	11.31	3.05E-13	1.18E-14	4.11E-14
1209	SUPPL INCIN EX	13	0.94	1.19	1.40	2.59	6.99E-14	2.70E-15	9.41E-15
1216	MAINT ENCL EX 4-B	13	3.89	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
1217	CONV ENCL EX 4-C	13	3.89	6.11	9.53	15.64	4.22E-13	1.63E-14	5.68E-14
1218	CONV ENCL EX 4-D	13	3.89	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
1219	CONV EMERG EX 4E	13	3.89	0.76	1.34	2.10	5.67E-14	2.19E-15	7.63E-15
1221	DECON ROOM EX	13	1.42	5.35	12.14	17.49	4.72E-13	1.82E-14	6.36E-14
1230	DEV LAB EX #1	13	0.94	2.57	4.56	7.13	1.92E-13	7.44E-15	2.59E-14
1232	PELLET COMBINED EX	13	4.72	6.45	6.18	12.63	3.41E-13	1.32E-14	4.59E-14
1233	SOLVENT EXT N EX	13	3.33	3.95	4.60	8.55	2.31E-13	8.92E-15	3.11E-14
1234	SOLVENT EXT S EX	13	3.33	1.82	2.94	4.76	1.28E-13	4.97E-15	1.73E-14
1229	HP LAB EX	15	0.58	0.85	0.97	1.82	4.91E-14	1.90E-15	6.61E-15
1236	MAP COMBINED	15	2.78	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
1240	AC-3	15	3.78	4.98	5.38	10.36	2.80E-13	1.08E-14	3.76E-14
1246	AC-4	15	3.89	5.48	5.26	10.74	2.90E-13	1.12E-14	3.90E-14
1210	CONV 1-A EX	16	4.17	6.59	5.73	12.32	3.32E-13	1.29E-14	4.48E-14
1211	CONV 1-B EX	16	4.17	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
1212	S1030 A	16	7.56	13.10	21.09	34.19	9.23E-13	3.57E-14	1.24E-13
1213	S1030 B	16	7.56	1.59	2.87	4.46	1.20E-13	4.65E-15	1.62E-14
1227	CHEM LAB EX #2	16	0.58	2.24	3.41	5.65	1.52E-13	5.89E-15	2.05E-14
1220	CHEM LAB FILT EX	17	5.56	7.61	9.10	16.71	4.51E-13	1.74E-14	6.07E-14
1242	AC-5	17	3.78	4.75	4.75	9.50	2.56E-13	9.91E-15	3.45E-14
1244	AMMON FUME SCR 1008A	17	1.89	2.89	2.94	5.83	1.57E-13	6.08E-15	2.12E-14
1245	AMMON FUME SCR 1008B	17	1.89	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
1248	ERBIA FURNACE EX	18	8.17	10.19	10.59	20.78	5.61E-13	2.17E-14	7.55E-14
1249	ERBIA SCRUBBER EX	18	4.33	5.56	5.58	11.14	3.01E-13	1.16E-14	4.05E-14
1250	ERBIA CHANGE ROOM	18	1.90	2.76	2.95	5.71	1.54E-13	5.96E-15	2.07E-14
	Total			***192.30***	***202.56***	***394.86***	***1.07E-11***	***4.12E-13***	***1.43E-12***

Total offside dose calculated by Comply (mrem/y) = 0.20
Assume 80% residence time (mrem/y) = 0.16

*Concentration LLD is 8E-14 uCi/mL

Attachment 2

Lung/Bone Organ Dose due to Gaseous Effluents								
	1st half (Jan-Jun)	**2nd half (Jul-Dec)**	**Total**	**EPA**				
STACK IDENTIFICATION	**uCi Uranium**	**uCi Uranium**	**uCi released**	**Comply Run Results**				
Hot Oil Room Ex	**28.48**	**14.77**	**43.25**	**Dose (mrem/yr)**	**2.30E-02**			
use highest release for year to calculate X/Q used by COMPLY				Stack height (m)	12			
				Release Rate (Ci/s)	U-234	U-235	U-238	
Dose from comply	0.02300	mrem/yr			1.17E-12	4.51E-14	1.57E-13	
release quantity	43.25	uCi/yr						
Inhalation from RG1.109	4.33E-05	Ci/yr						
App E table E-5	8000.00	m3/yr						
Effective Dose conversion								
EPA FGR 11 p150-151								
U-234	3.58E-05	Sv/Bq	85%					
U-235	3.32E-05	Sv/Bq	3%					
U-238	3.20E-05	Sv/Bq	11%					
weighted dose conversion	3.52E-05	Sv/Bq						
conversion factor	3700.00	mrem/pCi= factor* Sv/Bq						
weighted dose conversion	0.1303	mrem/pCi						
			equations					
Dose (mrem/yr) = R(a)*3.17e4*Q*(X/Q)*effective Dose conversion			see RG1.109-25					
Dose (mrem/yr)/(R(a)*3.17e4*Q*effective Dose conversion)=(X/Q)								
	1.61E-05	X/Q						
Estimate Lung Dose using X/Q and total released for 2014				Estimate Bone Dose using X/Q and total released for 2014				
App E table E-5								
Lung Organ Dose conversion								
EPA FGR 11 p150-151								
U-234	2.98E-04	Sv/Bq	85%	1.13E-06	Sv/Bq			
U-235	2.76E-04	Sv/Bq	3%	1.05E-06	Sv/Bq			
U-238	2.66E-04	Sv/Bq	11%	1.01E-06	Sv/Bq			
weighted dose conversion	2.93E-04	Sv/Bq		1.11E-06	Sv/Bq			
conversion factor	3700.00	mrem/pCi= factor* Sv/Bq		3700.00	mrem/pCi= factor* Sv/Bq			
weighted dose conversion	1.0847	mrem/pCi		4.11E-03	mrem/pCi			
release quantity	394.86	uCi/yr		394.86	uCi/yr			
	3.95E-04	Ci/yr		3.95E-04	Ci/yr			
Lung *	**1.40**	**mrem/yr**	**Bone ***	**5.30E-03**	**mrem/yr**			
*assume 80% residence								

2014

Attachment 3 - 2014 Liquid Effluent Discharges

	Liquid Effluent Discharges			Isotopic Uranium Measured Concentrations							Tc-99 Measured Concentrations		Sum U & Tc-99		Total uCi/month Released (based on monthly GEL discharge samples)			
Month	Average kgal/day	Actual kgal/month	Actual gal/month	U234 piC/L	U234 uCi/ml E-06	U235 piC/L	U235 uCi/ml E-06	U238 piC/L	U238 uCi/ml E-06	SUM ISO U uCi/ml E-06	Tc-99 piC/L	Tc-99 uCi/ml E-06	Sum U & Tc-99 uCi/ml E-06		U234	U-235	U-238	Tc-99
JAN	103.928	2806.060	2,806,060	23.9	0.024	0.890	0.001	3.29	0.003	0.028	69.2	0.069	0.097	JAN	291.446	10.853	40.120	843.852
FEB	113.506	2951.150	2,951,150	29.0	0.029	1.73	0.002	4.37	0.004	0.0351	145	0.145	0.180	FEB	348.852	20.811	52.568	1744.258
MAR	119.329	3699.200	3,699,200	21.1	0.021	0.865	0.001	2.44	0.002	0.024405	39.0	0.039	0.063	MAR	295.431	12.111	34.164	546.057
APR	84.031	2352.880	2,352,880	27.9	0.028	1.25	0.001	4.40	0.004	0.03355	34.0	0.034	0.068	APR	266.214	11.927	41.984	324.418
MAY	97.970	2253.310	2,253,310	27.6	0.028	0.539	0.001	3.34	0.003	0.031479	51.6	0.052	0.083	MAY	317.271	6.196	38.394	593.158
JUNE	100.426	3012.780	3,012,780	13.0	0.013	0.899	0.001	2.38	0.002	0.016279	109	0.109	0.125	JUNE	148.244	10.252	27.140	1242.968
JUL	102.678	2874.970	2,874,970	24.1	0.024	0.731	0.001	3.94	0.004	0.029	123.0	0.123	0.152	JUL	290.349	8.807	47.468	1481.863
AUG	110.894	3326.821	3,326,821	20.4	0.020	0.54	0.001	2.77	0.003	0.023709	27	0.027	0.051	AUG	265.440	7.013	36.043	348.715
SEP	102.726	2876.324	2,876,324	24.5	0.025	1.030	0.001	4.33	0.004	0.02986	0.0	0.000	0.030	SEP	285.781	12.014	50.507	0.000
OCT	87.940	2374.378	2,374,378	26.9	0.027	1.08	0.001	2.90	0.003	0.03088	0.0	0.000	0.031	OCT	277.566	11.144	29.923	0.000
NOV	87.694	2367.746	2,367,746	22.6	0.023	0.997	0.001	3.10	0.003	0.026697	146.0	0.146	0.173	NOV	225.044	9.928	30.869	1453.822
DEC	128.606	3215.145	3,215,145	13.6	0.014	0.823	0.001	1.87	0.002	0.016293	103	0.103	0.119	DEC	205.223	12.419	28.218	1554.266
Total (Jan-Dec)		34110.764	34,110,764												3216.859	133.475	457.398	10133.377
Liters (L)			1.29E+08												3807.7 uCi Uranium			10133.377
Milliliters (ml)			1.29E+11												13941.1 uCi Uranium & Tc-99			

Attachment 4

Whole Body Dose from Liquid Effluent Pathways - Potable Water																				
		Whole Body-Ingestion																		
730	liters	Usage by adult/yr	U	10CFR20	7.3 x 10^5 (ml) which is the annual water intake of "Reference Man."															
31293	mixing - dilution	Dilution at difuser	M																	
				Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985											
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec													
									effective	bone	effective	bone								
2.83E-04	U-234	mRem/pCi	D	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi								
2.66E-04	U-235	mRem/pCi	D	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03								
2.69E-04	U-236	mRem/pCi	D	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03								
2.55E-04	U-238	mRem/pCi	D					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03								
1.46E-06	Tc-99	mRem/pCi	D					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03								
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07								
12	hrs	transit time	t-p	reg guide 1.109	table E-15															
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ												
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10												
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13												
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12			for comaprison only									
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14												
				TC-99		2.13E+05	1.87E+09	3.71E-10			Part 20 table 2		soluble forms							
0.9999999961	U-234	exp(-λt-p)									Dose Conversion									
1.0000000000	U-235	exp(-λt-p)										uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi			
1.0000000000	U-236	exp(-λt-p)									U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04			
1.0000000000	U-238	exp(-λt-p)									U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04			
0.9999999955	Tc-99	exp(-λt-p)									U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04			
											U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04			
Activity Released											Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06			
3.8077E-03	**total uranium(Ci)**	Q		summation of liquid effluent alpha activity																
				% of activity based on current nominal uranium isotopic **(see U activity tab)**							ICRP 69	Comparison								
3.2407E-03	U-234 release fraction	Ci		URANIUM234	85.11%	0.8511						Sv/Bq	Rem/Bq	mRem/pCi						
1.2527E-04	U-235 release fraction	Ci		URANIUM235	3.29%	0.0329														
5.7116E-06	U-236 release fraction	Ci		URANIUM236	0.15%	0.0015														
4.3636E-04	U-238 release fraction	Ci		URANIUM238	11.46%	0.1146					adult	5.00E-08	0.005	1.85E-04						
1.0133E-02	Tc-99 release fraction	Ci		TC-99							infant	3.70E-07	0.037	1.37E-03						
											bone-adult	7.90E-07	0.079	2.92E-03						
check U sum	0.00381																			
9.18E-07	U-234	release fraction *dose factor*exp(-λ*tp)																		
3.33E-08	U-235	release fraction *dose factor*exp(-λ*tp)																		
1.53E-09	U-236	release fraction *dose factor*exp(-λ*tp)																		
1.11E-07	U-238	release fraction *dose factor*exp(-λ*tp)																		
1.48E-08	Tc-99	release fraction *dose factor*exp(-λ*tp)																		
1.08E-06	all nuclides	sum of nuclides																		
85.53473	usage	1100*(usage*dilution)/flow																		
9.23E-05	**mRem**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.																		

Attachment 5

Dose to the Bone Surface from Liquid Effluent Pathways - Potable Water																	
		Bone Surface-Ingestion															
730	liters	Usage by adult/yr	U	10CFR20	7.3 x 10^5 (ml) which is the annual water intake of "Reference Man."												
31293	mixing - dilution	Dilution at difuser	M														
				Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985								
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec										
									effective	bone	effective	bone					
4.18E-03	U-234	mRem/pCi	D-bone	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi					
3.88E-03	U-235	mRem/pCi	D-bone	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03					
3.96E-03	U-236	mRem/pCi	D-bone	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03					
3.74E-03	U-238	mRem/pCi	D-bone					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03					
2.23E-07	Tc-99	mRem/pCi	D-bone					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03					
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07					
12	hrs	transit time	t-p	reg guide 1	table E-15												
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ									
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10									
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13			Part 20 table 2		soluble forms				
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12			Dose Conversion						
3.71E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14				uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi
				TC-99		2.13E+05	1.87E+09	3.71E-10			U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
0.9999999961	U-234	exp(-λt-p)									U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.0000000000	U-235	exp(-λt-p)									U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.0000000000	U-236	exp(-λt-p)									U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.0000000000	U-238	exp(-λt-p)									Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06
0.9999999955	Tc-99	exp(-λt-p)															
											ICRP 69	Comparison					
Activity Released																	
3.8077E-03	**total uranium(Ci)**	**Q**	summation of liquid effluent alpha activity									Sv/Bq	Rem/Bq	mRem/pCi			
			% of activity based on current nominal uranium isotopic **(see U activity tab)**														
3.2407E-03	U-234 release fraction	Ci	URANIUM234	85.11%	0.8511						adult	5.00E-08	0.005	1.85E-04			
1.2527E-04	U-235 release fraction	Ci	URANIUM235	3.29%	0.0329						infant	3.70E-07	0.037	1.37E-03			
5.7116E-06	U-236 release fraction	Ci	URANIUM236	0.15%	0.0015						bone-adult	7.90E-07	0.079	2.92E-03			
4.3636E-04	U-238 release fraction	Ci	URANIUM238	11.46%	0.1146												
1.0133E-02	Tc-99 release fraction	Ci	TC-99														
check U sum	0.00381																
1.35E-05	U-234	release fraction *dose factor*exp(-λ*tp)															
4.87E-07	U-235	release fraction *dose factor*exp(-λ*tp)															
2.26E-08	U-236	release fraction *dose factor*exp(-λ*tp)															
1.63E-06	U-238	release fraction *dose factor*exp(-λ*tp)															
2.26E-09	Tc-99	release fraction *dose factor*exp(-λ*tp)															
1.57E-05	all nuclides	sum of nuclides															
85.53473	usage	1100*(usage*dilution)/flow															
1.34E-03	**mRem**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.															

Attachment 6

Whole Body Dose from Liquid Effluent Pathways - Aquatic Foods																		
		Whole Body																
21	Kg	Usage by adult/yr	U	see regulatory guide 1.109 page 1.109-40 table E-5, Recommended Values for U(ap)														
31293	mixing - dilution	Dilution at difuser	M	Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985									
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec											
									effective	bone	effective	bone						
2.83E-04	U-234	mRem/pCi	D	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi						
2.66E-04	U-235	mRem/pCi	D	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03						
2.69E-04	U-236	mRem/pCi	D	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03						
2.55E-04	U-238	mRem/pCi	D					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03						
1.46E-06	Tc-99	mRem/pCi	D					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03						
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07						
24	hrs	transit time	t-p	reg guide 1	table E-15													
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ										
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10				for comaprison only						
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13										
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12				Part 20 table 2		soluble forms				
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14				Dose Conversion						
				TC-99		2.13E+05	1.87E+09	3.71E-10					uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi
0.99999999223	U-234	exp(-λt-p)										U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.00000000000	U-235	exp(-λt-p)										U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
0.99999999992	U-236	exp(-λt-p)										U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.00000000000	U-238	exp(-λt-p)										U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
0.99999999109	Tc-99	exp(-λt-p)										Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06
Activity Released												ICRP 69	Comparison					
3.8077E-03	**total uranium(Ci)**	**Q**	summation of liquid effluent alpha activity										Sv/Bq	Rem/Bq	mRem/pCi			
			% of activity based on current nominal uranium isotopic **(see U activity tab)**															
3.2407E-03	U-234 release fraction	Ci	URANIUM234	85.11%	0.8511							adult	5.00E-08	0.005	1.85E-04			
1.2527E-04	U-235 release fraction	Ci	URANIUM235	3.29%	0.0329							infant	3.70E-07	0.037	1.37E-03			
5.7116E-06	U-236 release fraction	Ci	URANIUM236	0.15%	0.0015							bone-adult	7.90E-07	0.079	2.92E-03			
4.3636E-04	U-238 release fraction	Ci	URANIUM238	11.46%	0.1146													
1.0133E-02	Tc-99 release fraction	Ci	TC-99															
check U sum	0.00381																	
							bioaccumulation factor		BNWL-2075									
1.84E-06	U-234	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		UC-11									
6.67E-08	U-235	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		Methodology for Calculation of Radiation Doses									
3.07E-09	U-236	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		in the Environs from Nuclear Fuel									
2.22E-07	U-238	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		Cycle Facilities									
2.22E-07	Tc-99	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					15											
2.35E-06	all nuclides	sum of nuclides																
2.46059	usage	1100*(usage*dilution)/flow																
5.78E-06	**mRem**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.																

Attachment 7

Dose to the Bone Surface from Liquid Effluent Pathways - Aquatic Foods																						
	Bone Surface																					
21	Kg	Usage by adult/yr	U	see regulatory guide 1.109 page 1.109-40 table E-5, Recommended Values for U(ap)																		
31293	mixing - dilution	Dilution at difuser	M	Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985													
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec															
									effective	bone	effective	bone										
4.18E-03	U-234	mRem/pCi	D	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi										
3.88E-03	U-235	mRem/pCi	D	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03										
3.96E-03	U-236	mRem/pCi	D	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03										
3.74E-03	U-238	mRem/pCi	D					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03										
2.23E-07	Tc-99	mRem/pCi	D					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03										
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07										
24	hrs	transit time	t-p	reg guide 1.109	table E-15																	
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ				for comaprison only										
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10														
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13				Part 20 table 2		soluble forms								
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12				Dose Conversion										
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14					uCi/ml	milliliters	uCi	pCi	mRem	mRem/pCi				
				TC-99		2.13E+05	1.87E+09	3.71E-10				U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
0.99999999223	U-234	exp(-λt-p)										U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
1.00000000000	U-235	exp(-λt-p)										U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
0.99999999992	U-236	exp(-λt-p)										U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
1.00000000000	U-238	exp(-λt-p)										Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06				
0.99999999109	Tc-99	exp(-λt-p)																				
												ICRP 69	Comparison									
Activity Released													Sv/Bq	Rem/Bq	mRem/pCi							
3.8077E-03	**total uranium(C**	**Q**		summation of liquid effluent alpha activity																		
				% of activity based on current nominal uranium isotopic (see U activity tab)																		
3.2407E-03	U-234 release fra	Ci		URANIUM234	85.11%	0.8511						adult	5.00E-08	0.005	1.85E-04							
1.2527E-04	U-235 release fra	Ci		URANIUM235	3.29%	0.0329						infant	3.70E-07	0.037	1.37E-03							
5.7116E-06	U-236 release fra	Ci		URANIUM236	0.15%	0.0015						bone-adult	7.90E-07	0.079	2.92E-03							
4.3636E-04	U-238 release fra	Ci		URANIUM238	11.46%	0.1146																
1.0133E-02	Tc-99 release fra	Ci		TC-99																		
check U sum	0.00381																					
							bioaccumulation factor		BNWL-2075													
2.71E-05	U-234	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		UC-11													
9.73E-07	U-235	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		Methodology for Calculation of Radiation Doses													
4.52E-08	U-236	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		in the Environs from Nuclear Fuel													
3.26E-06	U-238	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		Cycle Facilities													
3.40E-08	Tc-99	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					15															
3.14E-05	all nuclides	sum of nuclides																				
2.46059	usage	1100*(usage*dilution)/flow																				
7.73E-05	**mRem**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.																				

Attachment 8

Whole Body Dose from Liquid Effluent Pathways - Shoreline Deposits																
		Whole Body														
12	hr	Usage by adult/yr	U	see regulatory guide 1.109 page 1.109-40 table E-5, Recommended Values for U(ap)												
31293	mixing - dilution	Dilution at difuser	M													
				Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 19							
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec									
					Sv/s:Bq/m^2	mrem/hr:pCi/m^2										
9.86E-12	U-234	mRem*m^2/pCi*hr	D	U-234	7.40E-19	9.86E-12	EPA FRG 12		Dose Coeff for exposure to contaminated ground surface							
1.97E-09	U-235	mRem*m^2/pCi*hr	D	U-235	1.48E-16	1.97E-09										
8.66E-12	U-236	mRem*m^2/pCi*hr	D	U-236	6.50E-19	8.66E-12										
7.34E-12	U-238	mRem*m^2/pCi*hr	D	U-238	5.51E-19	7.34E-12										
1.04E-12	Tc-99	mRem*m^2/pCi*hr	D	Tc-99	7.80E-20	1.04E-12										
12	hrs	transit time	t-p	see regulatory guide 1.109 page 1.109-69 table E-15, Recommended Values ...									t-i			
131040	hrs	xposure time of sedime	t-b	page 1.109-68			Nuclide		T(1/2) yr	T(1/2) hr	λ	T(1/2) day				
3.23557E-10	U-234	decay const	λ				URANIUM234		2.45E+05	2.14E+09	3.24E-10	8.90E+07				
1.12404E-13	U-235	decay const	λ				URANIUM235		7.04E+08	6.17E+12	1.12E-13	2.56E+11				
3.38075E-12	U-236	decay const	λ				URANIUM236		2.34E+07	2.05E+11	3.38E-12	8.52E+09				
1.77058E-14	U-238	decay const	λ				URANIUM238		4.47E+09	3.91E+13	1.77E-14	1.63E+12				
3.71407E-10	Tc-99	decay const	λ				TC-99		2.13E+05	1.87E+09	3.71E-10	7.75E+07				
0.0000423980	U-234	exp(-λt-p)*[1-exp(-λt-b)]														
0.0000000147	U-235	exp(-λt-p)*[1-exp(-λt-b)]														
0.0000004430	U-236	exp(-λt-p)*[1-exp(-λt-b)]														
0.0000000023	U-238	exp(-λt-p)*[1-exp(-λt-b)]														
0.0000486679	Tc-99	exp(-λt-p)*[1-exp(-λt-b)]														
Activity Released																
3.8077E-03	**total uranium(Ci)**	**Q**	summation of liquid effluent alpha activity													
			% of activity based on current nominal uranium isotopic **(see U activity tab)**													
3.2407E-03	U-234 release fraction	Ci	URANIUM234	85.11%	0.8511											
1.2527E-04	U-235 release fraction	Ci	URANIUM235	3.29%	0.0329											
5.7116E-06	U-236 release fraction	Ci	URANIUM236	0.15%	0.0015											
4.3636E-04	U-238 release fraction	Ci	URANIUM238	11.46%	0.1146											
1.0133E-02	Tc-99 release fraction	Ci	TC-99													
check U sum	0.00381															
1.21E-10	U-234	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i														
9.32E-10	U-235	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i														
1.87E-13	U-236	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i														
1.21E-11	U-238	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i														
3.97E-11	Tc-99	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i														
1.10E-09	all nuclides	sum of nuclides														
2.812101	usage	11000*(usage*dilution*shore width factor)/flow		see regulatory guide 1.109 page 1.109-40 table A-2,Shore width...												
3.11E-09	**mRem**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.														

Attachment 9

2014 Isotopic Fractions

Based on the plant nominal enrichment for 2014

Nuclide	Average wt%	Specific Activity Ci/g	Weighted Activity	% Activity
U-234	0.038	6.220E-03	2.388E-04	85.11
U-235	4.273	2.160E-06	9.230E-06	3.29
U-236	0.006	6.470E-05	4.076E-07	0.15
U-238	95.682	3.360E-07	3.215E-05	11.46
Total	100.000		2.806E-04	100.000

Attachment 10

COMPLY: V1.6. 2/20/2015 3:47

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH

THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

FROM THE COMPLY CODE - V1.6.

Prepared by:

Westinghouse Electric Company
Columbia Fuel Fabrication Facility
5801 Bluff Rd. Hopkins, SC 29061

David Wagoner
803.647.1919

Prepared for:

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Washington, DC 20460

2014 Annual Dose to the Public due to Gaseous Effluent

SCREENING LEVEL 2

DATA ENTERED:

RELEASE RATES FOR STACK 1.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	4.770E-13
U-235	Y	1.840E-14
U-238	Y	6.420E-14

RELEASE RATES FOR STACK 2.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	5.180E-13
U-235	Y	2.000E-14
U-238	Y	6.980E-14

RELEASE RATES FOR STACK 3.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	2.000E-12
U-235	Y	7.750E-14
U-238	Y	2.700E-13

RELEASE RATES FOR STACK 4.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	3.630E-12
U-235	Y	1.400E-13
U-238	Y	4.890E-13

RELEASE RATES FOR STACK 5.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	6.190E-13
U-235	Y	2.390E-14
U-238	Y	8.330E-14

RELEASE RATES FOR STACK 6.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	1.530E-12
U-235	Y	5.910E-14
U-238	Y	2.060E-13

RELEASE RATES FOR STACK 7.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	8.650E-13
U-235	Y	3.340E-14
U-238	Y	1.160E-13

RELEASE RATES FOR STACK 8.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	1.020E-12
U-235	Y	3.930E-14
U-238	Y	1.370E-13

SITE DATA FOR STACK 1.

Release height 10 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 2.

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 3.

Release height 12 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 4.

Release height 13 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 5.

Release height 15 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 6.

Release height 16 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 7.

Release height 17 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 8.

Release height 18 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

Default mean wind speed used (2.0 m/sec).

NOTES:

Input parameters outside the "normal" range:

Building (width) is unusually WIDE.
Receptor is unusually FAR.

RESULTS:

Effective dose equivalent: 0.2 mrem/yr.

*** Comply at level 2.

This facility is in COMPLIANCE.

It may or may not be EXEMPT from reporting to the EPA.

You may contact your regional EPA office for more information.

********** END OF COMPLIANCE REPORT **********

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH

THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

FROM THE COMPLY CODE - V1.6.

Prepared by:

Westinghouse Electric Company
Columbia Fuel Fabrication Facility
5801 Bluff Rd. Hopkins, SC 29061

David Wagoner
803.647.1919

Prepared for:

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Washington, DC 20460

Hot Oil Room Exhaust

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/SECOND)
U-234	Y	1.170E-12
U-235	Y	4.510E-14
U-238	Y	1.570E-13

Release height 12 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

Default mean wind speed used (2.0 m/sec).

NOTES:

Input parameters outside the "normal" range:

Building (width) is unusually WIDE.
Receptor is unusually FAR.

RESULTS:

Effective dose equivalent: 2.3E-02 mrem/yr.

*** Comply at level 2.

This facility is in COMPLIANCE.

It may or may not be EXEMPT from reporting to the EPA.

You may contact your regional EPA office for more information.

********** END OF COMPLIANCE REPORT **********

Attachment G

Westinghouse Electric Company
Nuclear Fuel
Columbia Fuel Site
5801 Bluff Rd
Hopkins, South Carolina 29061
USA

To: Cynthia Logsdon

Direct tel: 803-647-1919
Direct fax: 803-695-4158
e-mail: wagoneda@westinghouse.com

Your ref:
Our ref: LTR-EHS-15-62

Cc: John Howell, Carl Snyder, Nancy Parr,
Anna Pearson, Diana Joyner, Sherrie Culler

August 21, 2015

2015 Semi-Annual Assessment of Public Dose from Liquid and Gaseous Effluents

Effluents released from plant operations are monitored to determine the quantities of radionuclides discharged into the environment. The cumulative radioactivity released is summarized semi-annually and annually and input into dose models developed by the NRC and EPA to estimate the dose to the public.

The whole body and organ dose via the following pathways is determined in this assessment:

- Dose due to Gaseous Effluents by Direct Inhalation
  - The whole body dose was estimated using EPA's COMPLY Code at level 2 complexity. The organ dose was estimated by calculating the X/Q factor using the results of the COMPLY analysis for stack #1212 (S1030A), the measured release quantity, and the dose conversion factors from Federal Guidance Report No 11, "Limiting Values of Radionuclide Intake and Air concentration Factors for Inhalation, Submersion, and Ingestion" (FGR 11).
- Dose due to Liquid Effluents by Ingestion of Potable Water
  - Estimated using equations and recommended values in Regulatory Guide 1.109 (RG 1.109). Dose conversion factors are referenced from FGR 11.
- Dose due to Liquid Effluents by Ingestion of Fish
  - Estimated using equations and recommended values in RG 1.109. Dose conversion factors are referenced from FGR 11.
- Dose due to Liquid Effluents by Irradiation from Shoreline Deposition
  - Estimated using equations and recommended values in RG 1.109. Dose conversion factors are referenced from Federal Guidance report No 12, "External Exposure to Radionuclides in Air, Water, and Soil."

The inhalation dose is determined at the nearest site boundary at a distance of 595 meters. The ingestion dose from liquid effluent and external dose from sediment deposition is determined at the point at which the liquid effluent leaves the diffuser in the Congaree River.

Westinghouse Electric Company
Nuclear Fuel
Columbia Fuel Site
5801 Bluff Rd
Hopkins, South Carolina 29061
USA

The release rates for gaseous effluent are determined by gross alpha measurements performed on daily air samples, one per stack for 48 stacks (Attachment 1). The release rates for liquid effluent are determined by isotopic analysis of liquid effluent samples taken monthly (Attachment 3). Based on these results, the following quantities were released in the 1st half of calendar year 2015:

- 169.6 μCi of Uranium in gaseous effluent
- 1.63 mCi of Uranium in liquid effluent
- 3.70 mCi of Technetium in liquid effluent

Using these results and the methods previously mentioned the whole body dose, dose to the bone, and dose to the lung were determined for an individual present at the nearest site boundary. Table 1 provides a summary of the results for each pathway. The gaseous and liquid effluents released during the 1st half of 2015 resulted in a potential whole body dose of 0.08 mrem and a lung dose of 0.60 mrem to an individual present at the nearest site boundary. The dose to the bone is negligible. These doses are well below the 12.5 mrem (1/2 of the 25 mrem annual dose limit) and the 5 mrem ALARA limit (1/2 of 10 mrem annual ALARA limit) for a member of the public.

Table 1. 2015 Semi-Annual Dose to the Public from Liquid and Gaseous Effluents

	Whole Body Dose (mrem/6 months)	**Organ Dose - Bone (mrem/6 months)**	**Organ Dose - Lung (mrem/6 months)**
Gaseous Effluents			
Direct inhalation*	0.08	2.26E-03	0.60
Liquid Effluents			
Potable Water	1.98E-05	2.87E-04	-
Aquatic Food (Fish)	1.26E-06	1.65E-05	-
Shoreline Deposition	6.46E-10	-	-
Total (mrem/6 months)	*0.08*	*2.56E-03*	*0.60*

* Assumes 80 % residence time

There were no significant changes in source material or chemical form between 2014 and the 1st half of 2015. One release point, the Waterglass scrubber, was added to the air effluent monitoring program during the 1st half of 2015. Effluents from this release point are less than 1% of the total release quantity and are not expected to be a significant contributor. The attachments below illustrate the method used to calculate each result listed in Table 1. The annual dose calculation will be completed when the data is available for the entire calendar year.

Westinghouse Electric Company
Nuclear Fuel
Columbia Fuel Site
5801 Bluff Rd
Hopkins, South Carolina 29061
USA

Attachment 1:	1st Half 2015 Gaseous Effluent Discharges
Attachment 2:	Lung/Bone Organ Dose due to Gaseous Effluent
Attachment 3:	1st Half 2015 Liquid Effluent Discharges
Attachment 4:	Whole Body Dose from Liquid Effluent Pathways - Potable Water
Attachment 5:	Dose to the Bone Surface from Liquid Effluent Pathways - Potable Water
Attachment 6:	Whole Body Dose from Liquid Effluent Pathways - Aquatic Foods
Attachment 7:	Dose to the Bone Surface from Liquid Effluent Pathways - Aquatic Foods
Attachment 8:	Whole Body Dose from Liquid Effluent Pathways – Shoreline Deposits
Attachment 9:	2015 Isotopic Fractions
Attachment 10:	Comply Results

David Wagoner
Radiation Safety Engineer
EH&S Operations

Review by: Anna Pearson
Manager, RSO
EH&S Operations

Attachment 1
1st Half 2015 Gaseous Effluent Discharges

Sampling Station	Location Description	Stack Height (m)	Flow Rate (m/s)	Gross Alpha Concentration* (uCi/mL)	Release Rate (Ci/s) U234	U235	U238	1st Half (Jan-Jun) uCi Uranium Released
1207	MET LAB EXHAUST	10	0.56	1.47E-13	6.92E-14	2.54E-15	8.94E-15	1.27
1238	IFBA EXHAUST	10	4.72	8.02E-14	3.21E-13	1.18E-14	4.15E-14	5.89
1239	MAINT WELD EX	11	0.94	1.05E-13	8.39E-14	3.08E-15	1.08E-14	1.54
1243	AC-8	11	3.78	8.16E-14	2.61E-13	9.62E-15	3.38E-14	4.80
1222	CALC COMB GAS LN 1	12	0.16	3.05E-13	4.25E-14	1.56E-15	5.49E-15	0.78
1223	CALC COMB GAS LN 2	12	0.16	5.29E-13	7.35E-14	2.70E-15	9.50E-15	1.35
1224	CALC COMB GAS LN 3	12	0.16	1.20E-13	1.69E-14	6.21E-16	2.18E-15	0.31
1225	CALC COMB GAS LN 4	12	0.16	1.38E-13	1.91E-14	7.01E-16	2.46E-15	0.35
1226	CALC COMB GAS LN 5	12	0.16	4.70E-13	6.54E-14	2.40E-15	8.45E-15	1.20
1228	CHEM LAB EX #3	12	0.64	3.86E-13	1.05E-13	3.85E-15	1.35E-14	1.92
1231	DEV LAB EX #2	12	0.94	2.01E-13	1.61E-13	5.93E-15	2.08E-14	2.96
1237	ABF HOOD TORIT EX	12	1.42	8.22E-14	9.86E-14	3.63E-15	1.27E-14	1.81
1241	PELLET LINE 6	12	2.78	8.14E-14	1.92E-13	7.05E-15	2.48E-14	3.52
1247	HOT OIL RM EX	12	3.89	2.00E-13	6.58E-13	2.42E-14	8.50E-14	12.08
1201	FURNACE EX LINE 1	13	2.78	8.00E-14	1.88E-13	6.93E-15	2.44E-14	3.46
1202	FURNACE EX LINE 2	13	2.78	8.00E-14	1.88E-13	6.93E-15	2.44E-14	3.46
1203	FURNACE EX LINE 3	13	2.78	8.00E-14	1.88E-13	6.93E-15	2.44E-14	3.46
1204	FURNACE EX LINE 4	13	2.78	8.00E-14	1.88E-13	6.93E-15	2.44E-14	3.46
1205	FURNACE EX LINE 5	13	2.78	8.00E-14	1.88E-13	6.93E-15	2.44E-14	3.46
1206	NEW DECON ROOM	13	1.64	4.72E-13	6.55E-13	2.41E-14	8.47E-14	12.03
1208	INCINERATOR EX	13	1.89	2.04E-13	3.22E-13	1.19E-14	4.17E-14	5.92
1209	SUPPL INCIN EX	13	0.94	9.21E-14	7.35E-14	2.70E-15	9.50E-15	1.35
1216	MAINT ENCL EX 4-B	13	3.89	3.41E-13	0.00E+00	0.00E+00	0.00E+00	0.00
1217	CONV ENCL EX 4-C	13	3.89	9.03E-14	2.97E-13	1.09E-14	3.84E-14	5.46
1218	CONV ENCL EX 4-D	13	3.89	1.39E-13	0.00E+00	0.00E+00	0.00E+00	0.00
1219	CONV EMERG EX 4E	13	3.89	2.28E-13	3.54E-14	1.30E-15	4.58E-15	0.65
1221	DECON ROOM EX	13	1.42	2.66E-13	3.19E-13	1.17E-14	4.12E-14	5.85
1230	DEV LAB EX #1	13	0.94	1.51E-13	1.21E-13	4.45E-15	1.56E-14	2.22
1232	PELLET COMBINED EX	13	4.72	8.70E-14	3.48E-13	1.28E-14	4.50E-14	6.39
1233	SOLVENT EXT N EX	13	3.33	8.34E-14	2.02E-13	7.41E-15	2.60E-14	3.70
1234	SOLVENT EXT S EX	13	3.33	1.79E-13	7.24E-14	2.66E-15	9.36E-15	1.33
1229	HP LAB EX	15	0.58	8.67E-14	4.30E-14	1.58E-15	5.56E-15	0.79
1236	MAP COMBINED	15	2.78	1.25E-13	0.00E+00	0.00E+00	0.00E+00	0.00
1240	AC-3	15	3.78	8.00E-14	2.56E-13	9.42E-15	3.31E-14	4.70
1246	AC-4	15	3.89	8.16E-14	2.69E-13	9.90E-15	3.48E-14	4.94
1251	WATERGLASS SCR S1190	15	2.36	2.70E-13	6.26E-14	2.30E-15	8.10E-15	1.15
1210	CONV 1-A EX	16	4.17	9.24E-14	3.26E-13	1.20E-14	4.22E-14	5.99
1211	CONV 1-B EX	16	4.17	2.42E-13	0.00E+00	0.00E+00	0.00E+00	0.00
1212	S1030 A	16	7.56	1.27E-13	7.75E-13	2.85E-14	1.00E-13	14.23
1213	S1030 B	16	7.56	2.00E-13	6.10E-14	2.24E-15	7.88E-15	1.12
1227	CHEM LAB EX #2	16	0.58	1.93E-13	9.53E-14	3.51E-15	1.23E-14	1.75
1220	CHEM LAB FILT EX	17	5.56	8.23E-14	3.87E-13	1.42E-14	5.01E-14	7.11
1242	AC-5	17	3.78	8.26E-14	2.65E-13	9.74E-15	3.42E-14	4.86
1244	AMMON FUME SCR 1008A	17	1.89	9.71E-14	1.55E-13	5.71E-15	2.01E-14	2.85
1245	AMMON FUME SCR 1008B	17	1.89	1.48E-13	0.00E+00	0.00E+00	0.00E+00	0.00
1248	ERBIA FURNACE EX	18	8.17	8.00E-14	5.53E-13	2.04E-14	7.15E-14	10.16
1249	ERBIA SCRUBBER EX	18	4.33	8.02E-14	2.95E-13	1.08E-14	3.81E-14	5.41
1250	ERBIA CHANGE ROOM	18	1.9	8.82E-14	1.42E-13	5.23E-15	1.84E-14	2.61
	Total				***9.24E-12***	***3.40E-13***	***1.19E-12***	***169.65***

*Concentation LLD is 8E-14 uCi/mL

Attachment 2

Lung/Bone Organ Dose due to Gaseous Effluents								
	1st half (Jan-Jun)	**2nd half (Jul-Dec)**	**Total**	**EPA**				
STACK IDENTIFICATION	**uCi Uranium**	**uCi Uranium**	**uCi released**	**Comply Run Results**				
S1030A	**14.23**	**N/A**	**14.23**	**Dose (mrem/yr)**	**1.50E-02**			
use highest release to calculate X/Q used by COMPLY				Stack height (m)	16			
				Release Rate (Ci/s)	U-234	U-235	U-238	
Dose from comply	0.00750	mrem/6 mo			7.75E-13	2.85E-14	1.00E-13	
release quantity	14.23	uCi						
Inhalation from RG1.109	1.42E-05	Ci						
App E table E-5	4000.00	m3/6 mo						
Effective Dose conversion								
EPA FGR 11 p150-151								
U-234	3.58E-05	Sv/Bq	85.64%					
U-235	3.32E-05	Sv/Bq	3.15%					
U-238	3.20E-05	Sv/Bq	11.07%					
weighted dose conversion	3.52E-05	Sv/Bq						
conversion factor	3700.00	mrem/pCi= factor* Sv/Bq						
weighted dose conversion	0.1304	mrem/pCi						
			equations					
Dose (mrem) = R(a)*3.17e4*Q*(X/Q)*effective Dose conversion			see RG1.109-25					
Dose (mrem)/(R(a)*3.17e4*Q*effective Dose conversion)=(X/Q)								
	3.19E-05	X/Q						
Estimate Lung Dose using X/Q and semi-annual releases for 2015				Estimate Bone Dose using X/Q and semi-annual releases for 2015				
App E table E-5								
Lung Organ Dose conversion								
EPA FGR 11 p150-151								
U-234	2.98E-04	Sv/Bq	85.64%	1.13E-06	Sv/Bq			
U-235	2.76E-04	Sv/Bq	3.15%	1.05E-06	Sv/Bq			
U-238	2.66E-04	Sv/Bq	11.07%	1.01E-06	Sv/Bq			
weighted dose conversion	2.93E-04	Sv/Bq		1.11E-06	Sv/Bq			
conversion factor	3700.00	mrem/pCi= factor* Sv/Bq		3700.00	mrem/pCi= factor* Sv/Bq			
weighted dose conversion	1.0854	mrem/pCi		4.12E-03	mrem/pCi			
release quantity	169.65	uCi/6 mo		169.65	uCi/6 mo			
	1.70E-04	Ci/6 mo		1.70E-04	Ci/6 mo			
Lung *	**0.60**	**mrem/6 mo**	**Bone ***	**2.26E-03**	**mrem/6 mo**			
	assume 80% residence							

2015

Attachment 3 - 1st Half 2015 Liquid Effluent Discharges

	Liquid Effluent Discharges			Isotopic Uranium Measured Concentrations				Tc-99 Measured Concentrations	Sum U & Tc-99	Total uCi/month Released (based on monthly GEL discharge samples)				Measurement Uncertainty / Error				Uncertainty / Error			
Month	Average kgal/day	Actual kgal/month	Actual gal/month	U234 pCi/L	U235 pCi/L	U238 pCi/L	Total U pCi/L	Tc-99 piC/L	Total U & Tc-99 pCi/L	U234	U-235	U-238	Tc-99	U234 piC/L	U235 piC/L	U238 piC/L	Tc-99 piC/L	U234 (uCi)	U-235 (uCi)	U-238 (uCi)	Tc-99 (uCi)
JAN	104.160	3020.650	3,020,650	19.8	1.100	3.21	24.110	138	162.110	226.377	12.576	36.700	1577.776	1.57	0.417	0.644	118	17.950	4.768	7.363	1349.113
FEB	86.000	2407.890	2,407,890	20.8	1.29	3.11	25.200	0.00	25.200	189.568	11.757	28.344	0.000	2.54	0.729	0.997	119	23.149	6.644	9.087	1084.550
MAR	123.570	3707.010	3,707,010	21.9	1.22	3.56	26.680	0.00	26.680	307.280	17.118	49.950	0.000	2.23	0.606	0.909	119	31.289	8.503	12.754	1669.693
APR	104.110	2811.010	2,811,010	25.5	1.01	3.53	30.040	67.9	97.940	271.312	10.746	37.558	722.434	2.62	0.610	0.984	120	27.876	6.490	10.469	1276.761
MAY	97.670	2051.160	2,051,160	21.1	0.807	2.87	24.777	25.4	50.177	163.813	6.265	22.282	197.196	2.43	0.588	0.908	127	18.866	4.565	7.049	985.982
JUNE	108.880	3266.300	3,266,300	16.4	0.663	2.06	19.123	96.9	116.023	202.752	8.197	25.468	1197.969	2.39	0.576	0.882	142	29.547	7.121	10.904	1755.538
Total (Jan-June)		17264.020	17,264,020							1361.101	66.659	200.302	3695.376					149	38	58	8122
Liters (L)			6.53E+07							1628.1			3695.376								
Milliliters (ml)			6.53E+10							uCi Uranium for 6-month period (all types)											
										5323.4											
										uCi Uranium & Tc-99 for 6-month period											

FIRST HALF LIQUID DISCHARGES

Radionuclide	LLD (uCi/ml)	Quantity Released (uCi)	Error		Average Concentration Released (uCi/ml)
U234	6.00E-10	1361.1	+/-	149	2.08E-08
U235	6.00E-10	66.7	+/-	38	1.02E-09
U238	6.00E-10	200.3	+/-	58	3.07E-09
Total U		*1628.1*			*2.49E-08*
Tc-99	6.00E-10	3695.4	+/-	8122	5.66E-08
Total (Jan-June)		5323.4			1.06E-07

Whole Body Dose from Liquid Effluent Pathways - Potable Water																					
		Whole Body-Ingestion																			
365	liters	Usage by adult/6 m	U	10CFR20	7.3 x 10^5 (ml) which is the annual water intake of "Reference Man."																
31293	mixing - dilution	Dilution at difuser	M																		
				Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985												
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec														
									effective	bone	effective	bone									
2.83E-04	U-234	mRem/pCi	D	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi									
2.66E-04	U-235	mRem/pCi	D	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03									
2.69E-04	U-236	mRem/pCi	D	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03									
2.55E-04	U-238	mRem/pCi	D					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03									
1.46E-06	Tc-99	mRem/pCi	D					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03									
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07									
12	hrs	transit time	t-p	reg guide 1.109	table E-15																
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ													
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10													
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13													
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12			for comaprison only										
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14													
				TC-99		2.13E+05	1.87E+09	3.71E-10			Part 20 table 2		soluble forms								
0.9999999961	U-234	exp(-λt-p)									Dose Conversion										
1.0000000000	U-235	exp(-λt-p)										uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi				
1.0000000000	U-236	exp(-λt-p)									U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
1.0000000000	U-238	exp(-λt-p)									U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
0.9999999955	Tc-99	exp(-λt-p)									U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
											U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
Activity Released											Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06				
1.628E-03	total uranium(Ci)	Q		summation of liquid effluent alpha activity																	
				% of activity based on current nominal uranium isotopic (see U activity tab)							ICRP 69	Comparison									
1.394E-03	U-234 release fraction	Ci		URANIUM234	85.64%																
5.128E-05	U-235 release fraction	Ci		URANIUM235	3.15%							Sv/Bq	Rem/Bq	mRem/pCi							
2.279E-06	U-236 release fraction	Ci		URANIUM236	0.14%																
1.802E-04	U-238 release fraction	Ci		URANIUM238	11.07%						adult	5.00E-08	0.005	1.85E-04							
5.323E-03	Tc-99 release fraction	Ci		TC-99							infant	3.70E-07	0.037	1.37E-03							
											bone-adult	7.90E-07	0.079	2.92E-03							
check U sum	0.00163																				
3.95E-07	U-234	release fraction *dose factor*exp(-λ*tp)																			
1.36E-08	U-235	release fraction *dose factor*exp(-λ*tp)																			
6.12E-10	U-236	release fraction *dose factor*exp(-λ*tp)																			
4.59E-08	U-238	release fraction *dose factor*exp(-λ*tp)																			
7.78E-09	Tc-99	release fraction *dose factor*exp(-λ*tp)																			
4.63E-07	all nuclides	sum of nuclides																			
42.76736	usage	1100*(usage*dilution)/flow																			
1.98E-05	mRem	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.																			

Dose to the Bone Surface from Liquid Effluent Pathways - Potable Water

Bone Surface-Ingestion

365	liters	Usage by adult/6 m	U	10CFR20	7.3 x 10^5 (ml) which is the annual water intake of "Reference Man."												
31293	mixing - dilution	Dilution at difuser	M														
				Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985								
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec										
									effective	bone	effective	bone					
4.18E-03	U-234	mRem/pCi	D-bone	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi					
3.88E-03	U-235	mRem/pCi	D-bone	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03					
3.96E-03	U-236	mRem/pCi	D-bone	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03					
3.74E-03	U-238	mRem/pCi	D-bone					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03					
2.23E-07	Tc-99	mRem/pCi	D-bone					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03					
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07					
12	hrs	transit time	t-p	reg guide 1	table E-15												
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ									
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10									
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13			Part 20 table 2		soluble forms				
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12			Dose Conversion						
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14				uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi
				TC-99		2.13E+05	1.87E+09	3.71E-10			U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
0.9999999961	U-234	exp(-λt-p)									U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.0000000000	U-235	exp(-λt-p)									U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.0000000000	U-236	exp(-λt-p)									U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.0000000000	U-238	exp(-λt-p)									Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06
0.9999999955	Tc-99	exp(-λt-p)															
											ICRP 69	Comparison					
Activity Released																	
1.628E-03	**total uranium(Ci)**	**Q**	summation of liquid effluent alpha activity									Sv/Bq	Rem/Bq	mRem/pCi			
			% of activity based on current nominal uranium isotopic **(see U activity tab)**														
1.3942E-03	U-234 release fraction	Ci	URANIUM234	85.64%							adult	5.00E-08	0.005	1.85E-04			
5.1282E-05	U-235 release fraction	Ci	URANIUM235	3.15%							infant	3.70E-07	0.037	1.37E-03			
2.2792E-06	U-236 release fraction	Ci	URANIUM236	0.14%							bone-adult	7.90E-07	0.079	2.92E-03			
1.8022E-04	U-238 release fraction	Ci	URANIUM238	11.07%													
5.323E-03	Tc-99 release fraction	Ci	TC-99														
check U sum	0.00163																
5.83E-06	U-234	release fraction *dose factor*exp(-λ*tp)															
1.99E-07	U-235	release fraction *dose factor*exp(-λ*tp)															
9.02E-09	U-236	release fraction *dose factor*exp(-λ*tp)															
6.73E-07	U-238	release fraction *dose factor*exp(-λ*tp)															
1.19E-09	Tc-99	release fraction *dose factor*exp(-λ*tp)															
6.71E-06	all nuclides	sum of nuclides															
42.76736	usage	1100*(usage*dilution)/flow															
2.87E-04	**mRem**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.															

Whole Body Dose from Liquid Effluent Pathways - Aquatic Foods																	
		Whole Body															
10.5	Kg	Usage by adult/6 m	U	see regulatory guide 1.109 page 1.109-40 table E-5, Recommended Values for U(ap)													
31293	mixing - dilution	Dilution at difuser	M	Congaree Flow	9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985									
0.3	cubic ft/sec	Average discharge	F	Effluent Flow	3.00E-01	cubic feet/sec											
								effective	bone	effective	bone						
2.83E-04	U-234	mRem/pCi	D	EPA Limiting Values of Radioanuclide Intake.....				Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi						
2.66E-04	U-235	mRem/pCi	D	FRG no 11 1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03						
2.69E-04	U-236	mRem/pCi	D	Exposure-to-dose conversion factors for ingestion			U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03						
2.55E-04	U-238	mRem/pCi	D				U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03						
1.46E-06	Tc-99	mRem/pCi	D				U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03						
							Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07						
24	hrs	transit time	t-p	reg guide 1 table E-15													
3.23557E-10	U-234	decay const	λ	Nuclide	T(1/2) yr	T(1/2) hr	λ				for comaprison only						
1.12404E-13	U-235	decay const	λ	URANIUM234	2.45E+05	2.14E+09	3.24E-10										
3.38075E-12	U-236	decay const	λ	URANIUM235	7.04E+08	6.17E+12	1.12E-13										
1.77058E-14	U-238	decay const	λ	URANIUM236	2.34E+07	2.05E+11	3.38E-12				Part 20 table 2		soluble forms				
3.71407E-10	Tc-99	decay const	λ	URANIUM238	4.47E+09	3.91E+13	1.77E-14				Dose Conversion						
				TC-99	2.13E+05	1.87E+09	3.71E-10					uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi
0.99999999223	U-234	exp(-λt-p)									U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.00000000000	U-235	exp(-λt-p)									U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
0.99999999992	U-236	exp(-λt-p)									U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
1.00000000000	U-238	exp(-λt-p)									U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04
0.99999999109	Tc-99	exp(-λt-p)									Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06
Activity Released											ICRP 69	Comparison					
1.628E-03	**total uranium(Ci)**	**Q**	summation of liquid effluent alpha activity									Sv/Bq	Rem/Bq	mRem/pCi			
			% of activity based on current nominal uranium isotopic **(see U activity tab)**														
1.3942E-03	U-234 release fraction	Ci	URANIUM234	85.64%													
5.1282E-05	U-235 release fraction	Ci	URANIUM235	3.15%							adult	5.00E-08	0.005	1.85E-04			
2.2792E-06	U-236 release fraction	Ci	URANIUM236	0.14%							infant	3.70E-07	0.037	1.37E-03			
1.8022E-04	U-238 release fraction	Ci	URANIUM238	11.07%							bone-adult	7.90E-07	0.079	2.92E-03			
5.323E-03	Tc-99 release fraction	Ci	TC-99														
check U sum	0.00163																
						bioaccumulation factor		BNWL-2075									
7.90E-07	U-234	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)				2		UC-11									
2.73E-08	U-235	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)				2		Methodology for Calculation of Radiation Doses									
1.22E-09	U-236	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)				2		in the Environs from Nuclear Fuel									
9.18E-08	U-238	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)				2		Cycle Facilities									
1.17E-07	Tc-99	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)				15											
1.03E-06	all nuclides	sum of nuclides															
1.23029	usage	1100*(usage*dilution)/flow															
1.26E-06	**mRem**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.															

Dose to the Bone Surface from Liquid Effluent Pathways - Aquatic Foods

Bone Surface

10.5	Kg	Usage by adult/6 m	U	see regulatory guide 1.109 page 1.109-40 table E-5, Recommended Values for U(ap)																		
31293	mixing - dilution	Dilution at difuser	M	Congaree Flow		9388	cubic feet/sec		see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 1985													
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec															
									effective	bone	effective	bone										
4.18E-03	U-234	mRem/pCi	D	EPA Limiting Values of Radioanuclide Intake.....					Sv/Bq	Sv/Bq	mRem/pCi	mRem/pCi										
3.88E-03	U-235	mRem/pCi	D	FRG no 11	1988			U-234	7.66E-08	1.13E-06	2.83E-04	4.18E-03										
3.96E-03	U-236	mRem/pCi	D	Exposure-to-dose conversion factors for ingestion				U-235	7.19E-08	1.05E-06	2.66E-04	3.88E-03										
3.74E-03	U-238	mRem/pCi	D					U-236	7.26E-08	1.07E-06	2.69E-04	3.96E-03										
2.23E-07	Tc-99	mRem/pCi	D					U-238	6.88E-08	1.01E-06	2.55E-04	3.74E-03										
								Tc-99	3.95E-10	6.04E-11	1.46E-06	2.23E-07										
24	hrs	transit time	t-p	reg guide 1.109	table E-15																	
3.23557E-10	U-234	decay const	λ	Nuclide		T(1/2) yr	T(1/2) hr	λ				for comaprison only										
1.12404E-13	U-235	decay const	λ	URANIUM234		2.45E+05	2.14E+09	3.24E-10														
3.38075E-12	U-236	decay const	λ	URANIUM235		7.04E+08	6.17E+12	1.12E-13				Part 20 table 2		soluble forms								
1.77058E-14	U-238	decay const	λ	URANIUM236		2.34E+07	2.05E+11	3.38E-12				Dose Conversion										
3.71407E-10	Tc-99	decay const	λ	URANIUM238		4.47E+09	3.91E+13	1.77E-14					uCi/ml	milliters	uCi	pCi	mRem	mRem/pCi				
				TC-99		2.13E+05	1.87E+09	3.71E-10				U-234	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
0.99999999223	U-234	exp(-λt-p)										U-235	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
1.00000000000	U-235	exp(-λt-p)										U-236	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
0.99999999992	U-236	exp(-λt-p)										U-238	3.00E-07	7.30E+05	2.19E-01	2.19E+05	50	2.28E-04				
1.00000000000	U-238	exp(-λt-p)										Tc-99	6.00E-05	7.30E+05	4.38E+01	4.38E+07	50	1.14E-06				
0.99999999109	Tc-99	exp(-λt-p)																				
												ICRP 69	Comparison									
Activity Released													Sv/Bq	Rem/Bq	mRem/pCi							
1.628E-03	**total uranium(C**	**Q**		summation of liquid effluent alpha activity																		
				% of activity based on current nominal uranium isotopic **(see U activity tab)**								adult	5.00E-08	0.005	1.85E-04							
1.3942E-03	U-234 release fra	Ci		URANIUM234 85.64%								infant	3.70E-07	0.037	1.37E-03							
5.1282E-05	U-235 release fra	Ci		URANIUM235 3.15%								bone-adult	7.90E-07	0.079	2.92E-03							
2.2792E-06	U-236 release fra	Ci		URANIUM236 0.14%																		
1.8022E-04	U-238 release fra	Ci		URANIUM238 11.07%																		
5.323E-03	Tc-99 release fra	Ci		TC-99																		
check U sum	0.00163																					
							bioaccumulation factor		BNWL-2075													
1.17E-05	U-234	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		UC-11													
3.98E-07	U-235	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		Methodology for Calculation of Radiation Doses													
1.80E-08	U-236	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		in the Environs from Nuclear Fuel													
1.35E-06	U-238	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					2		Cycle Facilities													
1.78E-08	Tc-99	release fraction *bioaccumulation factor*dose factor*exp(-λ*tp)					15															
1.34E-05	all nuclides	sum of nuclides																				
1.23029	usage	1100*(usage*dilution)/flow																				
1.65E-05	**mRem**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.																				

Whole Body Dose from Liquid Effluent Pathways - Shoreline Deposits															
		Whole Body													
6	hr	Usage by adult/6 mo	U	see regulatory guide 1.109 page 1.109-40 table E-5, Recommended Values for U(ap)											
31293	mixing - dilution	Dilution at difuser	M												
				Congaree Flow		9388	cubic feet/sec	see Nureg-1118 Environmental Assessment for renewam ...SNM-1107 May 19							
0.3	cubic ft/sec	Average discharge	F	Effluent Flow		3.00E-01	cubic feet/sec								
					Sv/s:Bq/m^2	mrem/hr:pCi/m^2									
9.86E-12	U-234	mRem*m^2/pCi*hr	D	U-234	7.40E-19	9.86E-12	EPA FRG 12	Dose Coeff for exposure to contaminated ground surface							
1.97E-09	U-235	mRem*m^2/pCi*hr	D	U-235	1.48E-16	1.97E-09									
8.66E-12	U-236	mRem*m^2/pCi*hr	D	U-236	6.50E-19	8.66E-12									
7.34E-12	U-238	mRem*m^2/pCi*hr	D	U-238	5.51E-19	7.34E-12									
1.04E-12	Tc-99	mRem*m^2/pCi*hr	D	Tc-99	7.80E-20	1.04E-12									
12	hrs	transit time	t-p	see regulatory guide 1.109 page 1.109-69 table E-15, Recommended Values ...								t-i			
131040	hrs	xposure time of sedime	t-b	page 1.109-68			Nuclide	T(1/2) yr	T(1/2) hr	λ	T(1/2) day				
3.23557E-10	U-234	decay const	λ				URANIUM234	2.45E+05	2.14E+09	3.24E-10	8.90E+07				
1.12404E-13	U-235	decay const	λ				URANIUM235	7.04E+08	6.17E+12	1.12E-13	2.56E+11				
3.38075E-12	U-236	decay const	λ				URANIUM236	2.34E+07	2.05E+11	3.38E-12	8.52E+09				
1.77058E-14	U-238	decay const	λ				URANIUM238	4.47E+09	3.91E+13	1.77E-14	1.63E+12				
3.71407E-10	Tc-99	decay const	λ				TC-99	2.13E+05	1.87E+09	3.71E-10	7.75E+07				
0.0000423980	U-234	exp(-λt-p)*[1-exp(-λt-b)]													
0.0000000147	U-235	exp(-λt-p)*[1-exp(-λt-b)]													
0.0000004430	U-236	exp(-λt-p)*[1-exp(-λt-b)]													
0.0000000023	U-238	exp(-λt-p)*[1-exp(-λt-b)]													
0.0000486679	Tc-99	exp(-λt-p)*[1-exp(-λt-b)]													
Activity Released															
1.628E-03	**total uranium(Ci)**	Q		summation of liquid effluent alpha activity											
				% of activity based on current nominal uranium isotopic(see U activity tab)											
1.3942E-03	U-234 release fraction	Ci		URANIUM234	85.64%										
5.1282E-05	U-235 release fraction	Ci		URANIUM235	3.15%										
2.2792E-06	U-236 release fraction	Ci		URANIUM236	0.14%										
1.8022E-04	U-238 release fraction	Ci		URANIUM238	11.07%										
5.323E-03	Tc-99 release fraction	Ci		TC-99											
check U sum	0.00163														
5.19E-11	U-234	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
3.81E-10	U-235	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
7.45E-14	U-236	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
4.99E-12	U-238	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
2.09E-11	Tc-99	release fraction *dose factor*exp(-λt-p)*1-exp(-λt-b)*t-i													
4.59E-10	all nuclides	sum of nuclides													
1.406050	usage	11000*(usage*dilution*shore width factor)/flow		see regulatory guide 1.109 page 1.109-40 table A-2,Shore width...											
6.46E-10	**mRem**	see regulatory guide 1.109 page 1.109-2 and 1.109-3 for formula and definition of terms.													

2015 Isotopic Fractions

Based on the plant nominal enrichment for 2015

Nuclide	Average wt%	Specific Activity Ci/g	Weighted Activity	% Activity
U-234	0.04	6.220E-03	2.488E-04	85.64
U-235	4.24	2.160E-06	9.154E-06	3.15
U-236	0.01	6.470E-05	4.076E-07	0.14
U-238	95.72	3.360E-07	3.216E-05	11.07
Total	100.00		2.905E-04	100.00

COMPLY: V1.6. 8/21/2015 3:43

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH

THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

FROM THE COMPLY CODE - V1.6.

Prepared by:

Westinghouse Electric Company
Columbia Fuel Fabrication Facility
5801 Bluff Rd. Hopkins, SC 29061

David Wagoner
803.647.1919

Prepared for:

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Washington, DC 20460

2015 Semi-Annual Dose to the Public Due to Gaseous Effluent

SCREENING LEVEL 2

DATA ENTERED:

RELEASE RATES FOR STACK 1.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	3.900E-13
U-235	Y	1.430E-14
U-238	Y	5.040E-14

RELEASE RATES FOR STACK 2.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	3.450E-13
U-235	Y	1.270E-14
U-238	Y	4.460E-14

RELEASE RATES FOR STACK 3.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	1.430E-12
U-235	Y	5.260E-14
U-238	Y	1.850E-13

RELEASE RATES FOR STACK 4.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	3.390E-12
U-235	Y	1.250E-13
U-238	Y	4.380E-13

RELEASE RATES FOR STACK 5.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	6.310E-13
U-235	Y	2.320E-14
U-238	Y	8.150E-14

RELEASE RATES FOR STACK 6.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	1.260E-12
U-235	Y	4.630E-14
U-238	Y	1.630E-13

RELEASE RATES FOR STACK 7.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	8.070E-13
U-235	Y	2.970E-14
U-238	Y	1.040E-13

RELEASE RATES FOR STACK 8.

Nuclide		Release Rate (curies/SECOND)
U-234	Y	9.900E-13
U-235	Y	3.640E-14
U-238	Y	1.280E-13

SITE DATA FOR STACK 1.

Release height 10 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 2.

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 3.

Release height 12 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 4.

Release height 13 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 5.

Release height 15 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 6.

Release height 16 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 7.

Release height 17 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

SITE DATA FOR STACK 8.

Release height 18 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

Default mean wind speed used (2.0 m/sec).

NOTES:

Input parameters outside the "normal" range:

Building (width) is unusually WIDE.
Receptor is unusually FAR.

RESULTS:

Effective dose equivalent: 0.2 mrem/yr.

*** Comply at level 2.

This facility is in COMPLIANCE.

It may or may not be EXEMPT from reporting to the EPA.

You may contact your regional EPA office for more information.

********** END OF COMPLIANCE REPORT **********

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH

THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

FROM THE COMPLY CODE - V1.6.

Prepared by:

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David Wagoner
803.647.1919

Prepared for:

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Washington, DC 20460

S1030A

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/SECOND)
U-234	Y	7.750E-13
U-235	Y	2.850E-14
U-238	Y	1.000E-13

Release height 16 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 595 meters.

Building width 137 meters.

Default mean wind speed used (2.0 m/sec).

NOTES:

Input parameters outside the "normal" range:

Building (width) is unusually WIDE.
Receptor is unusually FAR.

RESULTS:

Effective dose equivalent: 1.5E-02 mrem/yr.

*** Comply at level 2.

This facility is in COMPLIANCE.

It may or may not be EXEMPT from reporting to the EPA.

You may contact your regional EPA office for more information.

********** END OF COMPLIANCE REPORT **********

Attachment H

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W3A	Mar-04	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
W3A	Jun-05	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W3A	Jun-06	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W3A	Jun-07	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W3A	Mar-08	NA	NA	NA	NA	NA	NA	**0.11**	**2.10**	**1.53**	NA	NA	NA
	Jun-08	NA	NA	NA	NA	NA	NA	**0.15**	**2.98**	**2.39**	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	**0.14**	**2.46**	0.00	NA	NA	NA
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	**0.03**	**0.30**	**2.48**	<5.0	NA	NA
W3A	Mar-09	NA	NA	NA	NA	<0.50	**4.92**	**0.22**	**0.90**	**0.02**	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<0.50	<1.00	**0.11**	**0.76**	0.00	NA	NA	NA
	Sep-09	NA	NA	NA	NA	<0.50	<1.00	**0.13**	**2.76**	**6.17**	NA	NA	NA
	Dec-09	NA	NA	NA	NA	<0.50	<1.00	NA	**0.65**	0.00	NA	NA	NA
W3A	Mar-10	NA	NA	NA	NA	<0.50	<1.00	**49.00**	**1.27**	<0.001	NA	NA	NA
	Jun-10	<1.00	<1.00	<1.00	<2.00	<0.50	<1.00	**0.12**	**2.66**	**10.70**	NA	NA	NA
	Sep-10	NA	NA	NA	NA	<0.50	<1.00	**0.08**	**2.94**	**1.20**	NA	NA	NA
	Dec-10	NA	NA	NA	NA	<0.50	<1.00	<0.02	**2.02**	**3.16**	NA	NA	NA
W3A	Apr-11	NA	NA	NA	NA	<0.50	<1.00	<0.02	**0.28**	0.00	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	<0.02	**0.86**	**2.07**	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	<0.02	**2.33**	**1.32**	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	<0.02	**1.81**	**0.17**	NA	NA	NA
W3A	Mar-12	NA	NA	NA	NA	<0.50	**0.05**	**0.04**	**2.86**	**1.00**	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	<0.02	**1.33**	**1.52**	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	N/A	**1.35**	**0.00**	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	<0.02	0.00	**0.73**	NA	NA	NA
W3A	Mar-13	NA	NA	NA	NA	<0.50	<1.00	<0.02	**0.46**	**4.85**	NA	NA	NA
	Jun-13	NA	NA	NA	NA	<0.50	<1.00	<0.02	**2.65**	**1.25**	NA	NA	NA
	Oct-13	NA	NA	NA	NA	<0.50	<1.00	<0.02	<0.77	<0.31	NA	NA	NA
W7	Feb/Mar 04	<1.0	<1.0	<1.0	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	**18.60**	**33.30**	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	**17.20**	**45.00**	NA	NA	NA	NA	NA	NA
	Dec-04	**1.30**	<1.0	<1.0	<2.0	**19.60**	**0.97**	**38.80**	**9.00**	**97.00**	NA	NA	NA

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W7	Jun-05	NA	NA	NA	NA	16.00	45.80	41.50	5.00	175.00	NA	NA	NA
	Dec-05	NA	NA	NA	NA	17.70	39.80	240.00	8.00	240.00	NA	NA	NA
W7	Jun-06	<1.0	<1.0	<1.0	<2.0	15.20	54.30	42.70	5.00	127.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	16.00	52.30	48.80	1.00	215.00	NA	NA	NA
W7	Jun-07	1.30	<1.0	<1.0	<2.0	13.00	54.20	53.30	2.00	141.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	17.00	45.10	46.90	2.00	195.00	NA	NA	NA
W7	Mar-08	NA	NA	NA	NA	NA	NA	42.60	14.80	234.00	NA	NA	NA
	Jun-08	1.20	<1.0	<1.0	<2.0	11.30	46.30	43.60	1.00	143.00	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	38.70	1.27	139.00	NA	NA	NA
	Dec-08	<1.0	<1.0	<1.0	<2.0	12.20	34.00	35.60	1.10	171.00	5.0	4.1	166.9
W7	Mar-09	NA	NA	NA	NA	12.85	51.50	40.10	26.10	122.00	NA	NA	NA
	Jun-09	NA	NA	NA	NA	29.40	46.00	35.70	0.35	214.00	NA	NA	NA
	Sep-09	NA	NA	NA	NA	12.45	63.10	40.50	9.95	211.00	NA	NA	NA
	Dec-09	NA	NA	NA	NA	14.75	48.00	43.00	7.29	169.00	NA	NA	NA
W7	Mar-10	NA	NA	NA	NA	12.30	64.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	11.90	52.00	63.00	4.21	153.00	NA	NA	NA
	Sep-10	NA	NA	NA	NA	9.50	58.00	90.00	1.30	215.00	NA	NA	NA
	Dec-10	NA	NA	NA	NA	10.20	49.00	130.00	5.72	212.00	NA	NA	NA
W7	Apr-11	NA	NA	NA	NA	7.60	52.00	<20.00	3.24	136.00	NA	NA	NA
	Jun-11	NA	NA	NA	NA	7.60	53.00	150.00	5.63	146.00	NA	NA	NA
	Sep-11	NA	NA	NA	NA	7.60	45.00	140.00	7.78	112.00	NA	NA	NA
	Dec-11	NA	NA	NA	NA	8.55	59.40	130.00	9.03	185.00	NA	NA	NA
W7	Mar-12	NA	NA	NA	NA	8.40	54.80	140.00	10.30	199.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	9.05	51.60	120.00	5.80	92.70	NA	NA	NA
	Sep-12	NA	NA	NA	NA	8.35	40.40	74.00	4.82	102.00	NA	NA	NA
	Dec-12	NA	NA	NA	NA	8.60	53.50	91.00	6.43	181.00	NA	NA	NA
W7	Mar-13	NA	NA	NA	NA	8.95	45.90	120.00	5.35	135.00	NA	NA	NA
	Jun-13	NA	NA	NA	NA	6.75	51.00	140.00	2.24	102.00	NA	NA	NA
	Oct-13	NA	NA	NA	NA	8.15	55.90	160.00	5.12	164.00	NA	NA	NA
W10	Feb/Mar-04	<1.0	<1.0	<1.0	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	5.16	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	4.10	6.26	NA	NA	NA	NA	NA	NA
	Dec-04	<1.0	<1.0	<1.0	<2.0	5.64	6.85	25.00	6.00	25.00	NA	NA	NA
W10	Jun-05	NA	NA	NA	NA	1.70	4.70	22.90	7.00	28.00	NA	NA	NA
	Dec-05	NA	NA	NA	NA	7.00	6.90	29.80	4.00	58.00	NA	NA	NA

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Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W10	Jun-06	NA	NA	NA	NA	7.40	3.70	26.80	6.00	63.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	5.10	2.50	31.40	0.00	77.00	NA	NA	NA
W10	Jun-07	NA	NA	NA	NA	5.10	7.60	43.40	3.00	72.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	4.80	14.00	11.80	4.00	70.00	NA	NA	NA
W10	Mar-08	NA	NA	NA	NA	NA	NA	16.00	5.71	65.70	NA	NA	NA
	Jun-08	NA	NA	NA	NA	0.50	1.10	17.20	3.00	41.00	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	11.20	0.65	28.30	NA	NA	NA
	Dec-08	<1.0	<1.0	<1.0	<2.0	2.90	2.00	10.50	0.52	47.60	<5.0	NA	NA
W10	Mar-09	NA	NA	NA	NA	3.50	1.40	15.30	3.83	34.30	NA	NA	NA
	Jun-09	NA	NA	NA	NA	3.14	2.00	13.50	0.68	38.80	NA	NA	NA
	Sep-09	NA	NA	NA	NA	3.36	3.40	18.60	2.46	46.10	NA	NA	NA
	Dec-09	NA	NA	NA	NA	3.93	3.00	19.00	2.48	43.30	NA	NA	NA
W10	Mar-10	NA	NA	NA	NA	3.10	7.00	NA	NA	NA	NA	NA	NA
	Jun-10	<1.0	<1.0	<1.0	<2.0	3.07	3.00	34.00	3.55	70.20	NA	NA	NA
	Sep-10	<1.0	<1.0	<1.0	<2.0	3.40	7.00	47.00	4.35	78.80	NA	NA	NA
	Dec-10	NA	NA	NA	NA	4.86	11.00	24.00	0.34	55.20	NA	NA	NA
W10	Apr-11	NA	NA	NA	NA	6.75	4.00	<20.00	1.48	86.80	NA	NA	NA
	Jun-11	NA	NA	NA	NA	3.22	3.00	44.00	5.49	81.70	NA	NA	NA
	Sep-11	NA	NA	NA	NA	4.60	12.00	41.00	5.08	77.80	NA	NA	NA
	Dec-11	NA	NA	NA	NA	4.19	15.20	27.00	6.22	99.30	NA	NA	NA
W10	Mar-12	NA	NA	NA	NA	4.15	10.40	35.00	6.12	117.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	4.23	2.21	39.00	2.72	58.60	NA	NA	NA
	Sep-12	NA	NA	NA	NA	2.57	3.41	28.00	3.10	53.50	NA	NA	NA
	Dec-12	NA	NA	NA	NA	3.78	15.70	18.00	1.41	56.70	NA	NA	NA
W10	Mar-13	NA	NA	NA	NA	4.59	<1.00	83.00	4.04	79.80	NA	NA	NA
	Jun-13	NA	NA	NA	NA	2.30	5.42	76.00	5.13	53.90	NA	NA	NA
	Oct-13	NA	NA	NA	NA	2.20	6.19	39.00	<4.51	59.20	NA	NA	NA
W13	Mar-04	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	0.44	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	0.48	<1.00	8.10	2.00	13.00	NA	NA	NA
W13	Jun-05	NA	NA	NA	NA	<0.50	<1.00	6.90	0.00	1.00	NA	NA	NA
	Dec-05	NA	NA	NA	NA	<0.50	<1.00	16.60	3.00	3.00	NA	NA	NA
W13	Jun-06	NA	NA	NA	NA	<0.50	<1.00	7.20	2.00	3.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	<0.50	<1.00	8.00	2.00	0.00	NA	NA	NA
W13	Jun-07	NA	NA	NA	NA	<0.50	<1.00	12.30	4.00	4.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	<0.50	<1.00	15.10	6.00	7.00	NA	NA	NA

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Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W13	Mar-08	NA	NA	NA	NA	NA	NA	5.15	2.58	6.61	NA	NA	NA
	Jun-08	NA	NA	NA	NA	<0.50	<1.00	8.29	3.00	3.00	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	8.30	NA	NA	<5.0	NA	NA
W13	Mar-09	NA	NA	NA	NA	<0.50	<1.00	3.62	4.04	5.24	NA	NA	NA
	Jun-09	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NA	NA	NA	NA	<0.50	<1.00	1.60	1.61	4.98	NA	NA	NA
W13	Mar-10	NA	NA	NA	NA	<0.50	<1.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	<0.50	<1.00	7.20	0.68	<0.001	NA	NA	NA
	Sep-10	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NA	NA	NA	NA	12.15	43.00	40.00	0.78	81.40	NA	NA	NA
W13	Apr-11	NA	NA	NA	NA	10.75	54.00	<20.00	2.60	85.60	NA	NA	NA
	Jun-11	NA	NA	NA	NA	10.35	56.00	35.00	9.92	121.00	NA	NA	NA
	Sep-11	NA	NA	NA	NA	10.00	47.00	40.00	16.90	90.60	NA	NA	NA
	Dec-11	NA	NA	NA	NA	10.40	56.70	51.00	17.90	132.00	NA	NA	NA
W13	Mar-12	NA	NA	NA	NA	9.60	53.70	44.00	7.30	138.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	10.90	59.00	43.00	7.66	68.20	NA	NA	NA
	Sep-12	NA	NA	NA	NA	9.85	46.30	38.00	2.94	110.00	NA	NA	NA
	Dec-12	NA	NA	NA	NA	11.10	51.00	36.00	9.65	142.00	NA	NA	NA
W13	Mar-13	NA	NA	NA	NA	10.40	41.60	40.00	5.78	99.30	NA	NA	NA
	Jun-13	NA	NA	NA	NA	10.90	50.20	39.00	3.01	130.00	NA	NA	NA
	Oct-13	NA	NA	NA	NA	10.20	48.10	31.00	<1.94	140.00	NA	NA	NA
W14	Mar-04	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	1.21	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	<0.40	1.22	NA	NA	NA	NA	NA	NA
W14	Jun-05	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W14	Jun-06	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W14	Jun-07	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W14	Mar-08	NA	NA	NA	NA	NA	NA	2.24	3.01	6.41	NA	NA	NA
	Jun-08	NA	NA	NA	NA	NA	NA	0.17	4.22	17.30	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	0.49	6.53	8.88	NA	NA	NA
	Dec-08	42.00	7.40	2.00	<2.0	<0.50	<1.00	2.90	1.50	9.00	8.0	6.6	2.4

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Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W14	Mar-09	NA	NA	NA	NA	<0.50	7.79	0.41	4.39	11.70	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<0.50	2.15	0.12	1.43	17.50	NA	NA	NA
	Sep-09	NA	NA	NA	NA	<0.50	2.60	0.14	3.29	9.50	NA	NA	NA
	Dec-09	NA	NA	NA	NA	<0.50	<1.00	NA	3.64	10.30	NA	NA	NA
W14	Mar-10	NA	NA	NA	NA	<0.50	2.60	<0.02	2.92	11.40	NA	NA	NA
	Jun-10	NA	NA	NA	NA	<0.50	2.00	<0.02	3.85	14.00	NA	NA	NA
	Sep-10	NA	NA	NA	NA	<0.50	2.41	0.30	14.40	23.10	NA	NA	NA
	Dec-10	NA	NA	NA	NA	<0.50	2.00	0.13	2.99	11.30	NA	NA	NA
W14	Apr-11	NA	NA	NA	NA	<0.50	2.00	0.79	1.69	10.40	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	3.00	0.10	6.41	10.10	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	3.00	0.20	3.23	8.74	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	1.40	2.01	9.88	NA	NA	NA
W14	Mar-12	NA	NA	NA	NA	<0.50	<1.00	3.90	0.22	5.01	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	1.76	2.60	0.91	6.62	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	1.28	3.10	0.00	4.12	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	2.77	0.84	6.91	15.90	NA	NA	NA
W14	Mar-13	NA	NA	NA	NA	<0.50	<1.00	4.70	1.32	2.82	NA	NA	NA
	Jun-13	NA	NA	NA	NA	<0.50	<1.00	4.30	0.82	3.98	NA	NA	NA
	Oct-13	NA	NA	NA	NA	<0.50	1.43	2.30	<0.97	28.60	NA	NA	NA
W15	Feb/Mar-04	49.00	4.10	2.00	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	9.53	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	5.00	15.60	NA	NA	NA	NA	NA	NA
	Dec-04	44.00	3.80	2.20	<2.0	7.20	17.20	15.90	1.00	62.00	NA	NA	NA
W15	Jun-05	NA	NA	NA	NA	4.60	<1.00	16.50	1.00	5.00	NA	NA	NA
	Dec-05	NA	NA	NA	NA	6.20	15.10	18.40	6.00	158.00	NA	NA	NA
W15	Jun-06	NA	NA	NA	NA	5.40	17.70	19.70	6.00	101.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	3.90	10.10	23.60	12.00	231.00	NA	NA	NA
W15	Jun-07	NA	NA	NA	NA	5.90	7.60	16.00	1.00	132.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	6.70	13.40	15.20	7.00	131.00	NA	NA	NA
W15	Mar-08	NA	NA	NA	NA	NA	NA	20.70	10.30	268.00	NA	NA	NA
	Jun-08	28.00	2.70	1.90	<2.0	6.60	13.60	16.90	0.35	153.00	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	14.40	1.33	144.00	NA	NA	NA
	Dec-08	35.00	3.50	2.50	<2.0	6.60	10.70	20.00	2.10	210.00	6.4	5.2	204.8

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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W15	Mar-09	NA	NA	NA	NA	4.20	13.40	19.80	9.82	154.00	NA	NA	NA
	Jun-09	NA	NA	NA	NA	4.92	15.00	17.20	1.70	141.00	NA	NA	NA
	Sep-09	NA	NA	NA	NA	5.50	20.90	14.90	7.86	209.00	NA	NA	NA
	Dec-09	NA	NA	NA	NA	3.73	9.00	23.00	5.07	210.00	NA	NA	NA
W15	Mar-10	NA	NA	NA	NA	3.00	13.20	27.00	7.34	184.00	NA	NA	NA
	Jun-10	NA	NA	NA	NA	4.41	15.00	19.00	4.52	201.00	NA	NA	NA
	Sep-10	NA	NA	NA	NA	2.30	12.10	21.00	11.30	293.00	NA	NA	NA
	Dec-10	NA	NA	NA	NA	2.65	10.00	29.00	4.61	159.00	NA	NA	NA
W15	Apr-11	NA	NA	NA	NA	2.15	10.00	19.00	4.17	188.00	NA	NA	NA
	Jun-11	NA	NA	NA	NA	2.00	12.00	23.00	9.89	232.00	NA	NA	NA
	Sep-11	NA	NA	NA	NA	2.00	14.00	20.00	6.20	177.00	NA	NA	NA
	Dec-11	NA	NA	NA	NA	2.90	13.00	20.00	3.25	203.00	NA	NA	NA
W15	Mar-12	NA	NA	NA	NA	2.12	12.10	25.00	3.68	229.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	2.48	14.40	28.00	4.60	111.00	NA	NA	NA
	Sep-12	NA	NA	NA	NA	2.76	12.30	22.00	0.95	165.00	NA	NA	NA
	Dec-12	NA	NA	NA	NA	3.00	14.70	22.00	3.22	160.00	NA	NA	NA
W15	Mar-13	NA	NA	NA	NA	2.37	13.90	21.00	3.89	174.00	NA	NA	NA
	Jun-13	NA	NA	NA	NA	2.55	15.60	23.00	4.08	145.00	NA	NA	NA
	Oct-13	NA	NA	NA	NA	2.80	12.70	23.00	<0.37	268.00	NA	NA	NA
W16	Feb/Mar-04	62.00	12.00	47.00	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	0.78	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	8.40	20.90	NA	NA	NA	NA	NA	NA
	Dec-04	56.00	11.00	56.00	<2.0	13.04	23.60	4.60	1.00	17.00	NA	NA	NA
W16	Jun-05	NA	NA	NA	NA	0.90	<1.00	5.20	4.00	14.00	NA	NA	NA
	Dec-05	39.00	8.70	40.00	<2.0	12.10	19.70	5.90	1.00	21.00	NA	NA	NA
W16	Jun-06	37.00	9.00	34.00	NA	12.00	31.80	2.80	1.00	23.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	7.90	14.90	3.40	0.00	19.00	NA	NA	NA
W16	Jun-07	35.00	8.80	23.00	<2.0	11.80	14.90	3.20	2.00	17.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	13.10	17.10	4.30	1.00	21.00	NA	NA	NA
W16	Mar-08	NA	NA	NA	NA	NA	NA	5.30	0.00	22.80	NA	NA	NA
	Jun-08	NA	NA	NA	NA	12.60	20.50	3.80	0.54	19.80	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	3.27	1.29	21.20	NA	NA	NA
	Dec-08	26.00	7.70	18.00	<2.0	11.00	16.20	3.60	1.20	22.40	12.0	9.8	12.6
W16	Mar-09	NA	NA	NA	NA	9.10	17.10	3.88	1.44	9.60	NA	NA	NA
	Jun-09	NA	NA	NA	NA	6.75	18.00	3.61	0.89	19.40	NA	NA	NA
	Sep-09	NA	NA	NA	NA	9.30	23.90	3.02	<0.001	22.90	NA	NA	NA
	Dec-09	NA	NA	NA	NA	8.10	16.00	2.80	1.88	19.10	NA	NA	NA

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W16	Mar-10	NA	NA	NA	NA	11.30	22.50	0.15	1.04	13.20	NA	NA	NA
	Jun-10	NA	NA	NA	NA	9.95	18.00	2.30	1.76	25.90	NA	NA	NA
	Sep-10	NA	NA	NA	NA	9.20	21.60	3.30	31.20	59.80	NA	NA	NA
	Dec-10	NA	NA	NA	NA	10.50	17.00	2.40	3.19	15.00	NA	NA	NA
W16	Apr-11	NA	NA	NA	NA	1.00	20.20	3.20	0.03	14.80	NA	NA	NA
	Jun-11	NA	NA	NA	NA	9.00	17.00	3.40	1.26	17.90	NA	NA	NA
	Sep-11	NA	NA	NA	NA	8.00	23.00	2.80	0.64	19.10	NA	NA	NA
	Dec-11	NA	NA	NA	NA	10.60	20.00	3.40	0.75	18.00	NA	NA	NA
W16	Mar-12	NA	NA	NA	NA	7.40	17.90	3.70	1.98	18.80	NA	NA	NA
	Jun-12	NA	NA	NA	NA	10.10	21.60	5.10	0.70	18.10	NA	NA	NA
	Sep-12	NA	NA	NA	NA	9.65	16.10	4.10	0.97	14.40	NA	NA	NA
	Dec-12	NA	NA	NA	NA	10.10	20.40	2.60	0.11	16.60	NA	NA	NA
W16	Mar-13	NA	NA	NA	NA	11.50	19.80	2.90	3.59	25.70	NA	NA	NA
	Jun-13	NA	NA	NA	NA	7.90	15.20	3.40	3.81	19.20	NA	NA	NA
	Oct-13	NA	NA	NA	NA	9.65	15.30	1.90	<0.32	16.10	NA	NA	NA
W17	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W17	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W17	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W17	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W17	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W17	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W17	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 4-3
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Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W17	Apr-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-11	NA	NA	NA	NA	2.40	7.00	11.00	6.81	224.00	NA	NA	NA
	Dec-11	NA	NA	NA	NA	2.48	7.40	5.20	3.29	273.00	NA	NA	NA
W17	Mar-12	NA	NA	NA	NA	2.64	7.32	11.00	7.43	263.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	2.30	8.02	21.00	1.54	257.00	NA	NA	NA
	Sep-12	NA	NA	NA	NA	2.53	6.88	11.00	6.35	202.00	NA	NA	NA
	Dec-12	NA	NA	NA	NA	2.28	6.99	12.00	0.53	356.00	NA	NA	NA
W17	Mar-13	NA	NA	NA	NA	2.64	7.95	11.00	5.90	314.00	NA	NA	NA
	Jun-13	NA	NA	NA	NA	2.45	7.37	12.00	2.63	264.00	NA	NA	NA
	Oct-13	NA	NA	NA	NA	1.96	6.07	12.00	12.80	372.00	NA	NA	NA
W18	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W18	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	4.30	<1.0	1.00	<2.0	15.90	<1.00	55.90	155.00	119.00	NA	NA	NA
W18	Jun-06	2.10	<1.0	<1.0	<2.0	25.70	<1.00	132.00	9.00	296.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	11.60	3.10	2.40	66.00	18.00	NA	NA	NA
W18	Jun-07	2.50	<1.0	<1.0	<2.0	1.70	3.10	3.90	112.00	19.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	10.80	39.40	69.80	31.00	38.00	NA	NA	NA
W18	Mar-08	NA	NA	NA	NA	NA	NA	12.50	3.46	11.80	NA	NA	NA
	Jun-08	NA	NA	NA	NA	12.00	82.60	141.00	8.44	72.20	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	86.40	12.40	47.40	NA	NA	NA
	Dec-08	1.10	<1.0	<1.0	<2.0	12.40	63.60	94.20	5.00	71.00	7.6	6.2	64.8
W18	Mar-09	NA	NA	NA	NA	13.15	88.50	151.00	9.50	103.00	NA	NA	NA
	Jun-09	NA	NA	NA	NA	3.82	3.00	142.00	9.25	94.70	NA	NA	NA
	Sep-09	NA	NA	NA	NA	11.45	106.00	85.60	17.80	55.70	NA	NA	NA
	Dec-09	NA	NA	NA	NA	14.95	71.00	15.00	17.40	45.10	NA	NA	NA
W18	Mar-10	NA	NA	NA	NA	10.60	130.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	6.00	90.00	3.80	10.40	101.00	NA	NA	NA
	Sep-10	NA	NA	NA	NA	13.00	110.00	200.00	24.60	115.00	NA	NA	NA
	Dec-10	NA	NA	NA	NA	12.00	92.00	240.00	4.52	118.00	NA	NA	NA
W18	Apr-11	NA	NA	NA	NA	11.90	91.00	<20.00	8.85	176.00	NA	NA	NA
	Jun-11	NA	NA	NA	NA	11.15	106.00	290.00	10.90	214.00	NA	NA	NA
	Sep-11	NA	NA	NA	NA	10.00	82.00	250.00	10.40	142.00	NA	NA	NA
	Dec-11	NA	NA	NA	NA	11.40	110.00	0.22	16.60	151.00	NA	NA	NA

Table 4-3
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Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W18	Mar-12	NA	NA	NA	NA	10.60	114.00	360.00	13.80	242.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	8.70	83.90	270.00	11.30	103.00	NA	NA	NA
	Sep-12	NA	NA	NA	NA	8.55	88.10	310.00	16.40	110.00	NA	NA	NA
	Dec-12	NA	NA	NA	NA	7.15	95.70	350.00	18.00	162.00	NA	NA	NA
W18	Mar-13	NA	NA	NA	NA	9.30	78.60	280.00	37.20	192.00	NA	NA	NA
	Jun-13	NA	NA	NA	NA	7.75	82.30	490.00	18.60	184.00	NA	NA	NA
	Oct-13	NA	NA	NA	NA	7.60	103.00	510.00	12.60	235.00	NA	NA	NA
W19	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
W19	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W19	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W19	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W19	Mar-08	NA	NA	NA	NA	NA	NA	6.10	1.52	3.65	NA	NA	NA
	Jun-08	NA	NA	NA	NA	NA	NA	6.50	1.57	1.51	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	5.95	2.39	7.77	NA	NA	NA
	Dec-08	NA	NA	NA	NA	<0.50	<1.00	6.20	0.90	1.60	NA	NA	NA
W19	Mar-09	NA	NA	NA	NA	<0.50	5.33	6.16	0.81	2.08	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<0.50	<1.00	6.17	0.44	1.06	NA	NA	NA
	Sep-09	NA	NA	NA	NA	<0.50	<1.00	5.93	1.30	3.91	NA	NA	NA
	Dec-09	NA	NA	NA	NA	<0.50	<1.00	NA	1.10	0.00	NA	NA	NA
W19	Mar-10	NA	NA	NA	NA	5.40	13.00	6.10	0.00	0.00	NA	NA	NA
	Jun-10	NA	NA	NA	NA	N/A	<1.00	6.20	1.60	3.12	NA	NA	NA
	Sep-10	NA	NA	NA	NA	<0.50	<1.00	5.70	1.66	1.93	NA	NA	NA
	Dec-10	NA	NA	NA	NA	<0.50	<1.00	6.50	0.00	0.00	NA	NA	NA
W19	Apr-11	NA	NA	NA	NA	<0.50	<1.00	6.50	0.00	1.05	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	4.60	1.19	1.55	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	4.90	0.79	1.09	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	4.90	0.95	0.00	NA	NA	NA
W19	Mar-12	NA	NA	NA	NA	<0.50	0.03	6.90	0.35	1.01	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	6.10	0.27	2.57	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	5.40	0.61	1.30	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	5.10	1.55	2.54	NA	NA	NA

Table 4-3
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Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W19	Mar-13	NA	NA	NA	NA	<0.50	<1.00	5.10	5.69	4.87	NA	NA	NA
	Jun-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W20	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
W20	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W20	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W20	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W20	Mar-08	NA	NA	NA	NA	NA	NA	0.91	1.08	1.43	NA	NA	NA
	Jun-08	NA	NA	NA	NA	NA	NA	0.11	2.58	2.96	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	0.16	0.92	0.00	NA	NA	NA
	Dec-08	NA	NA	NA	NA	<0.50	<1.00	0.40	0.00	3.40	NA	NA	NA
W20	Mar-09	NA	NA	NA	NA	<0.50	4.98	0.62	2.02	0.80	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<0.50	<1.00	0.41	1.69	0.16	NA	NA	NA
	Sep-09	NA	NA	NA	NA	<0.50	<1.00	0.09	0.00	7.88	NA	NA	NA
	Dec-09	NA	NA	NA	NA	<0.50	<1.00	NA	0.73	0.00	NA	NA	NA
W20	Mar-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	N/A	<1.00	0.48	3.16	1.02	NA	NA	NA
	Sep-10	NA	NA	NA	NA	<0.50	<1.00	0.49	3.69	0.00	NA	NA	NA
	Dec-10	NA	NA	NA	NA	<0.50	<1.00	0.03	1.48	0.20	NA	NA	NA
W20	Apr-11	NA	NA	NA	NA	<0.50	<1.00	0.25	0.09	2.35	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	0.19	0.81	0.00	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	0.73	2.76	0.00	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	<0.02	0.55	1.93	NA	NA	NA
W20	Mar-12	NA	NA	NA	NA	0.48	0.08	0.23	0.38	0.78	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	0.83	2.38	3.03	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	0.09	1.62	0.00	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	0.03	1.85	2.46	NA	NA	NA
W20	Mar-13	NA	NA	NA	NA	<0.50	<1.00	0.14	2.03	0.00	NA	NA	NA
	Jun-13	NA	NA	NA	NA	<0.50	<1.00	0.52	0.15	0.59	NA	NA	NA
	Oct-13	NA	NA	NA	NA	<0.50	<1.00	<0.02	<0.44	<2.27	NA	NA	NA

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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W22	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	<0.40	6.94	37.00	6.00	144.00	NA	NA	NA
W22	Jun-05	NA	NA	NA	NA	<0.50	<1.00	2.50	0.00	7.00	NA	NA	NA
	Dec-05	NA	NA	NA	NA	<0.50	<1.00	2.50	0.00	7.00	NA	NA	NA
W22	Jun-06	NA	NA	NA	NA	33.70	<1.00	35.00	0.00	2.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	3.10	52.30	56.80	3.00	38.00	NA	NA	NA
W22	Jun-07	NA	NA	NA	NA	5.00	10.20	22.80	2.00	8.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	5.00	10.20	22.80	NA	NA	NA	NA	NA
W22	Mar-08	NA	NA	NA	NA	NA	NA	10.80	2.43	10.40	NA	NA	NA
	Jun-08	NA	NA	NA	NA	20.50	87.70	71.40	2.08	25.60	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	<1.0	<1.0	<1.0	<2.0	5.60	5.70	21.60	2.60	13.70	<5.0	NA	NA
W22	Mar-09	NA	NA	NA	NA	6.30	22.90	43.90	4.00	26.20	NA	NA	NA
	Jun-09	NA	NA	NA	NA	1.22	<1.00	6.74	0.50	6.54	NA	NA	NA
	Sep-09	NA	NA	NA	NA	16.55	21.80	75.10	2.64	31.30	NA	NA	NA
	Dec-09	NA	NA	NA	NA	1.84	3.00	7.80	0.75	7.59	NA	NA	NA
W22	Mar-10	NA	NA	NA	NA	5.40	13.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	6.80	14.00	5.70	6.78	33.80	NA	NA	NA
	Sep-10	NA	NA	NA	NA	15.00	94.00	72.00	13.50	67.50	NA	NA	NA
	Dec-10	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W22	Apr-11	NA	NA	NA	NA	11.35	34.00	<20.00	5.92	21.60	NA	NA	NA
	Jun-11	NA	NA	NA	NA	15.05	84.00	150.00	14.70	95.10	NA	NA	NA
	Sep-11	NA	NA	NA	NA	7.00	49.00	100.00	12.30	86.70	NA	NA	NA
	Dec-11	NA	NA	NA	NA	23.10	105.00	0.12	32.60	224.00	NA	NA	NA
W22	Mar-12	NA	NA	NA	NA	16.00	78.00	190.00	14.30	126.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	6.35	19.90	28.00	7.82	5.13	NA	NA	NA
	Sep-12	NA	NA	NA	NA	11.90	27.40	110.00	8.67	51.20	NA	NA	NA
	Dec-12	NA	NA	NA	NA	16.40	94.20	290.00	28.20	143.00	NA	NA	NA
W22	Mar-13	NA	NA	NA	NA	11.40	43.90	220.00	4.92	70.90	NA	NA	NA
	Jun-13	NA	NA	NA	NA	5.50	7.24	26.00	9.88	26.10	NA	NA	NA
	Oct-13	NA	NA	NA	NA	15.80	65.00	260.00	8.13	91.20	NA	NA	NA
W23	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W23	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W23	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W23	Mar-08	NA	NA	NA	NA	NA	NA	7.62	5.09	1.26	NA	NA	NA
	Jun-08	NA	NA	NA	NA	NA	NA	3.24	10.60	5.79	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	1.99	3.54	3.25	NA	NA	NA
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	2.30	1.30	0.40	<5.0	NA	NA
W23	Mar-09	NA	NA	NA	NA	<0.50	4.75	2.72	1.90	1.51	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<0.50	<1.00	2.40	0.25	3.37	NA	NA	NA
	Sep-09	NA	NA	NA	NA	<0.50	<1.00	1.83	5.82	6.79	NA	NA	NA
	Dec-09	NA	NA	NA	NA	<0.50	<1.00	NA	0.59	2.68	NA	NA	NA
W23	Mar-10	NA	NA	NA	NA	<0.50	<1.00	1.80	1.14	<0.001	NA	NA	NA
	Jun-10	NA	NA	NA	NA	<0.50	<1.00	1.90	25.10	18.90	NA	NA	NA
	Sep-10	NA	NA	NA	NA	<0.50	<1.00	1.10	46.70	27.90	NA	NA	NA
	Dec-10	NA	NA	NA	NA	<0.50	<1.00	1.30	2.11	1.66	NA	NA	NA
W23	Apr-11	NA	NA	NA	NA	<0.50	<1.00	92.00	2.02	2.92	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	0.27	18.80	20.50	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	0.30	0.23	3.87	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	<0.02	3.40	1.03	NA	NA	NA
W23	Mar-12	NA	NA	NA	NA	<0.50	<1.00	0.34	2.69	2.60	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	1.20	2.25	2.76	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	1.20	1.10	2.49	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	0.77	0.94	3.19	NA	NA	NA
W23	Mar-13	NA	NA	NA	NA	<0.50	<1.00	1.20	1.77	2.07	NA	NA	NA
	Jun-13	NA	NA	NA	NA	<0.50	<1.00	1.30	1.27	6.40	NA	NA	NA
	Oct-13	NA	NA	NA	NA	<0.50	<1.00	1.40	6.92	5.78	NA	NA	NA
W24	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	<0.40	<1.00	2.80	0.00	9.00	NA	NA	NA
W24	Jun-05	NA	NA	NA	NA	<0.50	<1.00	2.20	0.00	9.00	NA	NA	NA
	Dec-05	NA	NA	NA	NA	<0.50	<1.00	2.10	0.00	3.00	NA	NA	NA
	Jun-06	NA	NA	NA	NA	<0.50	<1.00	1.20	1.00	1.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	<0.50	<1.00	1.60	0.00	5.00	NA	NA	NA

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Hopkins, South Carolina
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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W24	Jun-07	NA	NA	NA	NA	<0.50	<1.00	1.00	1.00	7.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	<0.50	<1.00	5.90	3.00	4.00	NA	NA	NA
W24	Mar-08	NA	NA	NA	NA	NA	NA	3.28	0.29	1.53	NA	NA	NA
	Jun-08	NA	NA	NA	NA	<0.50	<1.00	2.69	0.55	3.58	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	1.28	0.04	0.90	NA	NA	NA
	Dec-08	NA	NA	NA	NA	<0.50	<1.00	1.30	1.50	1.10	NA	NA	NA
W24	Mar-09	NA	NA	NA	NA	<0.50	4.60	0.80	0.00	2.24	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<0.50	<1.00	0.27	0.03	1.67	NA	NA	NA
	Sep-09	NA	NA	NA	NA	<0.50	<1.00	0.37	1.25	9.14	NA	NA	NA
	Dec-09	NA	NA	NA	NA	<0.50	<1.00	0.31	1.25	0.71	NA	NA	NA
W24	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NA	NA	NA	NA	<0.50	<1.00	<0.02	0.11	1.13	NA	NA	NA
	Sep-10	NA	NA	NA	NA	<0.50	<1.00	0.13	8.57	4.88	NA	NA	NA
	Dec-10	NA	NA	NA	NA	<0.50	<1.00	0.13	1.22	3.80	NA	NA	NA
W24	Apr-11	NA	NA	NA	NA	<0.50	<1.00	0.15	0.73	0.78	NA	NA	NA
	Jun-11	NA	NA	NA	NA	16.80	<1.00	0.12	0.70	4.37	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	0.11	9.47	5.81	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	0.06	2.74	2.23	NA	NA	NA
W24	Mar-12	NA	NA	NA	NA	<0.50	<1.00	0.22	3.48	2.26	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	0.49	1.05	1.61	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	0.21	0.60	0.00	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	0.22	2.22	1.25	NA	NA	NA
W24	Mar-13	NA	NA	NA	NA	<0.50	<1.00	0.23	5.11	5.84	NA	NA	NA
	Jun-13	NA	NA	NA	NA	<0.50	<1.00	0.30	0.41	8.05	NA	NA	NA
	Oct-13	NA	NA	NA	NA	<0.50	<1.00	0.04	4.88	<2.34	NA	NA	NA
W26	Feb/Mar-04	7.30	<1.0	<1.0	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	3.30	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	3.60	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	24.00	4.80	28.00	<2.0	3.52	<1.00	5.80	1.00	11.00	NA	NA	NA
W26	Jun-05	23.00	7.20	38.00	<2.0	3.50	<1.00	6.00	2.00	10.00	NA	NA	NA
	Dec-05	24.00	9.80	65.00	<2.0	3.00	<1.00	1.00	1.00	15.00	NA	NA	NA
W26	Jun-06	2.20	1.30	13.00	<2.0	2.30	<1.00	4.50	1.00	12.00	NA	NA	NA
	Dec-06	<1.0	<1.0	1.00	<2.0	1.80	<1.00	12.30	1.00	22.00	NA	NA	NA
W26	Jun-07	<1.0	<1.0	1.20	<2.0	<0.50	<1.00	16.00	1.00	14.00	NA	NA	NA
	Dec-07	<1.0	NA	NA	NA	<0.50	7.00	12.70	1.00	23.00	NA	NA	NA

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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W26	Mar-08	NA	NA	NA	NA	NA	NA	11.50	1.41	19.40	NA	NA	NA
	Jun-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	9.76	1.83	13.00	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	6.87	0.27	14.70	NA	NA	NA
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	9.80	0.29	14.40	5.2	4.3	10.1
W26	Mar-09	NA	NA	NA	NA	2.40	4.94	6.88	3.33	13.20	NA	NA	NA
	Jun-09	NA	NA	NA	NA	2.47	<1.00	6.31	1.64	11.10	NA	NA	NA
	Aug/Sep-09	<1.0	<1.0	<1.0	<2.0	2.31	<1.00	5.93	0.04	8.23	NA	NA	NA
	Dec-09	<1.0	<1.0	<1.0	<2.0	2.30	<1.00	NA	<0.001	10.10	NA	NA	NA
W26	Mar-10	NA	NA	NA	NA	1.50	<1.00	0.94	1.56	12.10	NA	NA	NA
	Jun-10	<1.0	<1.0	<1.0	<2.0	2.50	<1.00	15.00	6.29	27.00	NA	NA	NA
	Sep-10	<1.0	<1.0	<1.0	<2.0	2.60	<1.00	14.00	3.15	25.30	NA	NA	NA
	Dec-10	<1.0	<1.0	<1.0	<2.0	2.10	<1.00	13.00	0.00	16.30	NA	NA	NA
W26	Apr-11	<1.0	<1.0	<1.0	<2.0	2.90	<1.00	14.00	0.10	7.25	NA	NA	NA
	Jun-11	<1.0	<1.0	<1.0	<2.0	2.10	<1.00	11.00	1.78	17.70	NA	NA	NA
	Sep-11	<1.0	<1.0	<1.0	<2.0	2.18	<1.00	10.00	0.39	11.80	NA	NA	NA
	Dec-11	<1.0	<1.0	<1.0	<2.0	2.50	<1.00	9.60	2.15	9.98	NA	NA	NA
W26	Mar-12	<1.0	<1.0	<1.0	<1.0	2.14	<1.00	8.50	2.84	15.60	NA	NA	NA
	Jun-12	<1.0	<1.0	<1.0	<1.0	2.56	<1.00	8.90	3.21	11.40	NA	NA	NA
	Sep-12	<1.0	<1.0	<1.0	<1.0	2.70	<1.00	5.90	0.98	8.36	NA	NA	NA
	Dec-12	<1.0	<1.0	<1.0	<1.0	2.34	<1.00	6.50	2.24	22.10	NA	NA	NA
W26	Mar-13	<1.0	<1.0	<1.0	<1.0	2.57	<1.00	5.70	1.49	14.10	NA	NA	NA
	Jun-13	<1.0	<1.0	<1.0	<1.0	2.52	<1.00	6.50	0.57	9.21	NA	NA	NA
	Oct-13	<1.0	<1.0	1.70	<1.0	1.91	<1.00	4.80	<1.86	13.50	NA	NA	NA
W27	Feb/Mar-04	<1.0	<1.0	<1.0	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	2.37	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	2.10	5.33	NA	NA	NA	NA	NA	NA
	Dec-04	<1.0	<1.0	<1.0	<2.0	2.96	4.98	NA	NA	NA	NA	NA	NA
W27	Jun-05	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W27	Jun-06	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W27	Jun-07	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W27	Mar-08	NA	NA	NA	NA	NA	NA	<0.02	0.79	4.07	NA	NA	NA
	Jun-08	NA	NA	NA	NA	NA	NA	0.22	0.56	7.07	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	0.18	0.13	3.74	NA	NA	NA
	Dec-08	<1.0	<1.0	<1.0	<2.0	5.25	<1.00	0.28	1.80	8.10	<5.0	NA	NA

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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W27	Mar-09	NA	NA	NA	NA	5.70	9.44	0.09	1.14	3.38	NA	NA	NA
	Jun-09	NA	NA	NA	NA	5.70	7.26	0.13	1.39	6.58	NA	NA	NA
	Sep-09	NA	NA	NA	NA	6.25	9.60	0.24	1.64	6.96	NA	NA	NA
	Dec-09	NA	NA	NA	NA	6.25	7.00	NA	0.58	4.26	NA	NA	NA
W27	Mar-10	NA	NA	NA	NA	6.35	8.60	<0.02	<0.001	3.40	NA	NA	NA
	Jun-10	NA	NA	NA	NA	N/A	7.00	<0.02	2.50	7.14	NA	NA	NA
	Sep-10	NA	NA	NA	NA	6.20	9.72	<0.02	6.04	8.93	NA	NA	NA
	Dec-10	NA	NA	NA	NA	6.45	7.00	<0.02	2.23	5.03	NA	NA	NA
W27	Apr-11	NA	NA	NA	NA	8.00	9.00	<0.02	1.28	8.56	NA	NA	NA
	Jun-11	NA	NA	NA	NA	5.85	10.00	<0.02	3.58	5.72	NA	NA	NA
	Sep-11	NA	NA	NA	NA	6.40	9.00	<0.02	0.96	5.88	NA	NA	NA
	Dec-11	NA	NA	NA	NA	7.50	9.00	<0.02	3.07	0.38	NA	NA	NA
W27	Mar-12	NA	NA	NA	NA	7.35	9.11	0.04	3.10	6.61	NA	NA	NA
	Jun-12	NA	NA	NA	NA	6.50	9.80	<0.02	4.96	6.13	NA	NA	NA
	Sep-12	NA	NA	NA	NA	6.65	8.09	0.04	1.07	1.60	NA	NA	NA
	Dec-12	NA	NA	NA	NA	7.05	10.30	0.31	1.49	5.50	NA	NA	NA
W27	Mar-13	NA	NA	NA	NA	6.75	9.72	<0.02	3.08	12.20	NA	NA	NA
	Jun-13	NA	NA	NA	NA	6.35	7.18	<0.02	3.81	10.60	NA	NA	NA
	Oct-13	NA	NA	NA	NA	7.25	8.99	0.04	<0.35	12.50	NA	NA	NA
W28	Mar-04	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	7.28	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	7.60	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	10.56	<1.00	NA	NA	NA	NA	NA	NA
W28	Jun-05	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W28	Jun-06	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W28	Jun-07	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W28	Mar-08	NA	NA	NA	NA	NA	NA	16.10	10.80	9.92	NA	NA	NA
	Jun-08	NA	NA	NA	NA	NA	NA	6.82	1.22	0.00	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	7.03	3.29	10.80	NA	NA	NA
	Dec-08	<1.0	<1.0	<1.0	<2.0	7.20	<1.00	9.10	4.20	8.99	7.7	6.3	2.7
W28	Mar-09	NA	NA	NA	NA	12.50	<1.00	4.93	3.65	6.21	NA	NA	NA
	Jun-09	NA	NA	NA	NA	6.35	<1.00	9.82	6.15	8.87	NA	NA	NA
	Sep-09	NA	NA	NA	NA	14.05	2.50	2.69	9.69	10.00	NA	NA	NA
	Dec-09	NA	NA	NA	NA	9.45	<1.00	NA	2.36	7.13	NA	NA	NA

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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W28	Mar-10	NA	NA	NA	NA	12.20	<1.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	N/A	<1.00	5.90	8.26	9.33	NA	NA	NA
	Sep-10	NA	NA	NA	NA	23.00	5.00	1.80	18.80	15.80	NA	NA	NA
	Dec-10	NA	NA	NA	NA	16.40	2.00	9.60	4.56	11.80	NA	NA	NA
W28	Apr-11	NA	NA	NA	NA	4.00	<1.00	<20.00	6.89	13.80	NA	NA	NA
	Jun-11	NA	NA	NA	NA	26.05	5.00	3.80	7.71	10.70	NA	NA	NA
	Sep-11	NA	NA	NA	NA	12.00	<1.00	13.00	14.60	18.70	NA	NA	NA
	Dec-11	NA	NA	NA	NA	6.15	<1.00	5.90	25.00	119.00	NA	NA	NA
W28	Mar-12	NA	NA	NA	NA	6.30	0.81	9.80	21.30	105.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	5.55	<1.00	13.00	27.40	66.40	NA	NA	NA
	Sep-12	NA	NA	NA	NA	6.85	20.60	8.50	16.40	31.10	NA	NA	NA
	Dec-12	NA	NA	NA	NA	7.00	<1.00	3.60	19.00	47.40	NA	NA	NA
W28	Mar-13	NA	NA	NA	NA	5.85	<1.00	4.70	14.70	26.70	NA	NA	NA
	Jun-13	NA	NA	NA	NA	4.02	<1.00	5.00	11.40	22.60	NA	NA	NA
	Oct-13	NA	NA	NA	NA	7.75	<1.00	3.50	18.70	33.50	NA	NA	NA
W29	Mar-04	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	6.96	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	7.10	4.80	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	9.60	9.35	27.70	2.00	7.00	NA	NA	NA
W29	Jun-05	NA	NA	NA	NA	7.00	6.80	18.50	4.00	9.00	NA	NA	NA
	Dec-05	NA	NA	NA	NA	9.40	9.10	37.50	4.00	19.00	NA	NA	NA
W29	Jun-06	NA	NA	NA	NA	7.00	12.20	28.70	2.00	12.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	7.90	6.80	37.40	2.00	12.00	NA	NA	NA
W29	Jun-07	NA	NA	NA	NA	6.00	7.50	35.20	1.00	15.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	7.00	6.40	23.50	1.00	15.00	NA	NA	NA
W29	Mar-08	NA	NA	NA	NA	NA	NA	31.70	2.42	21.20	NA	NA	NA
	Jun-08	NA	NA	NA	NA	4.30	6.90	32.40	2.52	19.40	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	26.00	3.65	15.60	NA	NA	NA
	Dec-08	1.80	<1.0	<1.0	<2.0	6.50	6.40	20.90	0.24	17.40	<5.0	NA	NA
W29	Mar-09	NA	NA	NA	NA	6.45	9.26	25.00	2.49	9.07	NA	NA	NA
	Jun-09	NA	NA	NA	NA	6.70	3.00	28.60	1.37	12.30	NA	NA	NA
	Sep-09	NA	NA	NA	NA	6.80	11.70	21.20	2.64	17.20	NA	NA	NA
	Dec-09	NA	NA	NA	NA	6.40	7.00	26.00	4.64	1.33	NA	NA	NA
W29	Mar-10	NA	NA	NA	NA	5.10	11.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	6.80	7.00	13.00	2.73	10.30	NA	NA	NA
	Sep-10	NA	NA	NA	NA	7.10	8.00	20.00	7.30	9.51	NA	NA	NA
	Dec-10	NA	NA	NA	NA	6.25	7.00	13.00	1.29	6.00	NA	NA	NA

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W29	Apr-11	NA	NA	NA	NA	5.45	9.00	<20.00	1.35	8.33	NA	NA	NA
	Jun-11	NA	NA	NA	NA	4.40	7.00	18.00	3.41	5.38	NA	NA	NA
	Sep-11	NA	NA	NA	NA	4.50	3.00	28.00	3.82	9.78	NA	NA	NA
	Dec-11	NA	NA	NA	NA	4.94	8.50	17.00	7.10	8.30	NA	NA	NA
W29	Mar-12	NA	NA	NA	NA	3.95	18.70	690.00	10.10	97.60	NA	NA	NA
	Jun-12	NA	NA	NA	NA	3.87	36.30	790.00	6.07	101.00	NA	NA	NA
	Sep-12	NA	NA	NA	NA	4.03	5.02	840.00	4.81	78.20	NA	NA	NA
	Dec-12	NA	NA	NA	NA	4.10	38.20	450.00	7.22	50.90	NA	NA	NA
W29	Mar-13	NA	NA	NA	NA	4.06	25.20	980.00	12.70	94.40	NA	NA	NA
	Jun-13	NA	NA	NA	NA	3.89	20.70	440.00	6.42	67.60	NA	NA	NA
	Oct-13	NA	NA	NA	NA	4.44	19.70	170.00	6.94	32.10	NA	NA	NA
W30	Mar-04	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	23.96	31.90	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	20.80	35.90	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	19.24	32.60	380.00	21.00	64.00	NA	NA	NA
W30	Jun-05	NA	NA	NA	NA	10.00	30.60	521.00	45.00	61.00	NA	NA	NA
	Dec-05	NA	NA	NA	NA	15.60	<1.00	476.00	35.00	64.00	NA	NA	NA
W30	Jun-06	NA	NA	NA	NA	12.30	35.90	296.00	28.00	132.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	17.30	6.30	3.30	3.00	98.00	NA	NA	NA
W30	Jun-07	NA	NA	NA	NA	17.70	5.80	359.00	8.00	66.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	23.40	4.10	197.00	11.00	29.00	NA	NA	NA
W30	Mar-08	NA	NA	NA	NA	NA	NA	189.00	13.50	45.00	NA	NA	NA
	Jun-08	NA	NA	NA	NA	10.00	3.50	419.00	51.20	121.00	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	187.00	15.60	61.50	NA	NA	NA
	Dec-08	3.30	<1.0	<1.0	<2.0	27.60	2.30	133.00	10.00	70.00	8.0	6.6	63.4
W30	Mar-09	NA	NA	NA	NA	20.10	1.74	95.80	12.20	24.30	NA	NA	NA
	Jun-09	NA	NA	NA	NA	29.50	9.00	194.00	10.30	36.50	NA	NA	NA
	Sep-09	NA	NA	NA	NA	28.65	7.40	87.60	19.30	44.60	NA	NA	NA
	Dec-09	NA	NA	NA	NA	27.50	3.00	120.00	13.10	51.70	NA	NA	NA
W30	Mar-10	NA	NA	NA	NA	37.30	4.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	30.10	6.00	83.00	12.90	34.90	NA	NA	NA
	Sep-10	NA	NA	NA	NA	16.10	4.00	180.00	26.00	66.60	NA	NA	NA
	Dec-10	NA	NA	NA	NA	12.50	4.00	150.00	9.52	39.20	NA	NA	NA
W30	Apr-11	NA	NA	NA	NA	11.85	5.00	<20.00	9.32	37.30	NA	NA	NA
	Jun-11	NA	NA	NA	NA	11.00	2.00	110.00	10.50	46.90	NA	NA	NA
	Sep-11	NA	NA	NA	NA	5.00	53.00	230.00	18.90	45.80	NA	NA	NA
	Dec-11	NA	NA	NA	NA	12.15	3.50	2,900.00	26.10	80.20	NA	NA	NA

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Hopkins, South Carolina
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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W30	Mar-12	NA	NA	NA	NA	13.90	12.40	1,800.00	11.10	117.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	12.50	8.11	620.00	20.80	77.80	NA	NA	NA
	Sep-12	NA	NA	NA	NA	13.10	60.60	540.00	17.40	56.60	NA	NA	NA
	Dec-12	NA	NA	NA	NA	14.30	10.10	1,000.00	45.10	135.00	NA	NA	NA
W30	Mar-13	NA	NA	NA	NA	13.20	4.09	660.00	18.80	102.00	NA	NA	NA
	Jun-13	NA	NA	NA	NA	12.70	2.78	300.00	13.30	45.70	NA	NA	NA
	Oct-13	NA	NA	NA	NA	16.60	<1.00	140.00	18.80	53.70	NA	NA	NA
W32	Mar-04	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	1.57	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	<0.40	<1.00	37.70	75.00	546.00	NA	NA	NA
W32	Jun-05	NA	NA	NA	NA	<0.50	<1.00	46.00	70.00	1,020.00	NA	NA	NA
	Dec-05	NA	NA	NA	NA	<0.50	1.40	49.60	8.00	1,810.00	NA	NA	NA
W32	Jun-06	NA	NA	NA	NA	13.00	52.90	44.10	7.00	171.00	NA	NA	NA
	Dec-06	NA	NA	NA	NA	11.70	40.40	50.20	8.00	265.00	NA	NA	NA
W32	Jun-07	NA	NA	NA	NA	9.40	59.10	61.80	3.00	190.00	NA	NA	NA
	Dec-07	NA	NA	NA	NA	9.90	35.10	59.50	3.00	237.00	NA	NA	NA
W32	Mar-08	NA	NA	NA	NA	NA	NA	71.70	6.00	260.00	NA	NA	NA
	Jun-08	NA	NA	NA	NA	6.00	50.60	84.60	0.87	301.00	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	72.90	1.57	240.00	NA	NA	NA
	Dec-08	<1.0	<1.0	<1.0	<2.0	5.60	45.50	70.50	1.80	265.00	7.5	6.2	258.9
W32	Mar-09	NA	NA	NA	NA	7.10	46.10	71.10	7.72	236.00	NA	NA	NA
	Jun-09	NA	NA	NA	NA	8.15	46.00	63.70	2.30	260.00	NA	NA	NA
	Sep-09	<1.0	<1.0	<1.0	<2.0	7.70	65.20	63.00	5.41	235.00	NA	NA	NA
	Dec-09	NA	NA	NA	NA	8.25	42.00	57.00	3.51	285.00	NA	NA	NA
W32	Mar-10	NA	NA	NA	NA	6.90	54.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	8.85	48.00	54.00	12.00	266.00	NA	NA	NA
	Sep-10	NA	NA	NA	NA	9.30	46.00	57.00	3.47	270.00	NA	NA	NA
	Dec-10	NA	NA	NA	NA	8.70	40.00	55.00	1.11	165.00	NA	NA	NA
W32	Apr-11	NA	NA	NA	NA	7.85	48.00	<20.00	0.74	196.00	NA	NA	NA
	Jun-11	NA	NA	NA	NA	7.00	68.00	82.00	0.68	211.00	NA	NA	NA
	Sep-11	NA	NA	NA	NA	10.00	1.00	110.00	10.40	183.00	NA	NA	NA
	Dec-11	NA	NA	NA	NA	5.15	65.40	130.00	11.70	315.00	NA	NA	NA
W32	Mar-12	NA	NA	NA	NA	4.36	63.60	160.00	4.88	258.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	4.86	72.40	190.00	5.40	208.00	NA	NA	NA
	Sep-12	NA	NA	NA	NA	4.13	<1.00	170.00	3.48	136.00	NA	NA	NA
	Dec-12	NA	NA	NA	NA	3.63	64.70	150.00	0.00	283.00	NA	NA	NA

Table 4-3
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Hopkins, South Carolina
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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W32	Mar-13	NA	NA	NA	NA	3.79	47.10	84.00	8.43	264.00	NA	NA	NA
	Jun-13	NA	NA	NA	NA	3.28	54.10	170.00	2.08	213.00	NA	NA	NA
	Oct-13	NA	NA	NA	NA	3.53	69.60	180.00	14.70	265.00	NA	NA	NA
W33	Feb/Mar-04	470.00	94.00	5.10	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	280.00	50.00	2.80	<2.0	<0.40	<1.00	NA	NA	NA	NA	NA	NA
W33	Jun-05	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	360.00	61.00	1.60	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
W33	Jun-06	530.00	87.00	2.10	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W33	Jun-07	450.00	61.00	<2.0	<4.0	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W33	Mar-08	NA	NA	NA	NA	NA	NA	71.70	3.12	20.70	NA	NA	NA
	Jun-08	300.00	43.00	1.20	<2.0	NA	NA	18.20	0.45	10.80	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	9.56	0.00	4.01	NA	NA	NA
	Dec-08	240.00	36.00	<1.0	<2.0	<0.50	<1.00	9.50	0.80	8.88	<5.0	NA	NA
W33	Mar-09	NA	NA	NA	NA	<0.50	4.87	10.90	0.31	4.28	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<0.50	<1.00	18.10	0.17	9.19	NA	NA	NA
	Sep-09	NA	NA	NA	NA	<0.50	<1.00	19.80	0.07	8.89	NA	NA	NA
	Dec-09	NA	NA	NA	NA	<0.50	<1.00	NA	0.10	4.11	NA	NA	NA
W33	Mar-10	NA	NA	NA	NA	<0.50	<1.00	16.00	<0.001	5.01	NA	NA	NA
	Jun-10	NA	NA	NA	NA	N/A	<1.00	17.00	7.24	26.70	NA	NA	NA
	Sep-10	NA	NA	NA	NA	<0.50	<1.00	15.00	14.60	15.40	NA	NA	NA
	Dec-10	NA	NA	NA	NA	<0.50	<1.00	15.00	2.62	4.95	NA	NA	NA
W33	Apr-11	NA	NA	NA	NA	<0.50	<1.00	0.10	1.19	5.07	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	10.00	0.00	10.00	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	10.00	0.33	2.19	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	9.20	0.87	6.78	NA	NA	NA
W33	Mar-12	NA	NA	NA	NA	<0.50	<1.00	8.70	1.01	2.12	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	16.00	3.40	7.39	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	9.50	0.08	3.19	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	7.40	4.03	6.06	NA	NA	NA
W33	Mar-13	NA	NA	NA	NA	<0.50	<1.00	7.90	1.96	4.28	NA	NA	NA
	Jun-13	NA	NA	NA	NA	<0.50	<1.00	7.80	0.83	6.39	NA	NA	NA
	Oct-13	NA	NA	NA	NA	<0.50	<1.00	8.10	<3.17	9.44	NA	NA	NA

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Hopkins, South Carolina
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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W35	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W35	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W35	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W35	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W35	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W35	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W35	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W35	Apr-11	NA	NA	NA	NA	<0.50	<1.00	**0.41**	NA	NA	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	**0.30**	**2.22**	**8.30**	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	**0.57**	**1.73**	**2.88**	NA	NA	NA
	Dec-11	NA	NA	NA	NA	**0.02**	<1.00	**0.55**	**1.65**	**3.97**	NA	NA	NA
W35	Mar-12	NA	NA	NA	NA	<0.50	<1.00	**0.60**	**1.13**	**2.64**	NA	NA	NA
	Jun-12	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-12	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-12	NA	NA	NA	NA	<0.50	**1.20**	**0.12**	**4.30**	**7.95**	NA	NA	NA
W35	Mar-13	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-13	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W36	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W36	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W36	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W36	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W36	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	**0.20**	0.00	0.00	<5.0	NA	NA
W36	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W36	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W36	Apr-11	NA	NA	NA	NA	<0.50	<1.00	**0.13**	NA	NA	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	**0.17**	**1.14**	**4.94**	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	**0.21**	**0.87**	**1.00**	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	<0.02	**1.20**	**2.39**	NA	NA	NA
W36	Mar-12	NA	NA	NA	NA	<0.50	<1.00	**0.55**	**0.57**	**0.94**	NA	NA	NA
	Jun-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W36	Mar-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W37	Feb-Mar-04	<1.0	<1.0	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	<1.0	<1.0	<1.0	<2.0	<0.40	<1.00	NA	NA	NA	NA	NA	NA
W37	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W37	Jun-06	<1.0	<1.0	<1.0	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W37	Jun-07	<1.0	<1.0	<1.0	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W37	Mar-08	NA	NA	NA	NA	NA	NA	5.13	3.43	3.21	NA	NA	NA
	Jun-08	<1.0	<1.0	<1.0	<2.0	NA	NA	3.27	0.11	2.91	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	3.33	0.78	4.85	NA	NA	NA
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	3.60	0.60	1.60	<5.0	NA	NA
W37	Mar-09	NA	NA	NA	NA	<0.50	<1.00	3.58	0.14	1.24	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<1.00	<1.00	3.63	2.31	1.86	NA	NA	NA
	Sep-09	NA	NA	NA	NA	<0.50	<1.00	3.77	0.75	7.59	NA	NA	NA
	Dec-09	NA	NA	NA	NA	1.70	<1.00	NA	0.27	4.50	NA	NA	NA
W37	Mar-10	NA	NA	NA	NA	<0.50	<1.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	N/A	<1.00	4.10	1.34	15.90	NA	NA	NA
	Sep-10	NA	NA	NA	NA	<0.50	<1.00	5.40	7.58	13.90	NA	NA	NA
	Dec-10	NA	NA	NA	NA	<0.50	<1.00	4.00	1.47	2.43	NA	NA	NA
W37	Apr-11	NA	NA	NA	NA	<0.50	2.00	<20.00	0.97	2.18	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	3.80	1.55	3.82	NA	NA	NA
	Sep-11	NA	NA	NA	NA	6.00	<1.00	3.50	1.36	2.44	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	2.80	0.00	4.28	NA	NA	NA
W37	Mar-12	NA	NA	NA	NA	<0.50	0.17	5.70	0.00	5.64	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	5.50	0.13	3.99	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	3.70	0.00	2.58	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	4.10	6.32	28.50	NA	NA	NA
W37	Mar-13	NA	NA	NA	NA	<0.50	<1.00	4.20	1.17	1.88	NA	NA	NA
	Jun-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W38	Feb/Mar-04	12.00	140.00	<1.0	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	0.92	<1.00	NA	NA	NA	NA	NA	NA
	Sep-04	NA	NA	NA	NA	1.30	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	9.00	100.00	<1.0	<2.0	1.78	<1.00	NA	NA	NA	NA	NA	NA
W38	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	2.50	45.00	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
W38	Jun-06	2.10	47.00	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W38	Jun-07	2.60	48.00	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W38	Mar-08	NA	NA	NA	NA	NA	NA	3.26	0.40	0.00	NA	NA	NA
	Jun-08	2.30	47.00	<1.0	<2.0	NA	NA	6.45	0.62	1.71	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	5.49	1.67	5.46	NA	NA	NA
	Dec-08	2.00	38.00	<1.0	<2.0	1.80	<1.00	6.60	0.50	6.20	<5.0	NA	NA
W38	Mar-09	NA	NA	NA	NA	1.30	<1.00	9.37	1.99	3.99	NA	NA	NA
	Jun-09	NA	NA	NA	NA	1.79	<1.00	9.34	<0.001	3.01	NA	NA	NA
	Sep-09	NA	NA	NA	NA	1.98	<1.00	9.70	0.44	2.50	NA	NA	NA
	Dec-09	NA	NA	NA	NA	<0.50	<1.00	NA	0.57	1.92	NA	NA	NA
W38	Mar-10	NA	NA	NA	NA	0.50	<1.00	NA	NA	NA	NA	NA	NA
	Jun-10	NA	NA	NA	NA	N/A	<1.00	14.00	3.14	3.63	NA	NA	NA
	Sep-10	NA	NA	NA	NA	0.80	<1.00	15.00	5.99	3.23	NA	NA	NA
	Dec-10	NA	NA	NA	NA	0.83	<1.00	15.00	0.83	4.35	NA	NA	NA
W38	Apr-11	NA	NA	NA	NA	1.09	2.00	<20.00	0.00	3.40	NA	NA	NA
	Jun-11	NA	NA	NA	NA	1.08	<1.00	16.00	1.62	6.11	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	9.10	2.30	1.44	NA	NA	NA
	Dec-11	NA	NA	NA	NA	1.12	<1.00	13.00	2.76	2.17	NA	NA	NA
W38	Mar-12	NA	NA	NA	NA	1.11	0.17	17.00	3.50	3.53	NA	NA	NA
	Jun-12	NA	NA	NA	NA	1.47	<1.00	17.00	3.71	7.57	NA	NA	NA
	Sep-12	NA	NA	NA	NA	1.60	<1.00	12.00	2.46	7.22	NA	NA	NA
	Dec-12	NA	NA	NA	NA	1.43	<1.00	14.00	<2.46	4.38	NA	NA	NA
W38	Mar-13	NA	NA	NA	NA	1.60	<1.00	14.00	4.10	5.24	NA	NA	NA
	Jun-13	NA	NA	NA	NA	8.95	<1.00	12.00	7.72	<2.77	NA	NA	NA
	Oct-13	NA	NA	NA	NA	0.70	<1.00	13.00	<0.98	2.93	NA	NA	NA
W39	Feb/Mar-04	210.00	10.00	4.60	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	110.00	7.10	1.20	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
W39	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	140.00	7.20	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
W39	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W39	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W39	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	110.00	4.40	1.70	<2.0	<0.50	<1.00	58.30	1.50	11.70	<5.0	NA	NA

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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W39	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W39	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W39	Apr-11	NA	NA	NA	NA	<0.50	<1.00	**150.00**	NA	NA	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	**99.00**	**7.09**	**17.00**	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	**92.00**	**11.90**	**29.20**	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	**52.00**	**3.02**	**17.80**	NA	NA	NA
W39	Mar-12	NA	NA	NA	NA	<0.50	<1.00	**80.00**	**4.34**	**20.10**	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	**59.00**	**2.74**	**14.30**	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	**110.00**	**4.58**	**13.70**	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	**150.00**	**9.83**	**35.40**	NA	NA	NA
W39	Mar-13	NA	NA	NA	NA	<0.50	<1.00	**87.00**	**2.20**	**23.70**	NA	NA	NA
	Jun-13	NA	NA	NA	NA	<0.50	<1.00	**54.00**	**1.70**	**16.00**	NA	NA	NA
	Oct-13	NA	NA	NA	NA	<0.50	<1.00	**56.00**	**5.31**	**19.30**	NA	NA	NA
W40	Feb/Mar-04	<1.0	<1.0	<1.0	>2.0	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	**2.20**	<1.0	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
W40	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W40	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W40	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W40	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	**6.80**	0.00	**1.50**	<5.0	NA	NA
W40	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W40	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W40	Apr-11	NA	NA	NA	NA	<0.50	<1.00	6.10	NA	NA	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	6.40	2.58	5.71	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	9.70	4.69	3.98	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	5.70	5.72	9.54	NA	NA	NA
W40	Mar-12	NA	NA	NA	NA	<0.50	<1.00	9.30	3.95	10.70	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	8.20	1.27	6.52	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	6.40	3.10	3.95	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	5.50	6.25	9.37	NA	NA	NA
W40	Mar-13	NA	NA	NA	NA	<0.50	<1.00	5.90	4.02	5.62	NA	NA	NA
	Jun-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W41	Mar-04	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	320.00	54.00	3.70	<2.0	<0.40	<1.00	36.40	2.00	8.00	NA	NA	NA
W41	Jun-05	360.00	55.00	3.20	<2.0	<0.40	<1.00	35.10	3.00	23.00	NA	NA	NA
	Dec-05	280.00	72.00	3.30	<2.0	<0.40	<1.00	41.70	3.00	22.00	NA	NA	NA
W41	Jun-06	300.00	62.00	3.00	<2.0	<0.40	<1.00	30.10	3.00	22.00	NA	NA	NA
	Dec-06	280.00	61.00	3.40	<2.0	<0.40	<1.00	37.10	2.00	8.00	NA	NA	NA
W41	Jun-07	350.00	64.00	2.90	<2.0	<0.50	<1.00	41.80	3.00	12.00	NA	NA	NA
	Dec-07	240.00	49.00	2.10	NA	<0.50	<1.00	40.10	2.00	11.00	NA	NA	NA
W41	Mar-08	NA	NA	NA	NA	NA	NA	37.50	2.06	9.57	NA	NA	NA
	Jun-08	240.00	46.00	2.10	<2.0	<0.50	<1.00	41.10	1.88	10.90	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	38.90	1.81	10.30	NA	NA	NA
	Dec-08	200.00	42.00	1.80	<2.0	<0.50	<1.00	40.30	5.50	13.40	5.3	4.3	9.1
W41	Mar-09	NA	NA	NA	NA	<0.50	4.69	42.60	1.62	10.50	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<0.50	<1.00	50.00	2.16	15.60	NA	NA	NA
	Aug/Sep-09	140.00	29.00	<1.0	<2.0	<0.50	<1.00	51.80	2.53	14.10	NA	NA	NA
	Dec-09	230.00	47.00	2.00	<2.0	<0.50	<1.00	NA	1.80	16.50	NA	NA	NA
W41	Mar-10	NA	NA	NA	NA	<0.50	<1.00	31.00	1.90	9.30	NA	NA	NA
	Jun-10	51.00	9.50	<1.0	<2.0	<0.50	<1.00	63.00	6.19	13.90	NA	NA	NA
	Sep-10	120.00	22.00	<1.0	<2.0	<0.50	<1.00	67.00	6.24	23.20	NA	NA	NA
	Dec-10	140.00	29.00	1.20	<2.0	<0.50	<1.00	61.00	3.58	19.00	NA	NA	NA

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Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W41	Apr-11	170.00	35.00	1.30	<2.0	<0.50	<1.00	53.00	5.03	14.30	NA	NA	NA
	Jun-11	180.00	39.00	<2.0	<2.0	<0.50	<1.00	56.00	2.50	17.60	NA	NA	NA
	Sep-11	200.00	44.00	1.70	<2.0	<0.50	<1.00	59.00	3.95	16.70	NA	NA	NA
	Dec-11	210.00	46.00	1.70	<2.0	<0.50	<1.00	52.00	4.60	18.40	NA	NA	NA
W41	Mar-12	220.00	50.00	1.80	<2.0	<0.50	<1.00	56.00	4.46	16.90	NA	NA	NA
	Jun-12	250.00	48.00	1.60	<1.0	<0.50	<1.00	52.00	1.50	15.00	NA	NA	NA
	Sep-12	270.00	52.00	1.60	<1.0	<0.50	<1.00	41.00	2.54	8.36	NA	NA	NA
	Dec-12	210.00	41.00	<20.0	<1.0	<0.50	<1.00	41.00	3.82	21.40	NA	NA	NA
W41	Mar-13	210.00	41.00	<5.0	<1.0	<0.50	<1.00	37.00	4.51	11.70	NA	NA	NA
	Jun-13	180.00	43.00	1.20	<1.0	<0.50	<1.00	40.00	2.87	10.60	NA	NA	NA
	Oct-13	160.00	22.00	1.20	<1.0	<0.50	<1.00	43.00	<2.40	19.30	NA	NA	NA
W42	Feb/Mar-04	<1.0	<1.0	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA	NA	NA	NA
W42	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W42	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W42	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W42	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	<1.0	<1.0	<1.0	<2.0	1.90	5.00	17.40	1.90	27.80	6.4	5.2	22.6
W42	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W42	Mar-10	NS	NS	NS	NS								
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W42	Apr-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W42	Mar-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W42	Mar-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W43	Feb/Mar-04	<1.0	<1.0	<1.0	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	<1.0	<1.0	<1.0	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
W43	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W43	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W43	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W43	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	**10.80**	**2.50**	**4.40**	<5.0	NA	NA
W43	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W43	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W43	Apr-11	NA	NA	NA	NA	<0.50	<1.00	**8.50**	NA	NA	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	**11.00**	**4.07**	**9.07**	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	**6.20**	**2.42**	**6.58**	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	**12.00**	**1.09**	**4.28**	NA	NA	NA
W43	Mar-12	NA	NA	NA	NA	<0.50	<1.00	**19.00**	**2.08**	**9.90**	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	**13.00**	**5.97**	**6.68**	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	**5.90**	**5.00**	**5.74**	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	**10.00**	**3.33**	**6.32**	NA	NA	NA

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W43	Mar-13	NA	NA	NA	NA	<0.50	<1.00	9.40	4.74	6.44	NA	NA	NA
	Jun-13	NA	NA	NA	NA	<0.50	<1.00	6.90	0.66	5.47	NA	NA	NA
	Oct-13	NA	NA	NA	NA	<0.50	<1.00	3.40	7.35	11.20	NA	NA	NA
W44	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	<1.0	<1.0	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
W44	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W44	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W44	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W44	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	3.00	<1.0	<1.0	<2.0	<0.50	<1.00	9.30	0.90	7.90	<5.0	NA	NA
W44	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W44	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W44	Apr-11	NA	NA	NA	NA	<0.50	<1.00	4.00	NA	NA	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	3.60	2.41	7.98	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	5.00	0.65	6.92	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	7.40	0.27	3.37	NA	NA	NA
W44	Mar-12	NA	NA	NA	NA	<0.50	0.03	9.60	1.28	7.99	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	10.00	2.75	7.82	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	7.90	3.68	2.30	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	9.00	5.42	4.45	NA	NA	NA
W44	Mar-13	NA	NA	NA	NA	<0.50	<1.00	8.80	1.28	8.40	NA	NA	NA
	Jun-13	NA	NA	NA	NA	<0.50	<1.00	8.20	1.40	5.35	NA	NA	NA
	Oct-13	NA	NA	NA	NA	<0.50	<1.00	2.80	<2.88	4.21	NA	NA	NA

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W45	Feb/Mar-04	1.70	<1.0	1.00	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	<1.0	<1.0	1.60	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
W45	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W45	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W45	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W45	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	<1.0	<1.0	<1.0	<2.0	1.10	<1.00	0.20	0.30	3.90	<5.0	NA	NA
W45	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W45	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W45	Apr-11	NA	NA	NA	NA	0.80	<1.00	<0.02	NA	NA	NA	NA	NA
	Jun-11	NA	NA	NA	NA	1.17	<1.00	0.03	7.08	5.43	NA	NA	NA
	Sep-11	NA	NA	NA	NA	1.40	<1.00	<0.02	9.88	5.28	NA	NA	NA
	Dec-11	NA	NA	NA	NA	1.38	<1.00	<0.02	21.60	8.51	NA	NA	NA
W45	Mar-12	NA	NA	NA	NA	1.39	<1.00	<0.02	22.00	13.20	NA	NA	NA
	Jun-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-12	NA	NA	NA	NA	1.36	<1.00	<0.02	15.90	12.70	NA	NA	NA
W45	Mar-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
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Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W46	Feb/Mar-04	1.00	<1.0	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	1.40	<1.0	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
W46	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W46	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W46	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W46	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	1.90	<1.0	<1.0	<2.0	<0.50	<1.00	9.50	1.60	22.40	<5.0	NA	NA
W46	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W46	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W46	Apr-11	NA	NA	NA	NA	<0.50	<1.00	7.60	NA	NA	NA	NA	NA
	Jun-11	NA	NA	NA	NA	<0.50	<1.00	7.60	2.52	23.50	NA	NA	NA
	Sep-11	NA	NA	NA	NA	<0.50	<1.00	8.10	3.58	33.90	NA	NA	NA
	Dec-11	NA	NA	NA	NA	<0.50	<1.00	9.80	1.00	23.20	NA	NA	NA
W46	Mar-12	NA	NA	NA	NA	0.12	0.03	9.20	2.41	22.00	NA	NA	NA
	Jun-12	NA	NA	NA	NA	<0.50	<1.00	8.80	0.86	28.50	NA	NA	NA
	Sep-12	NA	NA	NA	NA	<0.50	<1.00	7.30	1.62	16.20	NA	NA	NA
	Dec-12	NA	NA	NA	NA	<0.50	<1.00	7.40	0.55	39.50	NA	NA	NA
W46	Mar-13	NA	NA	NA	NA	<0.50	<1.00	7.40	1.64	37.80	NA	NA	NA
	Jun-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W47	Feb/Mar-04	1.70	<1.0	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	<1.0	<1.0	<1.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W47	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W47	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W47	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W47	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	3.60	<1.0	<1.0	<2.0	6.80	16.10	22.90	0.30	10.10	8.0	6.6	3.5
W47	Mar-09	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS
W47	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W47	Apr-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W47	Mar-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-12	NA	NA	NA	NA	6.00	20.70	26.00	1.85	59.00	NA	NA	NA
	Sep-12	NA	NA	NA	NA	5.35	15.00	27.00	1.25	74.10	NA	NA	NA
	Dec-12	NA	NA	NA	NA	5.60	23.00	27.00	8.53	129.00	NA	NA	NA
W47	Mar-13	NA	NA	NA	NA	5.50	17.90	26.00	3.97	116.00	NA	NA	NA
	Jun-13	NA	NA	NA	NA	5.55	13.90	27.00	3.84	96.40	NA	NA	NA
	Oct-13	NA	NA	NA	NA	5.85	18.90	37.00	9.98	102.00	NA	NA	NA
W48	Feb/Mar-04	320.00	2.90	12.00	<2.0	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	290.00	2.80	12.00	<2.0	<0.40	<1.00	7.80	1.00	4.00	NA	NA	NA
W48	Jun-05	360.00	4.00	<1.0	<2.0	<0.50	<1.00	7.80	0.00	11.00	NA	NA	NA
	Dec-05	370.00	10.00	22.00	<2.0	<0.40	<1.00	8.70	0.00	11.00	NA	NA	NA
W48	Jun-06	380.00	7.50	18.00	<2.0	<0.40	<1.00	8.10	1.00	7.00	NA	NA	NA
	Dec-06	340.00	5.40	16.00	<2.0	<0.40	<1.00	8.90	4.00	9.00	NA	NA	NA

Table 4-3
Summary of Analytical Results in Groundwater (2004-2013)
Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W48	Jun-07	390.00	2.80	7.80	<4.0	<0.50	<1.00	6.50	1.00	6.00	NA	NA	NA
	Dec-07	340.00	2.80	9.20	<4.0	<0.50	<1.00	9.70	2.00	6.00	NA	NA	NA
W48	Mar-08	NA	NA	NA	NA	NA	NA	9.87	2.58	14.80	NA	NA	NA
	Jun-08	170.00	1.20	3.70	<2.0	<0.50	<1.00	9.62	1.09	8.43	NA	NA	NA
	Sep-08	NA	NA	NA	NA	NA	NA	9.27	1.46	14.00	NA	NA	NA
	Dec-08	270.00	1.80	6.70	<2.0	<0.50	<1.00	9.20	0.90	13.40	<5.0	NA	NA
W48	Mar-09	NA	NA	NA	NA	<0.50	4.82	8.41	0.39	7.23	NA	NA	NA
	Jun-09	NA	NA	NA	NA	<0.50	<1.00	7.93	0.72	1.75	NA	NA	NA
	Aug/Sep-09	250.00	3.30	9.60	<4.0	<0.50	<1.00	4.71	0.49	4.98	NA	NA	NA
	Dec-09	320.00	5.00	11.00	<2.0	<0.50	<1.00	NA	<0.001	6.34	NA	NA	NA
W48	Mar-10	NA	NA	NA	NA	<0.50	<1.00	9.10	0.84	3.71	NA	NA	NA
	Jun-10	330.00	2.10	5.90	<2.0	<0.50	<1.00	8.20	<0.001	8.48	NA	NA	NA
	Sep-10	370.00	2.20	6.60	<2.0	<0.50	<1.00	7.40	1.23	9.06	NA	NA	NA
	Dec-10	340.00	1.90	5.10	<2.0	<0.50	<1.00	8.30	0.65	11.80	NA	NA	NA
W48	Apr-11	310.00	1.80	5.10	<2.0	2.80	<1.00	10.00	1.65	8.03	NA	NA	NA
	Jun-11	230.00	<4.0	4.70	<8.0	<0.50	<1.00	8.90	0.94	7.93	NA	NA	NA
	Sep-11	260.00	1.70	5.20	<2.0	<0.50	<1.00	7.80	1.94	4.81	NA	NA	NA
	Dec-11	140.00	<1.0	2.40	<2.0	<0.50	<1.00	6.30	2.03	7.02	NA	NA	NA
W48	Mar-12	140.00	<1.0	2.10	<2.0	<0.50	<1.00	8.60	1.36	8.46	NA	NA	NA
	Jun-12	150.00	<1.0	2.40	<1.0	<0.50	<1.00	10.00	0.02	0.00	NA	NA	NA
	Sep-12	130.00	<1.0	1.70	<1.0	<0.50	<1.00	6.50	0.70	7.72	NA	NA	NA
	Dec-12	180.00	1.40	3.50	<1.0	<0.50	<1.00	6.20	3.60	8.70	NA	NA	NA
W48	Mar-13	180.00	1.30	3.20	<5.0	<0.50	<1.00	6.40	0.00	10.10	NA	NA	NA
	Jun-13	140.00	1.40	3.50	<1.0	<0.50	<1.00	6.20	2.30	7.33	NA	NA	NA
	Oct-13	160.00	2.80	5.00	<1.0	<0.50	<1.00	5.20	6.70	16.60	NA	NA	NA
W49	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W49	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W49	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W49	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

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Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W49	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	<0.02	**0.06**	0.00	<5.0	NA	NA
W49	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W49	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W49	Apr-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W49	Mar-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W49	Mar-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W50	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W50	Jun-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W50	Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W50	Jun-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 4-3
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Westinghouse Columbia Fuel Fabrication Facility
Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
W50	Mar-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-08	<1.0	<1.0	<1.0	<2.0	<0.50	<1.00	<0.02	NA	NA	<5.0	NA	NA
W50	Mar-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W50	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Dec-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W50	Apr-11	NS	NS	NS	NS	<0.50	<1.00	**0.06**	NA	NA	NA	NA	NA
	Jun-11	NS	NS	NS	NS	<0.50	<1.00	**0.03**	**1.73**	0.00	NA	NA	NA
	Sep-11	NS	NS	NS	NS	<0.50	<1.00	**0.03**	**2.14**	**3.56**	NA	NA	NA
	Dec-11	NS	NS	NS	NS	<0.50	<1.00	<0.02	**3.46**	0.00	NA	NA	NA
W50	Mar-12	NS	NS	NS	NS	<0.50	<1.00	<0.02	**1.35**	**0.49**	NA	NA	NA
	Jun-12	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA
	Sep-12	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA
	Dec-12	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA
W50	Mar-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
WRW-2	Mar-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-04	NA	NA	NA	NA	<0.40	<1.00	NA	NA	NA	NA	NA	NA
	Dec-04	NA	NA	NA	NA	**0.42**	<1.00	**54.90**	**7.00**	**15.00**	NA	NA	NA
WRW-2	Jun-05	**97.00**	**8.70**	**1.80**	<2.00	<0.50	<1.00	**153.00**	**11.00**	**99.00**	NA	NA	NA
	Dec-05	**83.00**	**7.20**	**1.70**	<2.00	<0.50	<1.00	**510.00**	**28.00**	**184.00**	NA	NA	NA
WRW-2	Jun-06	**190.00**	**9.60**	**2.40**	<2.00	**0.60**	**5.60**	**244.00**	**7.00**	**38.00**	NA	NA	NA
	Dec-06	**230.00**	**12.00**	**2.80**	<2.00	**1.50**	**4.20**	**139.00**	**9.00**	**48.00**	NA	NA	NA
WRW-2	Jun-07	**290.00**	**13.00**	**3.10**	<2.00	**1.00**	**6.50**	**127.00**	**6.00**	**52.00**	NA	NA	NA
	Dec-07	**160.00**	**9.70**	**2.70**	<2.00	**1.30**	**1.10**	**121.00**	**10.00**	**37.00**	NA	NA	NA
WRW-2	Mar-08	NA	NA	NA	<2.00	NA	NA	**77.70**	**3.55**	**23.00**	NA	NA	NA
	Jun-08	**120.00**	**6.00**	**2.20**	<2.00	**1.40**	<1.00	**148.00**	**3.78**	**30.70**	NA	NA	NA
	Sep-08	NA	NA	NA	<2.00	N/A	N/A	**117.00**	**4.18**	**31.90**	NA	NA	NA
	Dec-08	NA	NA	NA	<2.00	**1.20**	<1.00	**114.00**	**3.75**	**37.00**	**5.2**	**4.3**	**32.7**

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Hopkins, South Carolina
AECOM Project No. 60302740

Well	Sample Date	Tetrachloro-ethene ug/L	Trichloro-ethene Ug/L	cis-1,2-dichloro-ethene Ug/L	Vinyl Chloride Ug/L	Fluoride mg/L	NH3(N) mg/L	NO3 mg/L	Gross Alpha pCi/L	Gross Beta pCi/L	Potassium mg/L	Potassium 40 mg/L	Adjusted Gross Beta pCi/L
		MCL=5	MCL=5	MCL=70	MCL=2	MCL=4		MCL=10	MCL=15	MCL=50*			MCL=50*
WRW-2	Mar-09	NA	NA	NA	<2.00	1.30	5.77	109.00	2.69	25.80	NA	NA	NA
	Jun-09	NA	NA	NA	<2.00	1.68	<1.00	160.00	3.03	28.60	NA	NA	NA
	Aug/Sep-09	44.00	2.90	<1.00	<2.00	1.27	3.40	192.00	9.86	48.60	NA	NA	NA
	Dec-09	30.00	3.80	<1.00	<2.00	0.77	<1.00	N/A	5.50	45.60	NA	NA	NA
WRW-2	Mar-10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Jun-10	8.40	1.80	<1.00	<2.00	0.60	<1.00	78.00	1.01	26.20	NA	NA	NA
	Sep-10	12.00	1.90	<1.00	<2.00	0.60	<1.00	66.00	20.40	26.70	NA	NA	NA
	Dec-10	37.00	4.00	<1.00	<2.00	1.00	1.00	56.00	1.93	17.40	NA	NA	NA
WRW-2	Mar/Apr-11	180.00	9.00	<1.00	<2.00	<0.50	1.00	38.00	6.92	14.30	NA	NA	NA
	Jun-11	290.00	10.00	<4.00	<8.00	<0.50	1.00	33.00	6.13	14.80	NA	NA	NA
	Sep-11	NA	NA	NA	<2.00	<0.50	1.00	16.00	6.47	8.94	NA	NA	NA
	Dec-11	240.00	9.30	1.50	<2.00	<0.50	1.00	31.00	4.17	8.18	NA	NA	NA
WRW-2	Mar-12	230.00	11.00	1.40	<1.00	<0.50	1.00	30.00	5.03	10.50	NA	NA	NA
	Jun-12	190.00	8.00	1.70	<1.00	<0.50	1.00	27.00	0.54	4.78	NA	NA	NA
	Sep-12	160.00	7.00	1.60	<1.00	<0.50	<1.00	25.00	4.53	4.88	NA	NA	NA
	Dec-12	190.00	10.00	1.30	<1.00	<0.50	<1.00	34.00	3.47	14.20	NA	NA	NA
WRW-2	Mar-13	170.00	7.70	1.10	<1.00	<0.50	<1.00	28.00	1.91	7.72	NA	NA	NA
	Jun-13	130.00	5.80	<1.00	<1.00	<0.50	<1.00	30.00	0.69	7.81	NA	NA	NA
	Oct-13	130.00	12.00	<1.00	<1.00	<0.50	<1.00	28.00	<3.05	12.50	NA	NA	NA

Notes:

mg/L: Milligrams per liter
pCi/L: Picocuries per liter
MCL: Maximum contaminant level
Bold: The analyte was detected by the laboratory
Bold and Shaded: The analyte concetration exceeded the EPA MCL
NA: Not available
NS: Not sampled