Appendix D: **Radiological Environmental Monitoring Program Supplemental Information**

Negative values are reported in tables in this appendix. Background counts are subtracted from the sample counts. Negative values occur when the background count is greater than the sample count. Background counts reflect naturally occurring radionuclides and cosmic radiation that is detected by laboratory instrumentation.

Appendix Table D-1 Summary of Radioactive Atmospheric Releases by Source

In the Calculated column, blanks indicate the radionuclide is not present. A 0.00E+00 in the Calculated column indicates the radionuclide had the potential to be present, but the estimated release was zero. In the facility (Reactors, Separations, Savannah River National Laboratory [SRNL]) columns, a blank indicates the radionuclide was not analyzed. A 0.00E+00 in the facility columns indicates the result was not detected.

Radioactive Atmospheric Releases by Source (curies)[a]

Radionuclide	Half-Life[b]	Calculated[c] (Ci)	Reactors (Ci)	Separations[d] (Ci)	SRNL (Ci)	Total (Ci)
Gases and Vapors						
H-3 (oxide)	12.3 y	7.18E+01	3.13E+01	6.53E+03		6.63E+03
H-3 (elemental)	12.3 y			1.89E+03		1.89E+03
H-3 Total	12.3 y	7.18E+01	3.13E+01	8.42E+03		8.52E+03
C-14	5,700 y	3.52E-07		6.60E-02		6.60E-02
Hg-203	46.6 d	4.77E-10				4.77E-10
Kr-85	10.8 y			2.27E+04		2.27E+04
I-129	1.57E+07 y	6.04E-05		7.64E-03	0.00E+00	7.70E-03
I-131	8.02 d	5.52E-10				5.52E-10
Particles						
Ag-110m	250 d	0.00E+00				0.00E+00
Am-241	432 y	4.20E-07	0.00E+00	3.15E-06	1.30E-09	3.58E-06
Am-243	7,370 y	4.33E-09				4.33E-09
Au-198	2.6952 d	2.78E-08				2.78E-08
Ba-133	10.5 y	3.92E-09				3.92E-09
Be-7	53 d	0.00E+00				0.00E+00
Cd-109	461 d	1.65E-08				1.65E-08
Ce-137	9 h	1.87E-05				1.87E-05
Ce-139	138 d	4.71E-10				4.71E-10
Ce-141	32.5 d	0.00E+00				0.00E+00
Ce-144	285 d	0.00E+00				0.00E+00
Cm-243	29.1 y	0.00E+00				0.00E+00
Cm-244	18.1 y	7.46E-08	0.00E+00	3.50E-08	2.99E-08	1.39E-07
Co-56	77.23 d	0.00E+00				0.00E+00
Co-57	272 d	4.51E-10				4.51E-10
Co-60	5.27 y	1.80E-07	0.00E+00	0.00E+00	0.00E+00	1.80E-07
Cs-134	2.06 y	1.47E-09				1.47E-09
Cs-137	30.2 y	3.33E-03	0.00E+00	5.76E-04	0.00E+00	3.90E-03
Eu-152	13.5 y	8.61E-09				8.61E-09
Eu-154	8.59 y	9.53E-10				9.53E-10

Appendix Table D-1 Summary of Radioactive Atmospheric Releases by Source (continued)

Radioactive Atmospheric Releases by Source (curies)[a] (continued)

Radionuclide	Half-Life[b]		Calculated[c] (Ci)	Reactors (Ci)	Separations[d] (Ci)	SRNL (Ci)	Total (Ci)
Eu-155	4.76	y	0.00E+00				0.00E+00
F-18	1.83	h	0.00E+00				0.00E+00
Fe-55	2.74	y	6.76E-09				6.76E-09
K-40	1.25E+09	y	7.08E-09				7.08E-09
La-140	1.6781	d	0.00E+00				0.00E+00
Mn-54	312	d	4.51E-10				4.51E-10
Na-22	2.6019	y	0.00E+00				0.00E+00
Nb-94	2.03E+04	y	0.00E+00				0.00E+00
Nb-95	35	d	0.00E+00				0.00E+00
Ni-59	1.01E+05	y	0.00E+00				0.00E+00
Ni-63	100	y	3.20E-09				3.20E-09
Np-237	2.14E+06	y	1.40E-08	1.75E-10	3.08E-07	2.15E-10	3.22E-07
Pa-233	27	d	0.00E+00				0.00E+00
Pa-234	6.7	h	2.65E-07				2.65E-07
Pb-212	10.6	h	8.43E-07				8.43E-07
Pm-147	2.62	y	0.00E+00				0.00E+00
Pm-148m	41.3	d	0.00E+00				0.00E+00
Pr-144	17.3	m	0.00E+00				0.00E+00
Pu-236	2.86	y	1.21E-09				1.21E-09
Pu-238	87.7	y	1.16E-07	0.00E+00	2.90E-06	2.45E-08	3.04E-06
Pu-239	2.41E+04	y	4.16E-05	0.00E+00	4.53E-05	9.53E-09	8.69E-05
Pu-240	6,560	y	5.08E-07				5.08E-07
Pu-241	14.4	y	8.96E-06				8.96E-06
Pu-242	3.75E+05	y	3.29E-09				3.29E-09
Ra-226	1,600	y	1.16E-08				1.16E-08
Ra-228	5.75	y	1.82E-09				1.82E-09
Rh-106[e]	29.8	s	4.31E-09				4.31E-09
Ru-103	39.3	d	0.00E+00				0.00E+00
Ru-106	374	d	4.31E-09				4.31E-09
Sb-125	2.76	y	2.11E-09				2.11E-09
Sb-126[e]	12.4	d	0.00E+00				0.00E+00
Sc-46	83.79	d	0.00E+00				0.00E+00
Se-79	2.95E+05	y	0.00E+00				0.00E+00
Sm-151	90	y	0.00E+00				0.00E+00

Appendix Table D-1 Summary of Radioactive Atmospheric Releases by Source (continued)

Radioactive Atmospheric Releases by Source (curies)[a] (continued)

Radionuclide	Half-Life[b]		Calculated[c] (Ci)	Reactors (Ci)	Separations[d] (Ci)	SRNL (Ci)	Total (Ci)
Sn-113	115	d	6.27E-10				6.27E-10
Sn-123	129	d	0.00E+00				0.00E+00
Sn-126	2.30E+05	y	0.00E+00				0.00E+00
Sr-85	64.8	d	6.02E-10				6.02E-10
Sr-89	50.5	d	1.12E-10				1.12E-10
Sr-90	28.8	y	2.52E-03	0.00E+00	5.55E-05		2.58E-03
Tc-99	2.11E+05	y	3.75E-07				3.75E-07
Te-127	9.35	h	0.00E+00				0.00E+00
Te-129	69.6	m	0.00E+00				0.00E+00
Th-228	1.91	y	1.22E-11	1.82E-09			1.83E-09
Th-229	7,340	y	1.39E-09				1.39E-09
Th-230	7.54E+04	y	8.40E-07	2.03E-09			8.42E-07
Th-231	25.5	h	0.00E+00				0.00E+00
Th-232	1.41E+10	y	2.20E-08	1.07E-09			2.31E-08
Tl-208	3.05	m	1.41E-06				1.41E-06
U-232	68.9	y	2.80E-09				2.80E-09
U-233	1.59E+05	y	2.36E-07				2.36E-07
U-234	2.46E+05	y	1.95E-05	5.05E-08	1.73E-05	2.70E-09	3.69E-05
U-235	7.04E+08	y	4.76E-07	0.00E+00	1.42E-06	1.31E-09	1.90E-06
U-236	2.34E+07	y	1.54E-07				1.54E-07
U-237	6.75	d	2.21E-10				2.21E-10
U-238	4.47E+09	y	2.83E-05	6.45E-08	2.42E-05	0.00E+00	5.26E-05
Y-88	107	d	4.51E-10				4.51E-10
Y-90[e]	64.1	h	2.52E-03	0.00E+00	5.55E-05		2.58E-03
Y-91	58.5	d	0.00E+00				0.00E+00
Zn-65	244	d	9.93E-10				9.93E-10
Zr-95	64	d	0.00E+00				0.00E+00
Unidentified Alpha[f]	N/A		6.62E-05	6.06E-06	5.42E-06	8.35E-08	7.78E-05
Unidentified Beta[g]	N/A		1.75E-04	7.24E-05	7.99E-05	3.03E-06	3.30E-04
TOTAL	N/A		7.18E+01	3.13E+01	3.11E+04	3.19E-06	3.12E+04

Note:

SRNL = Savannah River National Laboratory

[a] One curie equals 3.7E+10 Becquerels

[b] ICRP 107, *Nuclear Decay Data for Dosimetric Calculations (2008);* Half-life time intervals are given in seconds (s), hours (h), days (d), minutes (m), and years (y).

[c] Estimated releases from unmonitored sources. Beginning in 2016, individual isotope annual releases below 1E-12 Ci (1 pCi) are no longer reported in this table; therefore, they were not used in the dose calculations.

[d] Includes separations, waste management, and tritium facilities

[e] Daughter products (Sb-126, Rh-106 and Y-90) in secular equilibrium with source terms (Sn-126, Ru-106 and Sr-90, respectively). In MAXDOSE/POPDOSE, they are included in the source term, and their ingrowth is included in their parents' source term.

[f,g] For dose calculations, unidentified alpha and beta/gamma releases are assumed to be Pu-239 and Sr-90, respectively.

Appendix Table D-2 Summary of Air Effluent DOE DCS Sum of Fractions

As discussed in Chapter 5, *Radiological Environmental Monitoring Program*, SRS evaluates the effluent monitoring program by comparing the annual average concentrations to the U.S. Department of Energy (DOE)-derived concentration standards (DCSs). DOE's *Derived Concentration Technical Standard*, DOE-STD-1196-2022 (DOE 2022), establishes numerical standards for DCSs to support implementing DOE Order 458.1. This table presents the air effluent DCS sum of fractions for continuously monitored sources where at least one analyte had at least one detected value. Continuously monitored sources are sampled on a weekly, biweekly, or monthly basis.

Facility (Sampling Location)	Radionuclides Included in the DCS Sum of Fractions	DCS Sum of Fractions	DCS Sum of Fractions Excluding Tritium
C Area (C-Area Main Stack)	H-3 (oxide)	1.76E-01	0.00E+00
F Area (235-F Sandfilter Discharge)	Pu-238, Pu-239/240, U-233/234, U-238	3.38E-04	3.38E-04
F Area (292-F Main Stack)	Am-241, Cm-243/244, I-129, Np-237, Pu-238, Pu-239/240, Sr-90, U-233/234, U-235, U-238	5.93E-01	5.93E-01
F Area (772-4F Stack)	Cm-243/244, Pu-238, Pu-239/240, U-233/234, U-238	3.22E-04	3.22E-04
H Area (292-H Main Stack)	Am-241, Cs-137, Cm-243/244, I-129, Np-237, Pu-238, Pu-239/240, Sr-90, U-233/234, U-235, U-238, H-3 (oxide), Kr-85, C-14	5.11E+00	4.69E+00
K Area (K-Area Main Stack)	H-3 (oxide)	1.05E-01	0.00E+00
L Area (L-Area Disassembly)	H-3 (oxide)	1.02E-01	0.00E+00
L area (L-Area Main Stack)	H-3 (oxide)	7.44E-02	0.00E+00
Tritium (232-H Stack)	H-3 (elemental), H-3 (oxide)	2.77E+01	0.00E+00
Tritium (233-H Stack)	H-3 (elemental), H-3 (oxide)	3.63E+00	0.00E+00
Tritium (234-H Stack)	H-3 (oxide)	5.34E+00	0.00E+00
Tritium (238-H Stack)	H-3 (oxide)	1.68E-01	0.00E+00
Tritium (264-H Stack)	H-3 (elemental), H-3 (oxide)	3.74E+01	0.00E+00

Appendix Table D-3 Summary of Tritium in Environmental Air

Samples were collected approximately every two weeks at each of the 16 air surveillance locations. Bolded minimum and maximum concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large. One sample was invalidated for Patterson Mill Road, deployed March 8 to March 22, and one sample was invalidated for Barricade 8, deployed November 1 to November 15, both due to pump failure. Special samples were pulled as a precautionary measure at Burial Ground North and Allendale Gate locations due to open glove box maintenance at H Area, which is why these locations have more samples. The results at the following locations were all not detected; therefore, they are not reported in this table: Site Perimeter (A-14, Barnwell Gate, and Patterson Mill Road) and 25-Mile Radius (Aiken Airport and Highway 301 @ State Line). The Highway 301 @ State Line location is the control location.

Location	Number of Detected Results	Mean Concentration (pCi/m^3)	Minimum Concentration (pCi/m^3)	Maximum Concentration (pCi/m^3)
Onsite				
Burial Ground North	27 of 27	3.53E+02	**9.84E+01**	**7.42E+02**
Site Perimeter				
Allendale Gate	2 of 27	3.20E+00	-6.34E+00	**1.73E+01**
Barricade 8	3 of 25	5.21E+00	-9.90E+00	**1.57E+01**
D Area	3 of 26	7.43E+00	-7.80E+00	2.76E+01
Darkhorse @ Williston Gate	3 of 26	5.22E+00	-4.89E+00	**1.74E+01**
East Talatha	3 of 26	5.07E+00	-3.91E+00	1.42E+01
Green Pond	1 of 26	4.25E+00	-4.09E+00	**2.25E+01**
Highway 21/167	1 of 26	5.19E+00	-5.54E-01	1.17E+01
Jackson	3 of 26	4.51E+00	-1.04E+01	**1.83E+01**
Talatha Gate	2 of 26	5.28E+00	-3.18E+00	**2.76E+01**
25-Mile Radius				
Augusta Lock and Dam 614	1 of 26	2.90E+00	-4.03E+00	1.36E+01

Appendix Table D-4 Summary of Tritium in Rainwater

Samples were collected approximately every four weeks at each of the 16 air surveillance locations. Bolded minimum and maximum concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large. The results at the following locations were all not detected; therefore, they are not reported in this table: Site Perimeter (A-14, Allendale Gate, Barnwell Gate, Darkhorse @ Williston Gate, East Talatha, Green Pond, Hwy 21/167, Jackson, Patterson Mill Road, and Talatha Gate) and 25-Mile Radius (Augusta Lock & Dam 614, Aiken Airport, and Highway 301 @ State Line). The Highway 301 @ State Line location is the control location.

Location	Number of Detected Results	Mean Concentration (pCi/L)	Minimum Concentration (pCi/L)	Maximum Concentration (pCi/L)
Onsite				
Burial Ground North	12 of 13	1.62E+03	3.68E+02	**3.34E+03**
Site Perimeter				
Barricade 8	1 of 13	9.93E+01	-1.57E+02	**7.51E+02**
D Area	1 of 13	1.77E+02	-3.09E+01	**6.83E+02**

Appendix Table D-5 Summary of Radionuclides in Environmental Air

Glass fiber filter samples were collected approximately every two weeks at each of the 16 air surveillance locations shown in Figure 5-4. Samples from all locations were analyzed biweekly for gamma-emitting radionuclides, gross alpha, and gross beta.

Bolded minimum and maximum concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large.

All media collected March 8 to March 22 at Patterson Mill Road and all media collected November 1 to November 15 at Barricade 8 were invalidated due to pump failure. Cobalt-60 and cesium-137 results were not detected for any samples collected biweekly; therefore, they were not reported in the table *Biweekly Samples: All Locations*.

Biweekly Samples: All Locations

Radionuclide	Number of Detected Results	Location of Minimum Concentration	Minimum Concentration (pCi/m^3)	Location of Maximum Concentration	Maximum Concentration (pCi/m^3)
Gross Alpha	408 of 414	Darkhorse @ Williston Gate	1.38E-04	Darkhorse @ Williston Gate	**6.54E-03**
Gross Beta	414 of 414	Darkhorse @ Williston Gate	**5.76E-03**	East Talatha	**3.31E-02**

One sample from every air surveillance location was chosen quarterly in 2023 for actinide and strontium-90 analysis based on elevated releases at F-Area stacks during 2023. This is true except for Burial Ground North, which began the year with biweekly analyses, resulting in a higher number of samples. Highway 301 @ State Line is the control location. Of note, the samples collected May 3 to May 17 at D Area and Barricade 8 were not analyzed for uranium-233/234, uranium-235, and uranium-238.

Strontium-90 results were not detected for the quarterly analyses; therefore, they were not reported in the table *Actinide and Strontium-90*.

Actinide and Strontium-90

Radionuclide	Number of Detected Results	Location of Minimum Concentration	Minimum Concentration (pCi/m^3)	Location of Maximum Concentration	Maximum Concentration (pCi/m^3)
Am-241	2 of 67	D Area	-1.99E-05	East Talatha	5.03E-05
Cm-243/244	7 of 67	Allendale Gate	-2.61E-06	Augusta Lock and Dam 614	**3.80E-05**
Pu-238	2 of 67	A-14	-1.15E-05	Allendale Gate	3.81E-05
Pu-239/240	1 of 67	Talatha Gate	-1.44E-05	D Area	2.96E-05
U-233/234	5 of 65	D Area	-4.60E-06	Allendale Gate	9.39E-05
U-235	1 of 65	Darkhorse @ Williston Gate	-1.41E-05	Burial Ground North	1.24E-05
U-238	9 of 65	Barnwell Gate	-1.10E-05	Green Pond	**1.33E-04**

Appendix Table D-6 Summary of Gamma Surveillance

Samples were collected approximately every quarter (13 weeks) at each of the 52 optically stimulated luminescent dosimeter locations. Please reference Environmental Maps, SRS Optically Stimulated Luminescent Dosimeter [OSLD] Sampling Locations.

Station Location Type	Number of Stations	Quarter 1 Average (mR/day)	Quarter 2 Average (mR/day)	Quarter 3 Average (mR/day)	Quarter 4 Average (mR/day)	Annual Total Average (mR/year)	Annual Minimum (mR/year)	Annual Maximum (mR/year)
Population Centers	9	0.37	0.38	0.35	0.42	138.79	119	157
Site Perimeter	9	0.30	0.33	0.29	0.35	115.92	100	132
Air Surveillance Stations	16	0.32	0.33	0.32	0.37	121.99	100	157
Plant Vogtle Vicinity	18	0.29	0.31	0.30	0.36	114.57	95	138

Appendix D-7 Summary of Radionuclides in Soil

Bolded concentration results were reported as detected. Concentrations not bolded indicate the result was less than the analytical method detection limit or that the uncertainty is large. Soil samples were collected from 24 locations in 2023, as described below. Creek Plantation locations are only sampled for gamma-emitting radionuclides and strontium-90.

Locations sampled are as follows:

- Onsite locations: F Area (2,000' West), H Area (2,000' East), Z Area (#3), and Burial Ground locations (643-26E-2 and Burial Ground North)
- Plant Perimeter locations: A-14, Allendale Gate, Barnwell Gate, Barricade 8, D Area, Darkhorse @ Williston Gate, East Talatha, Green Pond, Highway 21/167, Jackson, Patterson Mill Road, and Talatha Gate
- 25-Mile Radius locations: Aiken Airport, Augusta Lock and Dam 614, and Highway 301 @ State Line
- Creek Plantation locations: Trail 1 (1175', 1600', 1805') and Trail 6 (2300'). The Highway 301 @ State Line is the control location.

All cobalt-60 and neptunium-237 results were not detected; therefore, they were not reported in this table.

Radionuclide	Number of Detected Results	Control Hwy 301 Concentration (pCi/g)	Location of Minimum Concentration	Minimum Concentration (pCi/g)	Location of Maximum Concentration	Maximum Concentration (pCi/g)
Am-241	19 of 20	**3.21E-03**	Augusta Lock and Dam 614	**1.25E-03**	Burial Ground North	**1.55E-02**
Cm-243/244	6 of 20	3.66E-04	Patterson Mill Road	-1.28E-04	Burial Ground North	**6.77E-03**
Cs-137	21 of 24	**8.40E-02**	Green Pond	2.22E-02	Trail 1 1805'	**3.72E+01**
Gross Alpha	20 of 20	**1.74E+01**	East Talatha	**2.33E+00**	643-26E-2	**2.34E+01**
Gross Beta	12 of 20	**1.15E+01**	Highway 21/167	-4.89E-01	Z Area (#3)	**2.02E+01**
Pu-238	3 of 20	2.11E-04	Jackson	1.77E-04	F Area (2000' West)	**3.88E-02**
Pu-239/240	18 of 20	**6.45E-03**	Barricade 8	1.36E-03	F Area (2000' West)	**1.39E-01**
Sr-90	2 of 24	**1.22E-01**	D Area	-2.61E-02	Trail 1 1600'	**1.22E-01**
U-233/234	20 of 20	**1.62E+00**	F Area (2000' West)	**3.61E-01**	643-26E-2	**3.24E+00**
U-235	19 of 20	**9.42E-02**	Patterson Mill Road	7.98E-03	643-26E-2	**1.80E-01**
U-238	20 of 20	**1.51E+00**	F Area (2000' West)	**3.66E-01**	643-26E-2	**3.33E+00**

Appendix Table D-8 Summary of Radionuclides in Grassy Vegetation

Vegetation samples were collected from 16 locations in 2023. Bolded values are detected results. Values not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large.

Locations sampled are as follows:

- Onsite location: Burial Ground North
- Site Perimeter locations: A-14, Allendale Gate, Barnwell Gate, Barricade 8, D Area, Darkhorse @ Williston Gate, East Talatha, Green Pond, Highway 21/167, Jackson, Patterson Mill Road, and Talatha Gate
- 25-Mile Radius locations: Aiken Airport, Augusta Lock and Dam 614, and Highway 301 @ State Line. Highway 301 @ State Line is the control location.

All results for cobalt-60 and gross alpha were not detected; therefore, they were not reported in this table.

Radionuclide	Number of Detected Results	Control (Highway 301) Concentration (pCi/g)	Location of Minimum Concentration	Minimum Concentration (pCi/g)	Location of Maximum Concentration	Maximum Concentration (pCi/g)
Am-241	10 of 16	**5.17E-04**	Talatha Gate	-8.81E-05	Highway 21/167	**2.64E-03**
Cm-243/244	1 of 16	6.45E-05	Aiken Airport	-3.42E-05	Highway 21/167	**3.31E-03**
Cs-137	5 of 16	1.12E-01	Augusta Lock & Dam 614	-1.53E-02	Allendale Gate	**5.37E-01**
Gross Beta	16 of 16	**1.43E+01**	Allendale Gate	**8.68E+00**	Talatha Gate	**1.57E+01**
H-3	1 of 16	3.08E-02	A-14	-7.19E-03	Darkhorse @ Williston Gate	**5.51E-02**
Np-237	1 of 16	5.02E-05	Augusta Lock & Dam 614	-1.07E-04	A-14	4.66E-04
Pu-238	12 of 16	**3.68E-04**	Darkhorse @ Williston Gate	-9.90E-05	Allendale Gate	**4.69E-03**
Pu-239/240	5 of 16	1.22E-04	D Area	4.35E-07	Allendale Gate	**3.54E-03**
Sr-90	14 of 16	**8.94E-02**	Talatha Gate	1.30E-02	Highway 21/167	**1.56E-01**
Tc-99	11 of 16	**2.10E-01**	D Area	9.08E-02	Highway 21/167	**4.00E-01**
U-233/234	16 of 16	**7.96E-03**	Barnwell Gate	**1.06E-03**	Green Pond	**1.31E-02**
U-235	10 of 16	**5.61E-04**	Augusta Lock & Dam 614	-4.99E-05	Patterson Mill Road	**7.49E-04**
U-238	14 of 16	**6.32E-03**	Barnwell Gate	7.53E-04	Allendale Gate	**2.04E-02**

Appendix Table D-9 Summary of Radionuclides in Foodstuffs

Samples of five foodstuffs are collected annually from five regions surrounding SRS. Beef, greens, and fruit are collected each year. In 2023, the greens collected were collards, and the fruit collected was watermelon. Two specific crops a year are also collected, rotating through a variety of vegetables, grains, and nuts. Soybeans and peanuts were the rotational crop samples for 2023. Bolded minimum and maximum concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large.

Food Type	Radionuclide	Number of Samples	Number of Results > Detection Limit	Mean Sample Conc. (pCi/g)	Minimum Sample Conc. (pCi/g)	Maximum Sample Conc. (pCi/g)
Beef	Gross Beta	5	5	2.59E+00	**2.20E-01**	**3.53E+00**
	Plutonium-239/240	5	1	7.23E-06	-5.72E-06	**3.05E-05**
	Strontium-90	5	1	8.58E-04	1.91E-04	**3.03E-03**
	Uranium-233/234	5	2	5.77E-05	1.05E-05	**1.50E-04**
	Uranium-238	5	1	4.46E-05	-1.44E-05	**1.16E-04**
Americium-241, Cesium-137, Cobalt-60, Curium-243/244, Gross Alpha, Neptunium-237, Plutonium-238, Technetium-99, Tritium, and Uranium-235 were not detected in beef.						
Peanuts	Americium-241	5	2	4.98E-04	1.55E-04	**8.67E-04**
	Curium-243/244	5	4	1.14E-03	1.43E-04	**1.69E-03**
	Gross Beta	5	5	6.44E+00	**5.67E+00**	**7.05E+00**
	Neptunium-237	5	1	9.41E-05	-8.06E-05	**5.17E-04**
	Plutonium-238	5	2	4.24E-04	-1.86E-04	**9.42E-04**
	Uranium-233/234	5	1	6.33E-04	-9.53E-05	**1.16E-03**
Cesium-137, Cobalt-60, Gross Alpha, Plutonium-239/240, Strontium-90, Technetium-99, Tritium, Uranium-235, and Uranium-238 were not detected in peanuts.						
Watermelon	Americium-241	5	1	2.13E-05	-1.06E-05	**5.28E-05**
	Gross Beta	5	5	7.23E-01	**2.81E-01**	**1.31E+00**
	Plutonium-238	5	3	8.86E-05	5.30E-05	**1.70E-04**
	Strontium-90	5	1	2.18E-03	-1.71E-03	**6.31E-03**
	Uranium-233/234	5	5	1.85E-04	**1.30E-04**	**2.70E-04**
	Uranium-238	5	3	1.56E-04	9.46E-05	**2.28E-04**
Cesium-137, Cobalt-60, Curium-243/244, Gross Alpha, Neptunium-237, Plutonium 239/240, Technetium-99, Tritium, and Uranium-235 were not detected in watermelon.						

Appendix Table D-9 Summary of Radionuclides in Foodstuffs (continued)

Food Type	Radionuclide	Number of Samples	Number of Results > Detection Limit	Mean Sample Conc. (pCi/g)	Minimum Sample Conc. (pCi/g)	Maximum Sample Conc. (pCi/g)
Collards	Americium-241	5	2	2.76E-03	4.00E-06	**1.22E-02**
	Cesium-137	5	1	1.39E-02	-8.09E-04	**2.34E-02**
	Curium-243/244	5	1	1.02E-03	-1.59E-05	**4.83E-03**
	Gross Beta	5	5	2.31E+01	**1.02E+01**	**3.00E+01**
	Neptunium-237	5	2	5.44E-04	-6.51E-05	**1.97E-03**
	Plutonium-238	5	4	4.53E-04	2.09E-04	**7.03E-04**
	Plutonium-239/240	5	2	3.24E-04	1.46E-04	**5.17E-04**
	Strontium-90	5	4	5.41E-02	2.53E-02	**8.43E-02**
	Uranium-233/234	5	5	7.98E-03	**5.10E-03**	**9.18E-03**
	Uranium-235	5	2	5.49E-04	2.49E-04	**9.81E-04**
	Uranium-238	5	5	9.10E-03	**6.66E-03**	**1.35E-02**
Cobalt-60, Gross Alpha, Technetium-99, and Tritium were not detected in collards.						
Soybeans	Americium-241	5	4	9.25E-04	2.24E-04	**1.74E-03**
	Curium-243/244	5	1	1.40E-04	-3.03E-05	**5.92E-04**
	Gross Beta	5	5	1.55E+01	**1.36E+01**	**1.79E+01**
	Neptunium-237	5	1	1.48E-04	-8.74E-05	3.91E-04
	Plutonium-238	5	3	9.05E-04	4.91E-04	**1.39E-03**
	Plutonium-239/240	5	1	3.86E-04	7.60E-05	**1.06E-03**
	Uranium-233/234	5	4	2.51E-03	6.09E-04	**6.69E-03**
	Uranium-238	5	4	3.14E-03	8.81E-04	**7.95E-03**
Cesium-137, Cobalt-60, Gross Alpha, Strontium-90, Technetium-99, Tritium, and Uranium-235 were not detected in soybeans.						

Appendix Table D-10 Summary of Radionuclides in Dairy

SRS collects cow and goat milk samples from dairies in communities surrounding the Site. The number listed in parentheses in the "location" column indicates the number of locations in the named state that provide samples to SRS. For the 2023 reporting year, all Georgia dairies were not detected; therefore, they were not reported in this table.

Bolded minimum and maximum concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large. All cobalt-60 and tritium (H-3) results were not detected; therefore, they were not reported in this table.

Location	Nuclide	Number of Samples	Number of Results > Detection Limit	Mean Sample Concentration (pCi/L)	Minimum Sample Concentration (pCi/L)	Maximum Sample Concentration (pCi/L)
SC–Dairies (4) Cow Milk	Sr-90	15	2	6.13E-01	-1.37E-01	**2.12E+00**
SC–Dairies (1) Goat Milk	Sr-90	1	1	2.30E+00	**2.30E+00**	**2.30E+00**
	Cs-137	1	1	6.48E+00	**6.48E+00**	**6.48E+00**

Appendix Table D-11 Radiation in Liquid Source Releases

Tritium is the main contributing radionuclide in liquid source releases. Although the remaining radionuclides are contributors, their contributions in liquid source releases are minimal.

In the facility (Reactor, Separations, and SRNL) columns, a blank indicates the radionuclide was not analyzed. A 0.00E+00 in the facility columns indicates the result was not significant.

All cobalt-60 results were not detected; therefore, they were not reported in this table.

Radioactive Atmospheric Releases by Source (curies)[a]

Radionuclide	Half-Life[b]		Reactors (Ci)	Separations[c] (Ci)	SRNL (Ci)	Totals (Ci)
H-3[d]	12.3	y	1.09E+02	2.69E+02	0.00E+00	3.78E+02
C-14	5,700	y		3.48E-03	6.22E-04	4.11E-03
Sr-90	28.8	y	0.00E+00	1.90E-02		1.90E-02
Tc-99	2.11E+05	y	0.00E+00	1.24E-02	0.00E+00	1.24E-02
I-129	1.57E+07	y	0.00E+00	1.45E-02	0.00E+00	1.45E-02
Cs-137[e]	30.2	y	0.00E+00	8.83E-03	0.00E+00	8.83E-03
U-234	2.46E+05	y	1.95E-03	5.59E-02	1.50E-04	5.80E-02
U-235	7.04E+08	y	4.75E-04	3.56E-03	7.45E-06	4.04E-03
U-238	4.47E+09	y	1.41E-03	6.82E-02	1.37E-04	6.97E-02
Np-237	2.14E+06	y		3.60E-05		3.60E-05
Pu-238	87.7	y	0.00E+00	2.51E-04	6.67E-07	2.52E-04
Pu-239	2.41E+04	y	0.00E+00	8.92E-05	4.41E-07	8.96E-05
Am-241	432	y	0.00E+00	2.35E-04		2.35E-04
Cm-244	18.1	y	0.00E+00	1.47E-04		1.47E-04
Unidentified Alpha[f]	N/A		9.85E-03	5.58E-03	0.00E+00	1.54E-02
Unidentified Beta[g]	N/A		4.33E-02	1.35E-02	5.52E-04	5.73E-02
TOTAL						3.78E+02

Note:

SRNL = Savannah River National Laboratory

[a] One curie equals 3.7E+10 becquerels

[b] ICRP 107, *Nuclear Decay Data for Dosimetric Calculations* (2008). Half-life time intervals are given in years (y).

[c] Includes separations, waste management, and tritium processing facilities

[d] The tritium release total, which includes direct + migration releases, is used in the dose calculations for SRS impacts.

[e] Depending on which value is higher, the Cs-137 release total is based on concentrations measured in Steel Creek mouth fish near RM-141.5 or on the actual measured effluent release total from the Site. Refer to Chapter 6, *Radiological Dose Assessment*, for more information.

[f,g] For dose calculations, unidentified alpha and beta/gamma releases are assumed to be Pu-239 and Sr-90, respectively.

Appendix Table D-12 Summary of Liquid Effluent DOE DCS Sum of Fractions by Facility

As discussed in Chapter 5, *Radiological Environmental Monitoring Program*, SRS evaluates the effluent monitoring program by comparing the annual average concentrations to the U.S. Department of Energy (DOE)-derived concentration standards (DCSs). DOE's *Derived Concentration Technical Standard*, DOE-STD-1196-2022 (DOE 2022), establishes numerical standards for DCSs to support implementing DOE Order 458.1. This table presents the liquid effluent DCS sum of fractions for continuously monitored sources where at least one analyte had at least one detected value. Continuously monitored sources include outfalls where water flows continuously as well as those that discharge intermittently following rain events and batch discharges from facilities.

Facility (Sampling Location)	Radionuclides Included in the DCS Sum of Fractions	DCS Sum of Fractions	DCS Sum of Fractions Excluding Tritium
A Area (TB-2 Outfall at Road 1A)	C-14, Pu-238, Pu-239/240, U-233/234, U-235, U-238	7.76E-04	7.76E-04
E Area (E-003-EFF)	H-3, Sr-90, Tc-99	2.96E-03	1.09E-03
F Area (F-013 200-F Cooling Basin)	Cm-243/244, H-3, Pu-238, Pu-239/240, Tc-99, U-233/234, U-238	5.88E-04	2.77E-04
F Area (F-05)	Am-241, C-14, Cm-243/244, H-3, Pu-238, Pu-239/240, Sr-90, Tc-99, U-233/234, U-235, U-238	2.45E-03	2.18E-03
F Area (FM-3 F-Area Effluent)	Am-241, Cm-243/244, H-3, I-129, Pu-238, Pu-239/240, Tc-99, U-233/234, U-235, U-238	1.36E-03	1.20E-03
F Tank Farm (F-012 281-8F Retention Basin)	H-3, Cm-243/244, Cs-137, Pu-238, Pu-239/240, U-235, U-238	3.86E-03	3.51E-03
G Area (G-010)	Am-241, Cm-243/244, H-3, Pu-238, Sr-90, Tc-99, U-233/234, U-235, U-238	1.19E-03	7.83E-04
H Area (FM-1C H-Area Effluent)	Am-241, C-14, Cm-243/244, H-3, Np-237, Pu-238, Pu-239/240, Sr-90, U-233/234, U-238	1.30E-03	8.85E-04
H Area (H-004)	H-3, Pu-238, Pu-239/240, U-233/234, U-235, U-238	3.35E-03	1.77E-03
H ETP (U3R-2A ETP Outfall at Road C)	Am-241, C-14, Cm-243/244, Cs-137, H-3, Np-237, Pu-238, Pu-239/240, U-235, U-238	2.34E-01	2.66E-03
H-Tank Farm (H-017 281-8H Retention Basin)	Cm-243/244, Cs-137, H-3, I-129, Np-237, Pu-238, Pu-239/240, Sr-90, Tc-99, U-233/234, U-235, U-238	7.63E-03	7.16E-03
H-Tank Farm (HP-52 H-Area Tank Farm)	Am-241, Cm-243/244, Cs-137, H-3, Pu-238, Pu-239/240, U-233/234, U-235, U-238	3.80E-03	3.22E-03
K Area (K Canal)	H-3	2.00E-04	0.00E+00
L Area (L-07)	H-3	2.40E-04	0.00E+00
S Area (S-004)	H-3, Pu-238 U-238	2.25E-03	5.17E-05
Tritium (HP-15 Tritium Facility Outfall)	H-3	1.15E-02	0.00E+00

Appendix Table D-13 Summary of Radionuclides in Sediments

SRS collected annual sediment samples at 40 locations in 2023—11 Savannah River, 21 stream, and 8 stormwater basins—totaling 457 analytes.

Locations sampled are as follows:

- Savannah River locations River Miles (RM): 118.7, 129.0, 134.0, 141.5 (Steel Creek river mouth), 150.2, 150.4, 151.0, 152.3 (Beaver Dam Creek river mouth), 157.2, 161.0, and 170.5. The control location for the river sediment samples is RM-161.0.
- SRS Stream locations: FM-2, FM-3A, FM-A7, FM-A7A, FMC @ Rd A, FMC Swamp, L3R-1A , L3R-2, L3R-3, McQueens Branch (McQB) @ Monroe Owens, Meyers Branch, PB @ Rd A, PB Swamp, R Area (downstream of R-1), SC-2A, SC-4, TB-5, TC-1, U3R-1A, U3R-3, and U3R-4.
- SRS Stormwater Basin locations: E-001, E-002, E-003, E-004, E-05, E-06, Pond 400, and Z Basin. The control location for the river samples is RM-161.0. The control locations for the stream and stormwater basin sediment samples are TC-1 and U3R-1A.

Bolded concentration results were reported as detected. Concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large.

River Sediment Results

Ten River Locations Plus One Control

(Samples from some locations analyzed only for cesium-137, cobalt-60, gross alpha, and gross beta)

Radionuclide	Number > DL	Control RM-161.0 (pCi/g)	Location of Maximum Result	Maximum Result (pCi/g)
Americium-241	5 of 9	**1.93E-03**	BDC RM	**5.21E-03**
Cesium-137	5 of 11	< 8.71E-02	RM-129.0	**4.20E-01**
Cobalt-60	0 of 11	< 6.68E-02	All < DL	All < DL
Curium-243/244	3 of 9	< 7.19E-04	RM-150.2	< 1.02E-03
Gross Alpha	11 of 11	**2.30E+01**	BDC RM	**4.30E+01**
Gross Beta	11 of 11	**2.14E+01**	BDC RM	**3.42E+01**
Neptunium-237	0 of 9	< 1.04E-03	All < DL	All < DL
Plutonium-238	0 of 9	< 1.36E-03	All < DL	All < DL
Plutonium-239/240	3 of 9	< 1.28E-03	RM-157.2	**5.64E-03**
Strontium-90	0 of 9	< 1.40E-01	All < DL	All < DL
Uranium-233/234	9 of 9	**2.20E+00**	BDC RM	**3.74E+00**
Uranium-235	9 of 9	**1.20E-01**	BDC RM	**1.72E-01**
Uranium-238	9 of 9	**2.14E+00**	BDC RM	**3.66E+00**

Appendix Table D-13 Summary of Radionuclides in Sediments (continued)

Stream Sediment Results

Nineteen Stream Locations Plus Two Controls

(Some locations sampled only for cesium-137, cobalt-60, gross alpha, and gross beta)

Radionuclide	Number > DL	Control TC-1 (pCi/g)	Control U3R-1A (pCi/g)	Location of Maximum Result	Maximum Result (pCi/g)
Americium-241	14 of 16	**2.50E-03**	**2.07E-02**	Downstream of R-1	< 1.07E+00
Cesium-137	16 of 21	< 5.23E-02	**3.01E-01**	Downstream of R-1	**5.18E+01**
Cobalt-60	0 of 21	< 5.77E-02	< 1.69E-01	All < DL	All < DL
Curium-243/244	8 of 16	< 4.58E-04	**2.33E-03**	Downstream of R-1	< 1.16E+00
Gross Alpha	21 of 21	**8.96E+00**	**4.54E+01**	U3R-3	**4.18E+01**
Gross Beta	21 of 21	**5.01E+00**	**4.24E+01**	Downstream of R-1	**5.24E+01**
Neptunium-237	3 of 16	< 9.83E-04	< 8.07E-04	Downstream of R-1	< 6.32E-02
Plutonium-238	11 of 16	**1.21E-03**	**2.08E-03**	Downstream of R-1	< 8.31E-01
Plutonium-239/240	15 of 16	**2.97E-03**	**1.82E-02**	Downstream of R-1	< 9.32E-01
Strontium-90	5 of 16	< 1.31E-01	< 1.31E-01	FMC Swamp	**1.04E+00**
Uranium-233/234	16 of 16	**5.77E-01**	**2.14E+00**	TB-5	**3.47E+00**
Uranium-235	13 of 16	**3.15E-02**	**1.21E-01**	FM-3A	**3.38E-01**
Uranium-238	16 of 16	**5.27E-01**	**2.54E+00**	TB-5	**4.03E+00**

Stormwater Basin Sediment Results

Eight Basin Locations Plus Two Stream Control Locations

Radionuclide	Number > DL	Control TC-1 (pCi/g)	Control U3R-1A (pCi/g)	Location of Maximum Result	Maximum Result (pCi/g)
Americium-241	7 of 10	**2.50E-03**	**2.07E-02**	Z Basin	< 4.11E-01
Cesium-137	2 of 10	< 5.23E-02	**3.01E-01**	Z Basin	**1.16E+03**
Cobalt-60	0 of 10	< 5.77E-02	< 1.69E-01	All < DL	All < DL
Curium-243/244	4 of 10	< 4.58E-04	**2.33E-03**	Z Basin	< 4.06E-01
Gross Alpha	9 of 10	**8.96E+00**	**4.54E+01**	Pond 400	**2.28E+01**
Gross Beta	9 of 10	**5.01E+00**	**4.24E+01**	Z Basin	**7.98E+02**
Neptunium-237	0 of 10	< 9.83E-04	< 8.07E-04	All < DL	All < DL
Plutonium-238	8 of 10	**1.21E-03**	**2.08E-03**	Z Basin	< 3.89E-01
Plutonium-239/240	7 of 10	**2.97E-03**	**1.82E-02**	Z Basin	< 5.38E-01
Strontium-90	1 of 10	< 1.31E-01	< 1.31E-01	E-003	**2.24E+00**
Uranium-233/234	10 of 10	**5.77E-01**	**2.14E+00**	E-003	**2.41E+00**
Uranium-235	9 of 10	**3.15E-02**	**1.21E-01**	Z Basin	< 3.41E-01
Uranium-238	10 of 10	**5.27E-01**	**2.54E+00**	E-003	**2.40E+00**

Note:

The two stream and stormwater basin control locations, TC-1 and U3R-1A, are included in the number of results greater than the detection limit for both the stream and stormwater basin sediment results tables.

Appendix Table D-14 Summary of Radionuclides in Drinking Water

Samples at the treatment plants are collected monthly. These samples are analyzed for tritium, cobalt-60, cesium-137, gross alpha, and gross beta.

Bolded minimum and maximum concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large.

For the treatment plants samples, all results for cobalt-60, cesium-137, and gross alpha were below detection limits; therefore, they were not reported in the table below.

Treatment Plants—Finished Water Summary

			Tritium		
Locations	**Number of Samples**	**Number of Detects**	**Mean Concentration (pCi/L)**	**Minimum Concentration (pCi/L)**	**Maximum Concentration (pCi/L)**
BJWSA Purrysburg WTP	12	12	3.75E+02	**2.75E+02**	**5.47E+02**
North Augusta Public Water Works	12	1	1.00E+02	1.08E+01	**1.93E+02**

			Gross Beta		
Locations	**Number of Samples**	**Number of Detects**	**Mean Concentration (pCi/L)**	**Minimum Concentration (pCi/L)**	**Maximum Concentration (pCi/L)**
BJWSA Purrysburg WTP	12	12	1.55E+00	**1.07E+00**	**2.10E+00**
North Augusta Public Water Works	12	12	1.79E+00	**1.12E+00**	**2.76E+00**

Note:
BJWSA Purrysburg WTP is Beaufort-Jasper Water and Sewer Authority Purrysburg Water Treatment Plant.

Appendix Table D-14 Summary of Radionuclides in Drinking Water (continued)

Samples are collected onsite annually from 10 locations for tritium, cobalt-60, cesium-137, gross beta, gross alpha, americium-241, strontium-90, uranium-233/234, uranium-235, uranium-238, plutonium-238, plutonium-239/240, and curium-243/244. Site 905-112G was inoperable for 2023.

For the onsite annual samples, all results for tritium, cobalt-60, cesium-137, strontium-90, plutonium-238, plutonium-239/240, americium-241, and curium-243/244 were below detection limits; therefore, they were not reported in this table.

Onsite Location Summary—Annual Samples

		Gross Alpha	Gross Beta	Uranium-233/234	Uranium-235	Uranium-238
Location	**Number of Samples**	**Concentration (pCi/L)**	**Concentration (pCi/L)**	**Concentration (pCi/L)**	**Concentration (pCi/L)**	**Concentration (pCi/L)**
617-8G	1	2.12E-01	**8.37E-01**	**1.13E-02**	2.96E-03	**6.80E-03**
681-3G	1	**1.10E+01**	**7.66E+00**	1.49E-03	9.02E-04	3.33E-04
704-16G	1	**8.50E+00**	**4.55E+00**	2.59E-04	-1.10E-03	2.23E-03
709-1G	1	4.54E-01	**1.33E+00**	1.44E-03	2.96E-03	**6.79E-03**
737-G	1	4.92E-01	**1.32E+00**	**1.38E-02**	**9.85E-03**	**1.65E-02**
782-3A	1	**6.29E-01**	**1.12E+00**	**3.00E-02**	5.48E-03	**4.46E-02**
905-113G Well	1	**1.68E+00**	**2.02E+00**	**1.76E-02**	6.61E-04	**4.10E-02**
905-125B	1	**1.26E+00**	**1.58E+00**	**3.61E-02**	5.25E-03	**5.16E-02**
905-67B	1	**2.28E+00**	**1.42E+00**	**1.51E-02**	5.15E-03	**2.89E-02**

Appendix Table D-15 Summary of Radionuclides in Freshwater Fish

To provide a representative sample of the fish from each survey location, samples taken from each fish type are grouped into composite samples (three) and analyzed. Strontium-90 is the only analysis performed in both flesh (edible) and bone (nonedible) samples.

Bolded minimum and maximum concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large. All cobalt-60, iodine-129, and technitium-99 results were not detected; therefore, they were not reported in this table.

Cesium-137 (Edible)												
	Bass			Catfish			Flathead Catfish			Panfish		
Location	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)
Augusta L&D	1.71E-03	-8.16E-05	4.11E-03	1.40E-02	1.15E-03	**3.53E-02**	1.38E-02	3.54E-03	2.48E-02	1.43E-02	8.61E-03	**2.47E-02**
Four Mile Creek River Mouth	6.90E-02	**3.47E-02**	**1.03E-01**	2.29E-02	**1.67E-02**	**2.85E-02**	1.64E-02	4.53E-03	**3.12E-02**	1.74E-02	1.55E-02	**1.86E-02**
Hwy 301 Bridge Area	1.40E-02	1.09E-02	**1.66E-02**	9.69E-03	4.98E-03	**1.34E-02**	2.32E-02	**2.06E-02**	**2.74E-02**	8.29E-03	4.36E-03	1.35E-02
Lower Three Runs Creek River Mouth	1.44E-01	**2.31E-02**	**3.49E-01**	4.28E-02	**2.54E-02**	**5.89E-02**	1.29E-01	**9.86E-02**	**1.81E-01**	2.02E-02	1.48E-02	**2.83E-02**
Steel Creek River Mouth	4.26E-02	1.28E-02	**9.73E-02**	9.04E-02	**4.46E-02**	**1.66E-01**	7.98E-02	**3.02E-02**	**1.65E-01**	7.07E-02	**3.79E-02**	**1.02E-01**
Upper Three Runs Creek River Mouth	1.43E-02	-7.86E-04	**3.04E-02**	2.13E-02	9.57E-03	**4.18E-02**	1.13E-02	-9.70E-04	**1.79E-02**	4.29E-02	4.24E-03	**8.67E-02**

Appendix Table D-15 Summary of Radionuclides in Freshwater Fish (continued)

Strontium-90 (Edible)												
	Bass			Catfish			Flathead Catfish			Panfish		
Location	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)
Augusta L&D	-2.65E-04	-7.67E-04	5.52E-04	1.35E-03	-9.49E-05	**3.81E-03**	1.04E-03	-7.12E-06	1.58E-03	1.62E-03	-7.07E-04	5.62E-03
Four Mile Creek River Mouth	1.33E-03	2.60E-04	2.63E-03	1.38E-03	7.00E-04	1.76E-03	2.84E-04	-6.24E-04	9.46E-04	2.20E-03	7.02E-04	3.89E-03
Hwy 301 Bridge Area	1.86E-03	1.49E-03	2.22E-03	1.32E-03	1.02E-03	1.66E-03	1.15E-04	-9.86E-04	1.66E-03	1.56E-03	-4.11E-04	4.99E-03
Lower Three Runs Creek River Mouth	8.82E-04	4.57E-04	1.73E-03	7.92E-04	2.25E-04	1.21E-03	9.44E-04	6.74E-04	1.37E-03	2.63E-03	2.56E-03	2.75E-03
Steel Creek River Mouth	-2.22E-05	-1.53E-03	1.42E-03	8.47E-05	-4.03E-04	8.06E-04	8.30E-04	4.37E-04	1.26E-03	9.66E-04	2.58E-04	1.43E-03
Upper Three Runs Creek River Mouth	9.12E-04	3.73E-04	1.56E-03	1.12E-03	4.52E-04	2.33E-03	8.75E-04	1.51E-04	1.70E-03	2.38E-03	9.48E-04	**3.85E-03**

Strontium-90 (Nonedible)												
	Bass			Catfish			Flathead Catfish			Panfish		
Location	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)	Mean (pCi/g)	Minimum (pCi/g)	Maximum (pCi/g)
Augusta L&D	3.87E-01	2.69E-01	**4.60E-01**	5.44E-01	**4.60E-01**	**6.35E-01**	5.55E-01	**4.74E-01**	**6.76E-01**	6.57E-01	**3.46E-01**	**1.23E+00**
Four Mile Creek River Mouth	8.92E-01	**6.34E-01**	**1.34E+00**	7.82E-01	**4.17E-01**	**1.25E+00**	4.18E-01	2.42E-01	**6.72E-01**	7.80E-01	**6.22E-01**	**9.06E-01**
Hwy 301 Bridge Area	5.48E-01	**3.49E-01**	**8.40E-01**	3.06E-01	1.32E-01	**5.91E-01**	4.48E-01	1.44E-01	**6.34E-01**	7.20E-01	**6.04E-01**	**8.94E-01**
Lower Three Runs Creek River Mouth	4.56E-01	**3.41E-01**	**5.47E-01**	4.53E-01	**4.04E-01**	**5.44E-01**	3.77E-01	1.98E-01	**5.02E-01**	4.34E-01	2.45E-01	**7.28E-01**
Steel Creek River Mouth	8.90E-01	**5.73E-01**	**1.23E+00**	7.59E-01	**5.11E-01**	**9.96E-01**	5.60E-01	**3.67E-01**	**9.08E-01**	8.86E-01	**7.76E-01**	**9.73E-01**
Upper Three Runs Creek River Mouth	5.80E-01	**5.07E-01**	**6.56E-01**	4.67E-01	**3.87E-01**	**5.09E-01**	4.60E-01	**3.91E-01**	**5.08E-01**	7.67E-01	**4.84E-01**	**9.64E-01**

Appendix Table D-15 Summary of Radionuclides in Freshwater Fish (continued)

Gross Alpha (Edible)

Location	Bass Mean (pCi/g)	Bass Minimum (pCi/g)	Bass Maximum (pCi/g)	Catfish Mean (pCi/g)	Catfish Minimum (pCi/g)	Catfish Maximum (pCi/g)	Flathead Catfish Mean (pCi/g)	Flathead Catfish Minimum (pCi/g)	Flathead Catfish Maximum (pCi/g)	Panfish Mean (pCi/g)	Panfish Minimum (pCi/g)	Panfish Maximum (pCi/g)
Augusta L&D	-1.97E-03	-4.07E-02	4.10E-02	3.81E-02	-4.38E-02	1.30E-01	-7.82E-03	-4.36E-02	2.53E-02	6.92E-03	-6.25E-03	3.02E-02
Four Mile Creek River Mouth	4.75E-03	-2.84E-02	3.68E-02	-1.72E-02	-5.82E-02	3.59E-02	-5.07E-02	-6.22E-02	-2.79E-02	1.60E-02	-2.88E-02	7.10E-02
Hwy 301 Bridge Area	-9.13E-04	-4.25E-03	2.17E-03	3.30E-04	-5.57E-03	8.61E-03	2.99E-03	1.93E-03	4.86E-03	4.03E-03	-1.81E-03	8.48E-03
Lower Three Runs Creek River Mouth	1.41E-01	-3.41E-03	**2.49E-01**	3.09E-02	-3.43E-02	1.29E-01	-2.60E-03	-3.70E-02	6.30E-02	2.18E-02	-3.01E-02	6.37E-02
Steel Creek River Mouth	-5.95E-04	-1.70E-03	5.78E-04	-1.94E-03	-3.62E-02	3.22E-02	5.50E-02	6.45E-04	9.81E-02	4.51E-02	-3.56E-02	1.36E-01
Upper Three Runs Creek River Mouth	5.29E-02	2.06E-02	8.62E-02	-2.73E-02	-5.08E-02	-1.53E-02	4.07E-02	-1.65E-02	8.57E-02	-1.76E-02	-3.74E-02	-7.29E-03

Gross Beta (Edible)

Location	Bass Mean (pCi/g)	Bass Minimum (pCi/g)	Bass Maximum (pCi/g)	Catfish Mean (pCi/g)	Catfish Minimum (pCi/g)	Catfish Maximum (pCi/g)	Flathead Catfish Mean (pCi/g)	Flathead Catfish Minimum (pCi/g)	Flathead Catfish Maximum (pCi/g)	Panfish Mean (pCi/g)	Panfish Minimum (pCi/g)	Panfish Maximum (pCi/g)
Augusta L&D	2.22E+00	**1.11E+00**	**2.85E+00**	2.89E+00	**2.66E+00**	**3.25E+00**	2.83E+00	**2.40E+00**	**3.28E+00**	2.34E+00	**1.94E+00**	**2.60E+00**
Four Mile Creek River Mouth	2.49E+00	**2.12E+00**	**2.70E+00**	2.88E+00	**2.26E+00**	**3.28E+00**	2.65E+00	**2.62E+00**	**2.68E+00**	2.56E+00	**2.19E+00**	**2.85E+00**
Hwy 301 Bridge Area	2.35E-01	**2.00E-01**	**2.65E-01**	3.71E-01	**3.11E-01**	**4.10E-01**	3.32E-01	**2.77E-01**	**4.11E-01**	2.75E-01	**1.78E-01**	**3.51E-01**
Lower Three Runs Creek River Mouth	3.50E+00	**3.07E+00**	**3.96E+00**	2.88E+00	**2.71E+00**	**3.10E+00**	3.02E+00	**2.78E+00**	**3.48E+00**	1.99E+00	**1.73E+00**	**2.34E+00**
Steel Creek River Mouth	2.50E+00	**2.23E+00**	**2.75E+00**	2.70E+00	**2.56E+00**	**2.77E+00**	2.47E+00	**2.21E+00**	**2.62E+00**	2.22E+00	**1.94E+00**	**2.63E+00**
Upper Three Runs Creek River Mouth	2.51E+00	**2.27E+00**	**2.90E+00**	2.93E+00	**2.82E+00**	**3.08E+00**	2.85E+00	**2.74E+00**	**2.97E+00**	1.65E+00	**1.56E+00**	**1.75E+00**

Appendix Table D-16 Summary of Radionuclides in Saltwater Fish

All saltwater fish are collected at the location designated as RM 0–8 (mouth of Savannah River). Strontium-90 is the only analysis performed in both flesh (edible) and bone (nonedible) samples.

Bolded minimum and maximum concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large. For the current reporting year, results of strontium-90 bone (nonedible) were all below method detection limits. Results of all samples for cesium-137, cobalt-60, gross alpha, iodine-129, and technetium-99 were below method detection limits.

Marine Mullet					
Radionuclide	**Number of Samples**	**Number of Results > Detection Limit**	**Mean Concentration (pCi/g)**	**Minimum Concentration (pCi/g)**	**Maximum Concentration (pCi/g)**
Gross Beta	3	3	3.26E-01	**3.10E-01**	**3.45E-01**
Sr-90 (Edible)	3	1	1.53E-03	-7.95E-04	**3.83E-03**

Appendix Table D-17 Summary of Radionuclides in Shellfish

All shellfish are collected at the location designated as RM 0-8 (at the mouth of Savannah River). The species of shellfish collected in 2023 were crab and shrimp.

Bolded minimum and maximum concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large. All cesium-137, cobalt-60, gross alpha, iodine-129, and technetium-99 results were not detected; therefore, they were not reported in this table. Strontium-90 is reported only for shrimp in the table below as the strontium-90 results for crab were not detected.

Shellfish Species	Radionuclide	Number of Samples	Number of Results > Detection Limit	Mean Concentration (pCi/g)	Minimum Concentration (pCi/g)	Maximum Concentration (pCi/g)
Crab	Gross Beta	1	1	2.74E+00	**2.74E+00**	**2.74E+00**
Shrimp	Gross Beta	1	1	2.56E+00	**2.56E+00**	**2.56E+00**
	Sr-90	1	1	7.38E-03	**7.38E-03**	**7.38E-03**

Appendix Table D-18 Summary of Radionuclides in Wildlife

Samples collected for laboratory analysis are selected based on a set frequency, the field-measured cesium-137 activity concentration, and exposure limit considerations as mentioned in section 5.6, *Wildlife Results Summary.* Strontium-90 is the only analysis performed in both flesh and bone samples.

Bolded concentration results were reported as detected. Minimum and maximum concentrations not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large. All cobalt-60 results were below detection limits; therefore, they are not reported in this table.

Sample Type	Radionuclide	Number of Samples	Number of Results > Detection Limit	Mean Concentration (pCi/g)	Minimum Concentration (pCi/g)	Maximum Concentration (pCi/g)
Deer Flesh	Cs-137	41	41	1.82E+00	**1.13E-01**	**5.26E+00**
	Sr-90	41	1	1.42E-03	-2.60E-03	**7.43E-03**
Hog Flesh	Cs-137	6	6	1.46E+00	**8.32E-02**	**3.54E+00**
	Sr-90	6	0	2.43E-03	-5.07E-04	4.71E-03
Deer Bone	Sr-90	41	41	2.12E+00	**9.81E-01**	**5.18E+00**
Hog Bone	Sr-90	6	6	4.83E+00	**1.24E+00**	**1.17E+01**