2022 ASER Errata

Record of Changes to 2022 ASER

This erratum has been prepared to make minor corrections to the 2022 Annual Site Environmental Report for Savannah River Site. In 2023, SRS transitioned to a new comprehensive environmental database. This system replaced a suite of existing applications, systems, and databases and now allows for SRS to load and extract data from a consolidated data storage system. The 2022 SRS Environmental Report was the first publication after this change. For the 2022 reporting year, data was housed in both the new and pre-existing databases, which made for a challenge in reporting data. In preparation of the 2023 SRS Environmental Report, we identified some cases where the continuity of data across systems had not been perfect and, as such, there are corrections to be made to the 2022 report. These corrections do not influence the final dose values that were reported for 2022.

Corrections to a value or interpretation of a value are shown in blue. Corrections to formatting that did not affect the meaning of the result, but were made to help clarify the material presented, are shown in orange.

Table of Contents

Chapter 4, page 4-7, Figure 4-3.

Three outfalls–B-10, Y-01, and Y-03–were deactivated and removed from the suite of sampled locations. The outfalls S-13, S-10, and S-10A were renamed to J-13, J-10, and J-10A respectively.

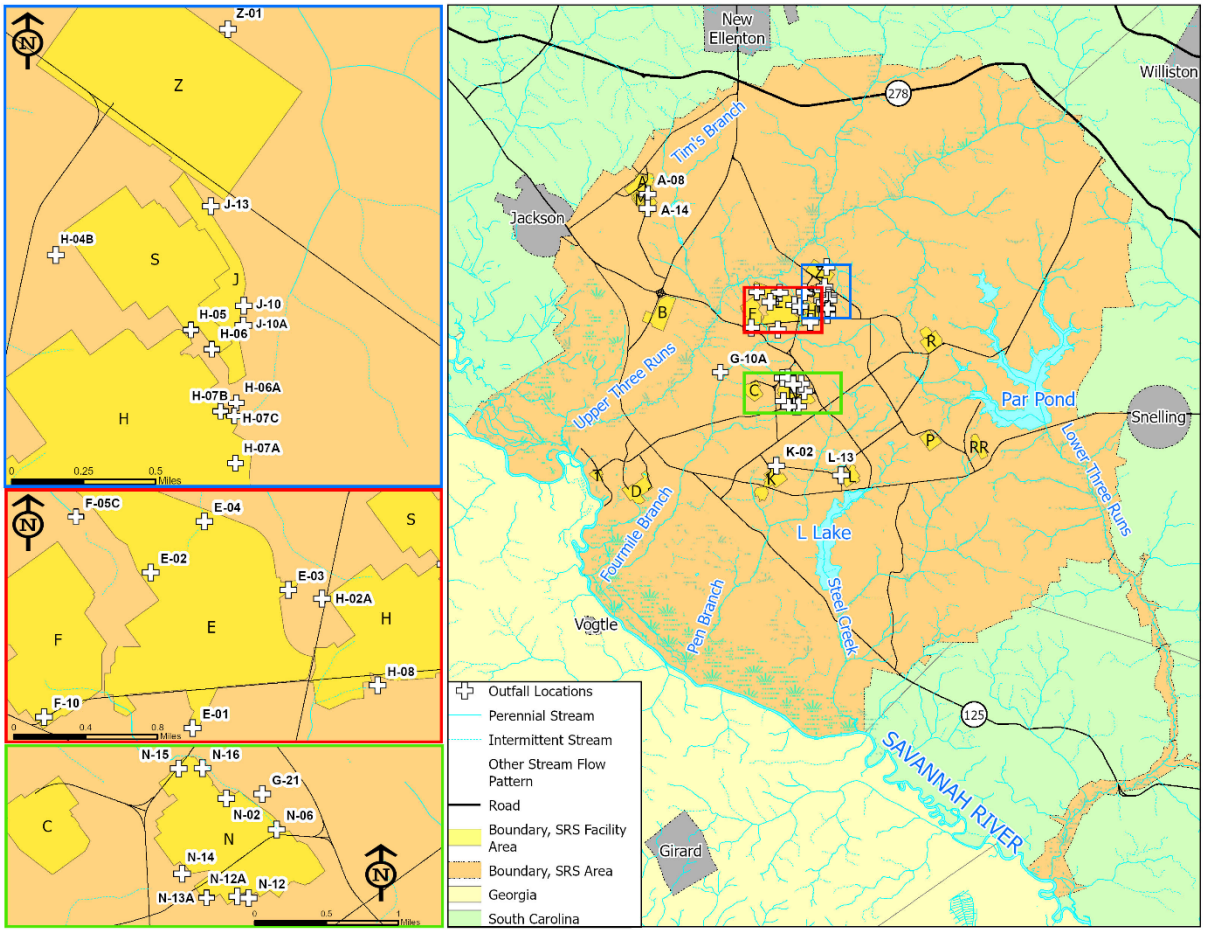

Figure 4-3 NPDES Industrial Stormwater Outfall Sampling Locations

Chapter 4, page 4-13, Figure 4-6.

The average mercury concentration (µg/g) for each fish type is as follows: bass, 0.494; catfish, 0.257; panfish, 0.231; and flathead, 0.283.

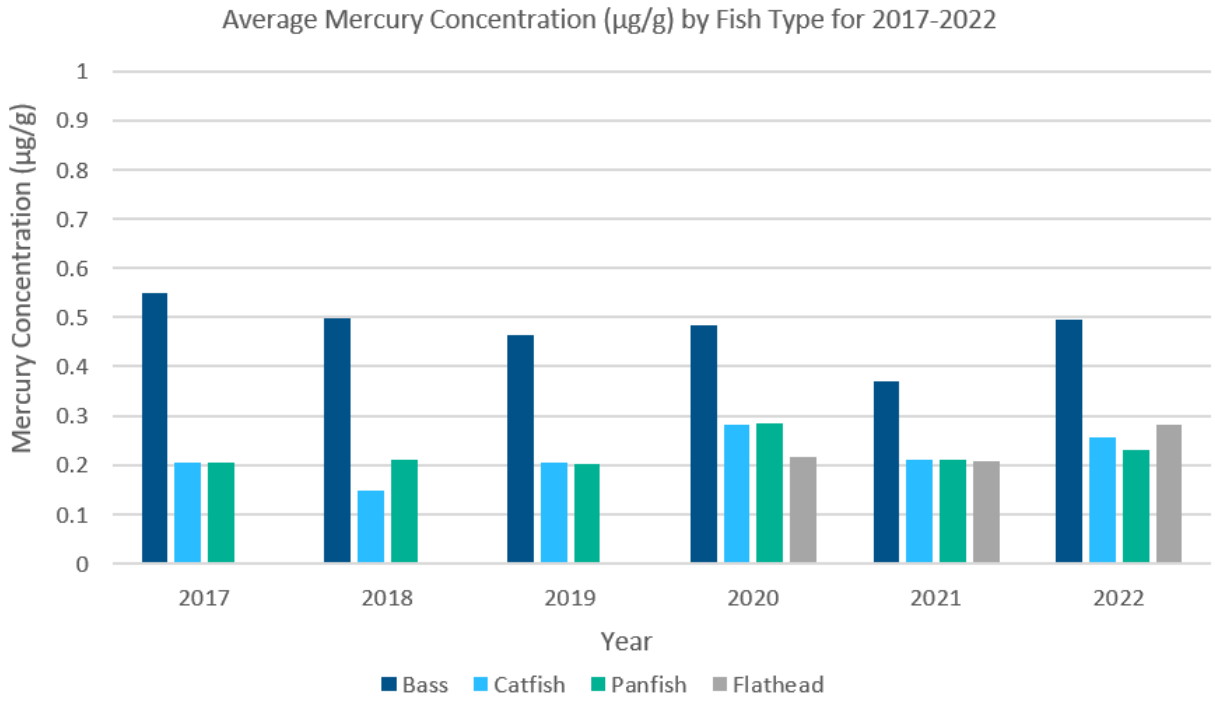

Figure 4-6 Average Mercury Concentration of Fish Species in the Savannah River, Adjacent to the Savannah River Site

Chapter 5, page 5-6, Table 5-2.

The total tritium release is 9.93E+03 curies (Ci).

The associated text on page 5-5 should say, “The 2022 SRS tritium releases totaled 9,930 Ci.”

Table 5-2 SRS Radiological Atmospheric Releases for CY 2022

Release Type	Total (curies)
Tritium	9.93E+03
Krypton-85 (^{85}Kr)	1.30E+04
Short-Lived Fission and Activation Products (T1/2 < 3 hr)[a,b]	1.69E-05
Fission and Activation Products (T1/2 > 3 hr)[a,b]	5.51E-02
Total Radio-iodine	7.08E-03
Total Radio-strontium[c]	7.01E-03
Total Uranium	5.65E-05
Plutonium[d]	4.83E-04
Other Actinides	2.30E-04
Other	2.96E-06

[a]International Commission on Radiological Protection (ICRP) 107 half-life data, *Nuclear Decay Data for Dosimetric Calculations (2008)*
[b]International Atomic Energy Agency (IAEA) Common Fission and Activation Products
[c]Includes unidentified beta releases
[d]Includes unidentified alpha releases

Chapter 5, page 5-7, Figure 5-2.

The 2022 total tritium from separations areas is 9.72E+03 Ci.

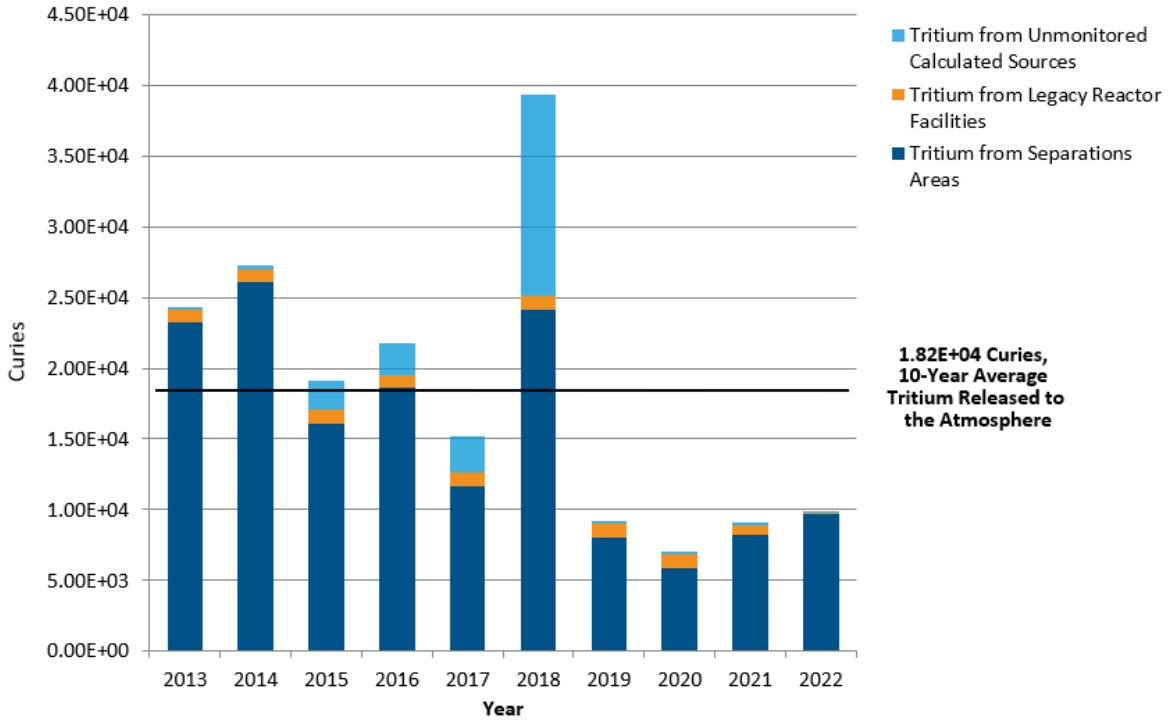

Figure 5-2 10-Year History of SRS Annual Tritium Releases to the Air

Chapter 5, page 5-7, Figure 5-2.

The 2022 total tritium from separations areas is 9.72E+03 Ci and the total Savannah River Site tritium releases is 9.93E+03 Ci. The breakdown of tritium released by location group is as follows: separations areas, 97.92%; legacy reactor facilities, 1.04%; and unmonitored calculated sources, 1.04%.

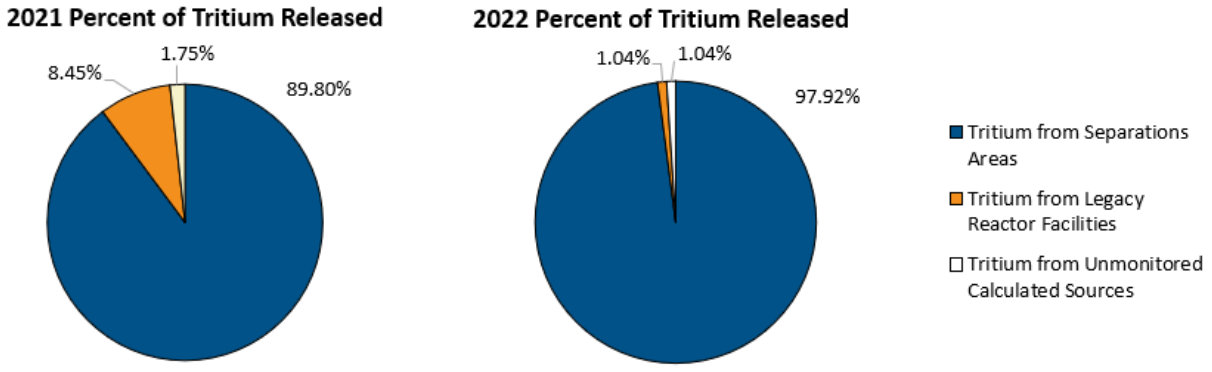

Figure 5-3 Percent of Tritium Released to the Air for 2021 and 2022

Chapter 5, page 5-20, Table 5-7.

The average gross alpha result for RM-118.8 is 0.263 pCi/L.

Table 5-7 Radionuclide Concentrations in the Savannah River for CY 2022

Location	Average Gross Alpha (pCi/L)	Average Gross Beta (pCi/L)	Average Tritium (pCi/L)	Maximum Tritium (pCi/L)
CONTROL (RM-161)	0.204	2.06	85.1	737
RM-150.4 (VEGP)	0.253	2.28	478	3,510
RM-150	0.242	2.20	133	275
RM-141.5	0.297	2.26	241	1,210
RM-118.8	0.263	2.11	243	1,080

Chapter 5, page 5-27, 5.5.1.1 Fish in Savannah River Results Summary

The text should say, “SRS did not detect cobalt-60, iodine 129, and gross alpha in any fish flesh samples.”

Chapter 8, page 8-6, Table 8-1.

The categories presented in the table are “RPD between Results ≤ 20%” and “RPD between Results > 20%.” For NPDES blinds the number of analyses within acceptable limits is 164 and the number of analyses outside acceptable limits is 8. For NPDES duplicates the number of analyses within acceptable limits is 196 and the number of analyses outside acceptable limits is 2. For water quality river/stream duplicates the number of analyses within acceptable limits is 814 and the number of analyses outside acceptable limits is 50. For nonradiological sediment duplicates the number of analyses within acceptable limits is 66 and the number of analyses outside acceptable limits is 30. For radiological sediment duplicates the number of analyses within acceptable limits is 56 and the number of analyses outside acceptable limits is 4.

The associated text should say, “Ninety-five percent of the blind samples, 99% of the NPDES duplicate samples, 94% of the water-quality duplicate samples, 69% of the nonradiological sediment duplicate samples, and 93% of the radiological sediment duplicate samples met the acceptable difference limit.

Table 8-1 Summary of Laboratory Blind and Duplicate Sample Analyses

Program and Sample Type	Number of Analyses	Number of Analyses within Acceptable Limits (RPD between Results ≤ 20%)	Number of Analyses Outside Acceptable Limits (RPD between Results > 20%)	Number of Impacted Analytes
NPDES Blind	172	164	8	2
NPDES Duplicate	198	196	2	1
Water Quality River/ Stream Duplicate	864	814	50	7
Nonradiological River/Stream/Basin Sediment Duplicate	96	66	30	9
Radiological River/Stream/Basin Sediment Duplicate	60	56	4	2

Appendix B

Appendix B, page B-2, Appendix Table B-2.

Onsite drinking water was not sampled quarterly in 2022. Onsite surface water (streams and basins) was not sampled weekly in 2022.

Appendix Table B-2 SRS Radiological Media and Sampling Frequencies

Media	Environmental Surveillance	Sampling Frequency				
		Weekly	Bi-Weekly	Monthly	Quarterly	Annually
Air	Airborne particulate matter		✓			
	Gaseous state of radioiodine		✓			
	Tritiated water vapor		✓			
	Tritium in rainwater			✓		
Soil	Radionuclide deposition into soils					✓
Food Products	Radionuclide uptake in the food chain					✓
Vegetation	Radionuclide uptake in plants					✓
Optically Stimulated Luminescence	Ambient gamma radiation monitoring				✓	
Water	Onsite drinking water				(removed)	✓
	Offsite drinking water			✓		
	Onsite surface water (Streams and basins)	(removed)		✓		✓
	Savannah River	✓				✓
Sediment	Radionuclides in streambeds, the Savannah Riverbed, and SRS basin beds					✓
Fish and Shellfish	Radionuclides in freshwater fish, saltwater fish, and shellfish					✓
Wildlife	Radionuclides in onsite deer, feral hogs, turkey, and coyotes during SRS-sponsored hunts					✓

Appendix C

Appendix C, page C-2 through C-4, Appendix Table C-1.

The South Carolina freshwater quality standard for 2022 is 0.05 µg/L. The river location with the TSS maximum value of 16 mg/L is RM-118.8 only. For streams, the number of phosphorous results outside of the standard is 34 of 120. For streams, the number of phosphorous results greater than the detection limit is 45 of 120.

The associated text on page 4-10 should say, "SRS analyzed 3,717 individual analytes (177 samples) collected from the 15 stream- and river-water quality locations during 2022, with 2,716 of 3,009 (90.3%) meeting South Carolina Freshwater Quality Standards, as available. (Not all analytes sampled have a standard.)"

Appendix Table C-1 River and Stream Water Quality Results Summary

SRS collected monthly water quality samples at 5 Savannah River and 10 stream locations in 2022, totaling 177 samples per analyte or 3,717 records. Locations sampled are as follows: Savannah River locations (RM-118.8, RM 129.1, RM-141.5 and RM 150.4 [Vogtle discharge]), and SRS Stream locations (FM-2B, FM-6, FMC-2, L3R-2, PB-3, SC-4, TB-5, and U3R-4). The control location for the river samples is RM 161.0. The control locations for the stream samples are TC-1 and U3R-1A.

The table compares all results to South Carolina Freshwater Quality Standards (unless otherwise noted) and shows the average and maximum values of each analyte for the river and stream samples. Locations exceeding standards are shown in **red** text. Field duplicates are not included in the generation of these tables.

DL-Detection Limit
DO-Dissolved Oxygen
TOC-Total Organic Carbon
TSS-Total Suspended Solids

Notes:

1. The DO value in the maximum column is a minimum value because the South Carolina Freshwater Quality Standard is based on a minimum value.
2. The pH value in the average column is a minimum value because the South Carolina Freshwater Quality Standard includes minimum and maximum limits.

Appendix Table C-1 River and Stream Water Quality Results Summary (continued)

Four River Locations Plus One Control

Analyte	South Carolina Freshwater Quality Standard	Unit	Number of Results Outside Standard	Number of Results > DL	Control RM-161.0		Highest River Location				Comments
					Avg.[a]	Max.[b]	Avg.[a]		Max.[b]		
DO[c]	min. 4.0	mg/L	0 of 57		8.9	7.0	RM-129.1	7.8	RM-150.4	5.3	All samples met standard
pH[d]	6.0-8.5	SU	1 of 57		**5.9**	7.2	RM-150.4	6.2	RM-118.8	7.4	All maximums met standard
Temperature	< 5° F (2.8° C) above nat. cond. and not > 90° F (32.2° C)	° C	0 of 57		18.3	23.7	RM-129.1	20.1	RM-129.1	29.3	All samples met standard
Aluminum	87[e]	µg/L	53 of 57	57 of 57	**309**	**1,260**	RM-118.8	**310**	RM-150.4	**997**	
Beryllium	4[f]	µg/L	0 of 57	1 of 57	< DL	< DL	RM-118.8	0.1	RM-118.8	0.1	All samples met standard
Cadmium	0.25	µg/L	1 of 57	2 of 57	< DL	< DL	RM-150.4	0.11	RM-150.4	**0.25**	All averages met standard
Chromium	11	µg/L	0 of 57	42 of 57	2	4	RM-118.8	2	RM-118.8	6	All samples met standard
Copper	2.9	µg/L	1 of 57	53 of 57	1.4	**3.0**	RM-141.5	1.4	RM-129.1	2.7	All averages met standard
Hardness (total)	none	mg/L	no std.	57 of 57	19	26	RM-129.1	26	RM-129.1	42	
Iron	1,000[g]	µg/L	1 of 57	57 of 57	433	834	RM-118.8	658	RM-118.8	**1,110**	All averages met standard
Lead	0.54	µg/L	0 of 57	56 of 57	0.25	0.51	RM-118.8	0.28	RM-150.4	0.47	All samples met standard
Manganese	none	µg/L	no std.	57 of 57	85	153	RM-118.8	82	RM-118.8	159	
Mercury	0.05	µg/L	0 of 57	0 of 57	< DL	< DL	< DL	< DL	< DL	< DL	All samples met standard
Nickel	16	µg/L	0 of 57	36 of 57	1	2	RM-129.1	1	RM-129.1	1	All samples met standard
Nitrate-Nitrogen	1[h]	mg/L	0 of 57	57 of 57	0.3	0.4	RM-141.5	0.3	RM-150.4	0.4	All samples met standard
Nitrite-Nitrogen	1[h]	mg/L	0 of 57	56 of 57	0.01	0.03	RM-150.4	0.01	RM-150.4	0.02	All samples met standard
Thallium	0.24[f]	µg/L	0 of 57	0 of 57	< DL	< DL	< DL	< DL	< DL	< DL	All samples met standard
TOC	none	mg/L	no std.	57 of 57	3.2	4.9	RM-129.1	4.6	RM-129.1	13.0	
Phosphorus	0.06	mg/L	50 of 57	53 of 57	**0.13**	**0.32**	RM-141.5	**0.15**	RM-141.5	**0.34**	
TSS	none	mg/L	no std.	56 of 57	5	11	RM-118.8	9	RM-118.8	16	
Zinc	37	µg/L	0 of 57	56 of 57	4	9	RM-150.4	5	RM-150.4	29	All samples met standard

Appendix C

Appendix Table C-1 River and Stream Water Quality Results Summary (continued)

Eight Stream Locations Plus Two Controls

Analyte	South Carolina Freshwater Quality Standard	Unit	Number of Results Outside Standard	Number of Results > DL	Control TC-1		Control U3R-1A		Highest Stream Location				Comments
					Avg.[a]	Max.[b]	Avg.[a]	Max.[b]	Avg.[a]		Max.[b]		
DO[c]	min. 4.0	mg/L	6 of 120		8.8	6.9	8.5	7.5	FMC-2	4.5	FMC-2	**1.6**	All averages met standard
pH[d]	6.0-8.5	SU	8 of 120		**5.6**	7.3	**4.9**	7.3	U3R-4	**5.2**	U3R-4	7.6	All maximums met standard
Temperature	< 5°F (2.8°C) above nat. cond. and not > 90°F (32.2°C)	°C	3 of 120		19	27	17	24	SC-4	20	PB-3	**39**	All averages met standard
Aluminum	87[e]	µg/L	79 of 120	118 of 120	**142**	**607**	**146**	**513**	U3R-4	**235**	FM-6	**978**	
Beryllium	4[f]	µg/L	0 of 120	8 of 120	< DL	< DL	0.1	0.1	L3R-2	0.1	L3R-2	0.2	All samples met standard
Cadmium	0.26	µg/L	0 of 120	3 of 120	< DL	< DL	< DL	< DL	TB-5	0.11	TB-5	0.19	All samples met standard
Chromium	11	µg/L	0 of 120	48 of 120	1.5	4.7	0.9	2.9	FMC-2	1.4	L3R-2	4.8	All samples met standard
Copper	2.9	µg/L	5 of 120	54 of 120	1.2	**7.3**	0.6	0.7	FMC-2	1.6	L3R-2	**6.0**	All averages met standard
Hardness (total)	none	mg/L	no std.	84 of 120	13	20	4	10	L3R-2	41	L3R-2	59	
Iron	1,000[g]	µg/L	37 of 120	120 of 120	489	915	401	693	FM-2B	**3,081**	FM-2B	**6,790**	
Lead	0.54	µg/L	12 of 120	111 of 120	0.32	**1.34**	0.24	**0.57**	FM-6	0.30	L3R-2	**1.33**	All averages met standard
Manganese	none	µg/L	no std.	120 of 120	21	43	10	16	FM-2B	197	L3R-2	930	
Mercury	0.05	µg/L	0 of 120	6 of 120	< DL	< DL	< DL	< DL	SC-4	0.02	SC-4	0.04	All samples met standard
Nickel	16	µg/L	0 of 120	90 of 120	1	1	1	1	TB-5	4	TB-5	8	All samples met standard
Nitrate-Nitrogen	1[h]	mg/L	1 of 120	119 of 120	0.1	0.2	0.4	0.4	FM-6	0.7	FM-6	**1.3**	All averages met standard
Nitrite-Nitrogen	1[h]	mg/L	0 of 120	85 of 120	0.005	0.017	0.004	0.017	PB-3	0.006	PB-3	0.020	All samples met standard
Thallium	0.24[f]	µg/L	1 of 120	3 of 120	< DL	< DL	< DL	< DL	U3R-4	0.09	U3R-4	**0.5**	All averages met standard
TOC	none	mg/L	no std.	120 of 120	4	8	2	6	FMC-2	11	FMC-2	55	
Phosphorus	0.06	mg/L	34 of 120	45 of 120	**0.06**	**0.12**	0.03	**0.13**	FM-6	**0.11**	TB-5	**0.23**	
TSS	none	mg/L	no std.	115 of 120	6	15	4	7	FM-2B	9	L3R-2	66	
Zinc	37	µg/L	0 of 120	115 of 120	3	13	3	6	FMC-2	11	FMC-2	31	All samples met standard

[a] If analyte is non-detect, detection limit is used in averaging calculation.
[b] Maximum detected value
[c] Minimum was reported in the maximum (Max.) value reported columns for DO.
[d] Minimum was reported in the average (Avg.) value columns for pH.
[e] Environmental Protection Agency (EPA) Region 4 Ecological Risk Assessment Supplemental Guidance, March 2018 Update
[f] Standard from Human Health vs. Freshwater Aquatic Life, which has no standard
[g] EPA National Recommended Water Quality Criteria—Aquatic Life
[h] Per South Carolina Department of Health and Environmental Control Environmental Surveillance and Oversight Program 2022 Data Report (CR-004111 12/23)

Appendix C

Appendix C, page C-5 through C-7, Appendix Table C-2.

For rivers, the number of chromium results detected is 9 of 9. For rivers, the maximum nickel concentration is 15. For rivers, the maximum zinc concentration is 64. For the control locations in all three tables, "< DL" results are not greater than the Refinement Screening Values (RSVs), therefore should not be shown in red text. For basins, the location with the maximum lead result is both E-001 and E-003.

The associated text on page 4-11 should say, "Of the 2022 results, 95.8% (368 of 384 analyses) met the EPA Region 4 Sediment Refinement Screening Values (RSVs). Barium accounted for 13 of the 16 samples that exceeded its RSV (60 mg/kg), while manganese accounted for the remaining three exceeding its RSV (1,100 mg/kg)."

Appendix Table C-2 Summary of Nonradiological Results for Sediments Collected from the Savannah River, SRS Streams, and Stormwater Basins

SRS collected annual sediment samples at 24 locations in 2022: 9 Savannah River, 12 stream, and 3 stormwater basins, totaling 384 analytes. 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.

The table compares all results to EPA Region 4 Refinement Screening Values (RSVs) for sediment and shows the maximum value of each analyte for the river, stream, and stormwater basin samples. Locations exceeding RSVs are shown in **red** text.

River Sediment Results

Eight River Locations Plus One Control

Analyte	No. of Detected Results	Control RM 161.0 (mg/kg)	Location of Maximum Result	Maximum Conc. (mg/kg)	EPA Region 4 RSV for Sediment (mg/kg)	No. of Results > RSV	Comments
Aluminum	9 of 9	16,000	RM-157.2	37,000	58,000	0	All samples met std.
Antimony	0 of 9	<DL	All < DL	All < DL	25	0	All samples met std.
Arsenic	9 of 9	2	RM-157.2	4	33	0	All samples met std.
Barium	9 of 9	**110**	RM-141.0 SC Landing	**160**	60	9	
Cadmium	0 of 9	<DL	All < DL	All < DL	5	0	All samples met std.
Chromium	9 of 9	22	RM-157.2	38	111	0	All samples met std.
Copper	9 of 9	13	RM-157.2	24	149	0	All samples met std.
Iron	9 of 9	18,000	RM-141.0 SC Landing	33,000	40,000	0	All samples met std.
Lead	9 of 9	11	RM-157.2	25	128	0	All samples met std.
Manganese	9 of 9	**1,200**	RM-141.0 SC Landing	**1,900**	1,100	3	
Mercury	0 of 9	<DL	All < DL	All < DL	1.1	0	All samples met std.
Nickel	9 of 9	9	RM-157.2	15	48.6	0	All samples met std.
Selenium	0 of 9	<DL	All < DL	All < DL	2.9	0	All samples met std.
Silver	0 of 9	<DL	All < DL	All < DL	2.2	0	All samples met std.
Uranium	0 of 9	<DL	All < DL	All < DL	1,000	0	All samples met std.
Zinc	9 of 9	46	RM-157.2	64	459	0	All samples met std.

Appendix Table C-2 Summary of Nonradiological Results for Sediments Collected from the Savannah River, SRS Streams, and Stormwater Basins (continued)

Stream Sediment Results

10 Stream Locations Plus 2 Controls

Analyte	No. of Detected Results	Control TC-1 (mg/kg)	Control U3R-1A (mg/kg)	Location of Maximum Result	Maximum Conc. (mg/kg)	EPA Region 4 RSV for Sediment (mg/kg)	No. of Results > RSV	Comments
Aluminum	12 of 12	6,000	4,600	BDC	26,000	58,000	0	All samples met std.
Antimony	0 of 12	<DL	<DL	All < DL	All < DL	25	0	All samples met std.
Arsenic	6 of 12	<DL	<DL	L3R-2	5	33	0	All samples met std.
Barium	12 of 12	**110**	42	U3R-3	**96**	60	2	
Cadmium	4 of 12	<DL	<DL	SC-4	0.8	5	0	All samples met std.
Chromium	12 of 12	9	7	BDC	17	111	0	All samples met std.
Copper	12 of 12	4	4	BDC	10	149	0	All samples met std.
Iron	12 of 12	4,100	2,400	BDC	9,800	40,000	0	All samples met std.
Lead	11 of 12	8	8	BDC	13	128	0	All samples met std.
Manganese	12 of 12	170	19	SC-4	186	1,100	0	All samples met std.
Mercury	5 of 12	<DL	<DL	L3R-1A	0.2	1.1	0	All samples met std.
Nickel	11 of 12	4.5	<DL	U3R-3	8.9	48.6	0	All samples met std.
Selenium	6 of 12	<DL	<DL	PB @ Rd A	2.0	2.9	0	All samples met std.
Silver	2 of 12	<DL	<DL	U3R-3	0.93	2.2	0	All samples met std.
Uranium	0 of 12	<DL	<DL	All < DL	All < DL	1,000	0	All samples met std.
Zinc	12 of 12	15	10	U3R-3	29	459	0	All samples met std.

Appendix Table C-2 Summary of Nonradiological Results for Sediments Collected from the Savannah River, SRS Streams, and Stormwater Basins (continued)

Stormwater Basin Sediment Results

Three Basin Locations Compared to Two Stream Controls

Analyte	Number of Detected Results	Control TC-1 (mg/kg)	Control U3R-1A (mg/kg)	Location of Maximum Result	Maximum Conc. (mg/kg)	EPA Region 4 RSV for Sediment (mg/kg)	Number of Results > RSV	Comments
Aluminum	5 of 5	6,000	4,600	E-001	38,000	58,000	0	All samples met std.
Antimony	0 of 5	<DL	<DL	All < DL	All < DL	25	0	All samples met std.
Arsenic	3 of 5	<DL	<DL	E-003	8	33	0	All samples met std.
Barium	5 of 5	**110**	42	E-001	**72**	60	2	
Cadmium	0 of 5	<DL	<DL	All < DL	All < DL	5	0	All samples met std.
Chromium	5 of 5	9	7	E-003	39	111	0	All samples met std.
Copper	5 of 5	4	4	E-003	16	149	0	All samples met std.
Iron	5 of 5	4,100	2,400	E-003	38,000	40,000	0	All samples met std.
Lead	5 of 5	8	8	E-001 & E-003	18	128	0	All samples met std.
Manganese	5 of 5	170	19	E-003	210	1,100	0	All samples met std.
Mercury	0 of 5	<DL	<DL	All < DL	All < DL	1.1	0	All samples met std.
Nickel	4 of 5	5	<DL	E-001	10.0	48.6	0	All samples met std.
Selenium	0 of 5	<DL	<DL	All < DL	All < DL	2.9	0	All samples met std.
Silver	0 of 5	<DL	<DL	All < DL	All < DL	2.2	0	All samples met std.
Uranium	0 of 5	<DL	<DL	All < DL	All < DL	1,000	0	All samples met std.
Zinc	5 of 5	15	10	E-003	83	459	0	All samples met std.

Appendix C

Appendix C, page C-8, Appendix Table C-3.

The number of estimated values for copper should be 92. For arsenic the SQL should me 3.7 and the MDC should be 0.37. For cadmium, the SQL should be 0.492 and the MDC should be 0.0492. For chromium, the SQL should be 1.63 and the MDC should be 0.163. For copper, the SQL should be 1.96 and the MDC should be 0.196.

The associated text on page 4-13 should say, "SRS detected and quantified 17%, or 285 results, of the 1,720 individual analyses."

Appendix Table C-3 Summary of Detected Metal Results for Freshwater Fish Tissue Collected from the Savannah River

All antimony, lead, and nickel results were not detected; therefore, they were not reported in this table.

Analyte	Number of Detected Values (above the MDC)	Number of Estimated Values (above the MDC, below the SQL)	Maximum Detected Concentration (µg/g)	SQL (µg/g)	MDC (µg/g)	Fish Type with Maximum Concentration	Location of Maximum Concentration
Arsenic	29	29	1.87	3.7	0.37	Catfish	Steel Creek River Mouth
Cadmium	53	53	0.147	0.492	0.0492	Bass	Augusta Lock and Dam 614
Chromium	3	3	0.293	1.63	0.163	Bass	Lower Three Runs Creek River Mouth
Copper	92	92	0.741	1.96	0.196	Flathead Catfish	Fourmile Creek River Mouth
Manganese	88	88	0.544	0.867	0.0867	Panfish	Upper Three Runs Creek River Mouth
Mercury	165	52	0.984	0.2	0.02	Bass	Highway 301 Bridge Area
Zinc	165	0	21.4	1.96	0.196	Flathead Catfish	Fourmile Creek River Mouth

Note:
165 freshwater tissue samples were collected and analyzed for metals and mercury.

Appendix C

Appendix C, page C-9, Appendix Table C-4.

For zinc, the SQL should be 1.86 and the MDC should be 0.186.

Appendix Table C-4 Summary of Detected Metal Results for Saltwater Fish Tissue Collected from the Savannah River between River Miles 0–8, Near Savannah, Georgia

Antimony, lead, mercury, and nickel results were not detected; therefore, they were not reported in this table.

All results are for mullet.

Analyte	Number of Detected Values (above the MDC)	Number of Estimated Values (above the MDC, below the SQL)	Maximum Detected Concentration (µg/g)	SQL (µg/g)	MDC (µg/g)
Arsenic	3	3	1.78	4.82	0.482
Cadmium	3	3	0.0536	0.48	0.048
Chromium	1	1	0.202	1.93	0.193
Copper	3	3	0.266	1.92	0.192
Manganese	4	4	0.122	0.963	0.0963
Zinc	7	0	14	1.86	0.186

Note:
Seven saltwater tissue samples were collected and analyzed for metals and mercury.

Appendix D

Appendix D, page D-2 through D-4, Appendix Table D-1.

The separations H-3 (elemental) value is 3.44E+03 curies Ci. The total H-3 (elemental) value is 3.44E+03 Ci. The separations H-3 total value is 9.72E+03 Ci. The total H-3 value is 9.93E+03 Ci. The total Co-58 value is 0.00E+00 Ci. The separations total value is 2.28E+04 Ci. The overall total value is 2.30E+04 Ci. The half-life unit of “m” represents minutes.

Appendix D

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

All values under the "Calculated" column through "Totals" column are reported in curies.[a]

In the Calculated column, blanks indicate the radionuclide is not present. In the facility (Reactors, Separations, 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	1.03E+02	1.03E+02	6.29E+03		6.49E+03
H-3 (elemental)	12.3 y			3.44E+03		3.44E+03
H-3 Total	12.3 y	1.03E+02	1.03E+02	9.72E+03		9.93E+03
C-14	5700 y	3.33E-07		4.10E-02		4.10E-02
Hg-203	46.6 d	4.02E-10				4.02E-10
Kr-85	10.8 y			1.30E+04		1.30E+04
I-129	1.57E+07 y	7.48E-05		7.01E-03	7.48E-07	7.08E-03
I-131	8.02 d	6.67E-10				6.67E-10
Particles						
Ag-110m	250 d	1.48E-11				1.48E-11
Am-241	432 y	1.12E-05	0.00E+00	3.48E-06	3.10E-09	1.47E-05
Am-243	7370 y	3.69E-09				3.69E-09
Ba-133	10.5 y	1.01E-08				1.01E-08
Be-7	53 d	1.17E-11				1.17E-11
Cd-109	461 d	0.00E+00				0.00E+00
Ce-139	138 d	3.78E-10				3.78E-10
Ce-141	32.5 d	4.94E-11				4.94E-11
Ce-144	285 d	2.00E-08				2.00E-08
Cm-243	29.1 y	1.47E-08				1.47E-08
Cm-244	18.1 y	2.75E-07	1.07E-09	1.11E-08	2.46E-08	3.12E-07
Co-56	77.23 d	1.20E-10				1.20E-10
Co-57	272 d	5.12E-07				5.12E-07
Co-58	70.9 d			0.00E+00		0.00E+00
Co-60	5.27 y	2.65E-06	0.00E+00	0.00E+00	0.00E+00	2.65E-06
Cs-134	2.06 y	3.42E-10				3.42E-10
Cs-137	30.2 y	3.98E-03	0.00E+00	1.00E-02	0.00E+00	1.40E-02
Eu-152	13.5 y	8.82E-09				8.82E-09
Eu-154	8.59 y	3.56E-07				3.56E-07
Eu-155	4.76 y	1.18E-07				1.18E-07
F-18	1.83 h	0.00E+00				0.00E+00
Fe-55	2.74 y	7.09E-09				7.09E-09

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)
K-40	1.25E+09	y	7.47E-09				7.47E-09
La-140	1.6781	d	5.00E-06				5.00E-06
Mn-54	312	d	2.91E-07				2.91E-07
Na-22	2.6019	y	1.50E-05				1.50E-05
Nb-94	2.03E+04	y	2.42E-07				2.42E-07
Nb-95	35.0	d	3.63E-07				3.63E-07
Ni-59	1.01E+05	y	5.76E-11				5.76E-11
Ni-63	100	y	5.56E-09				5.56E-09
Np-237	2.14E+06	y	1.54E-06	0.00E+00	1.04E-07	0.00E+00	1.64E-06
Pa-233	27.0	d	1.42E-06				1.42E-06
Pb-212	10.6	h	8.43E-07				8.43E-07
Pm-147	2.62	y	2.89E-06				2.89E-06
Pm-148m	41.3	d	1.90E-12				1.90E-12
Pr-144	17.3	m	2.00E-08				2.00E-08
Pu-236	2.86	y	4.21E-10				4.21E-10
Pu-238	87.7	y	3.13E-05	1.73E-11	1.55E-05	2.74E-09	4.68E-05
Pu-239	2.41E+04	y	6.92E-05	3.20E-10	4.90E-05	2.41E-09	1.18E-04
Pu-240	6560	y	7.68E-06				7.68E-06
Pu-241	14.4	y	2.07E-04				2.07E-04
Pu-242	3.75E+05	y	2.67E-08				2.67E-08
Ra-226	1600	y	2.66E-07				2.66E-07
Ra-228	5.75	y	2.65E-07				2.65E-07
Rh-106[e]	29.8	s	3.04E-06		1.38E-05		1.68E-05
Ru-103	39.3	d	5.11E-10				5.11E-10
Ru-106	374	d	3.04E-06		1.38E-05		1.68E-05
Sb-125	2.76	y	1.18E-06				1.18E-06
Sb-126[e]	12.4	d	1.70E-07				1.70E-07
Sc-46	83.79	d	1.72E-10				1.72E-10
Se-79	2.95E+05	y	4.90E-09				4.90E-09
Sm-151	90	y	2.89E-06				2.89E-06
Sn-113	115	d	4.56E-10				4.56E-10
Sn-123	129	d	6.66E-12				6.66E-12
Sn-126	2.30E+05	y	1.70E-07				1.70E-07
Sr-85	64.8	d	4.68E-10				4.68E-10
Sr-89	50.5	d	4.93E-10				4.93E-10
Sr-90	28.8	y	3.09E-03	0.00E+00	4.30E-05		3.13E-03

Appendix D

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)
Tc-99	2.11E+05	y	6.02E-05				6.02E-05
Te-127	9.35	h	1.04E-11				1.04E-11
Te-129	69.6	m	1.05E-12				1.05E-12
Th-228	1.91	y	8.66E-09	2.76E-09			1.14E-08
Th-229	7340	y	1.05E-09				1.05E-09
Th-230	7.54E+04	y	5.70E-11	5.89E-09			5.95E-09
Th-231	25.5	h	2.12E-04				2.12E-04
Th-232	1.41E+10	y	9.06E-12	1.72E-09			1.73E-09
Tl-208	3.05	m	1.41E-06				1.41E-06
U-232	68.9	y	5.48E-09				5.48E-09
U-233	1.59E+05	y	1.24E-08				1.24E-08
U-234	2.46E+05	y	5.95E-07	2.71E-09	2.31E-05	7.57E-09	2.37E-05
U-235	7.04E+08	y	3.84E-08	0.00E+00	1.35E-06	3.15E-10	1.38E-06
U-236	2.34E+07	y	3.97E-08				3.97E-08
U-238	4.47E+09	y	1.62E-06	2.21E-09	2.97E-05	1.04E-08	3.13E-05
Y-88	107	d	3.60E-10				3.60E-10
Y-90[(e)]	64.1	h	3.09E-03	0.00E+00	4.30E-05		3.13E-03
Y-91	58.5	d	7.98E-10				7.98E-10
Zn-65	244	d	1.64E-06				1.64E-06
Zr-95	64.0	d	1.22E-07				1.22E-07
Unidentified alpha	N/A		9.82E-05	2.46E-06	2.16E-06	3.41E-07	1.03E-04
Unidentified beta	N/A		6.09E-04	5.44E-05	7.25E-05	1.24E-06	7.38E-04
TOTAL	N/A		1.03E+02	1.03E+02	2.28E+04	2.37E-06	2.30E+04

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

Appendix D

Appendix D, page D-5, Appendix Table D-2.

The tritium (234-H) 2022 DCS Sum of Fractions value is 5.16E+00.

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

As discussed in Chapter 5, 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-1196-2011 (DOE 2011), establishes numerical standards for DCSs to support implementing DOE Order 458.1. This document was updated in 2022 (DOE 2022). This table presents the air effluent DCS sums of fractions for continuously monitored sources where at least one analyte had at least one detected value. These sums of fractions determined by using both the 2011 and the 2022 standards are included. Discussion regarding the 291-F sum of fractions exceedance can be found in Section 5.3.2.1.

Facility (Sampling Location)	Radionuclides Included in the DCS Sum of Fractions	2011 DCS Sum of Fractions	2011 DCS Sum of Fractions Excluding Tritium	2022 DCS Sum of Fractions	2022 DCS Sum of Fractions Excluding Tritium
A Area (791-A Sandfilter Discharge)	I-129	7.16E-05	7.16E-05	4.69E-05	4.69E-05
C Area (C-Area Main Stack)	H-3 (oxide)	3.60E-01	0.00E+00	5.82E-01	0.00E+00
F Area (235-F Sandfilter Discharge)	U-234, U-238, Am-241, Pu-239	1.79E-03	1.79E-03	2.05E-03	2.05E-03
F Area (292-F Main Stack)	I-129, Cs-137, U-234, U-235, Np-237, U-238, Pu-238, Pu-239, Am-241, Cm-244, Sr-90	1.59E+00	1.59E+00	6.93E-01	6.93E-01
F Area (772-4F Stack)	U-234, U-238, Pu-238, Pu-239, Am-241	8.50E-04	8.50E-04	7.30E-04	7.30E-04
H Area (292-H Main Stack)	H-3 (oxide), C-14, Kr-85, I-129, Cs-137, U-234, U-235, U-238, Pu-238, Pu-239, Am-241, Cm-244, Np-237, Sr-90	1.27E+00	1.12E+00	2.97E+00	2.72E+00
K Area (K-Area Main Stack)	H-3 (oxide)	2.39E-01	0.00E+00	3.86E-01	0.00E+00
L Area (L-Area Disassembly)	H-3 (oxide)	2.28E-01	0.00E+00	3.68E-01	0.00E+00
L Area (L-Area Main Stack)	H-3 (oxide)	1.40E-01	0.00E+00	2.26E-01	0.00E+00
Tritium (232-H Stack)	H-3 (elemental), H-3 (oxide)	2.04E+01	0.00E+00	3.30E+01	0.00E+00
Tritium (233-H)	H-3 (elemental), H-3 (oxide)	3.77E+00	0.00E+00	6.09E+00	0.00E+00
Tritium (234-H)	H-3 (oxide)	3.20E+00	0.00E+00	5.16E+00	0.00E+00
Tritium (238-H)	H-3 (oxide)	8.43E-02	0.00E+00	1.36E-01	0.00E+00
Tritium (264-H Stack)	H-3 (elemental), H-3 (oxide)	1.34E+01	0.00E+00	2.17E+01	0.00E+00

Appendix D, page D-10, Appendix Table D-6.

For population centers, the results are the following: quarter 1 average, 0.39 mR/day; quarter 2 average, 0.33 mR/day; quarter 3 average, 0.36 mR/day; quarter 4 average, 0.43 mR/day; annual total average, 135.65 mR/year; annual minimum, 113 mR/year; and annual maximum, 162 mR/year. For site perimeter, the results are the following: quarter 3 average, 0.29 mR/day; quarter 4 average, 0.36 mR/day; annual total average, 110.89 mR/year; annual minimum, 97 mR/year; and annual maximum, 127 mR/year. For air surveillance stations, the results are the following: quarter 3 average, 0.30 mR/day; quarter 4 average, 0.37 mR/day; annual total average, 117.22 mR/year; annual minimum, 96 mR/year; and annual maximum, 152 mR/year. For Plant Vogtle vicinity, the results are the following: quarter 3 average, 0.30 mR/day; quarter 4 average, 0.36 mR/day; annual total average, 112.20 mR/year; annual minimum, 95 mR/year; and annual maximum, 137 mR/year.

The associated text on page 5-10 should say, “In 2022, ambient gamma exposure rates onsite varied between 96 mR/yr at location Allendale Gate and 152 mR/yr at A-14. Rates at population centers ranged from 113 mR/yr at the McBean, South Carolina, location to 162 mR/yr at the Beech Island, South Carolina, location.”

Appendix Table D-6 Summary of Gamma Surveillance

Samples were collected approximately every quarter (13 weeks) at each of the 52 locations. Typically, two samples are collected from each location. This was the case in 2022 except for Plant Vogtle location NRC_1, which had a damaged badge for one sample for the fourth quarter, and Population Center location McBean, which was missing one first quarter sample. Also, SRS was not able to retrieve any OSLDs for Population Center location Windsor during the fourth quarter. Please reference Environmental Maps, SRS Optically Stimulated Luminescent Dosimeter [OSLD] Sampling Locations, which can be found on the SRS Environmental Report 2022 webpage.

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	0.39	0.33	0.36	0.43	135.65	113	162
Site Perimeter	9	0.31	0.27	0.29	0.36	110.89	97	127
Air Surveillance Stations	16	0.33	0.28	0.30	0.37	117.22	96	152
Plant Vogtle Vicinity	18	0.31	0.26	0.30	0.36	112.20	95	137

Appendix D

Appendix D, page D-11, Appendix Table D-7.

The Hwy 301 Cm-244 concentration of 1.48E-03 pCi/g should be bold. The minimum gross beta concentration of 5.19E+00 pCi/g should be bold.

Appendix D-7 Summary of Radionuclides in Soil

Soil samples were collected from 24 locations in 2022. Bolded values are detected results. Values not bolded indicate the result was less than the analytical method detection limit, or the uncertainty is large.

The following locations were sampled: F Area (2,000 feet West), H Area (2,000 feet East), Z Area (#3), 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), and Creek Plantation Trail 1 (1175', 1600', 1805') and Trail 6 (2300'). The Highway 301 @ State Line is the control location.

All Co-60 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)
Cs-137	22 of 24	**1.50E-01**	Burial Ground North	4.03E-02	Trail 1 1805'	**3.59E+01**
U-234	20 of 20	**1.65E+00**	Allendale Gate	**4.62E-01**	Burial Ground North	**1.87E+00**
U-235	20 of 20	**9.22E-02**	Allendale Gate	**1.73E-02**	Burial Ground North	**9.43E-02**
U-238	20 of 20	**1.67E+00**	Allendale Gate	**4.59E-01**	Burial Ground North	**1.74E+00**
Pu-238	2 of 20	7.95E-04	Allendale Gate	-7.00E-04	F Area (2000 feet west)	**7.19E-02**
Pu-239	19 of 20	**2.29E-03**	A-14	8.59E-04	F Area (2000 feet west)	**5.62E-02**
Np-237	1 of 20	**1.64E-03**	Aiken Airport	-8.73E-04	Z Area (#3)	5.51E-04
Sr-89/90	1 of 24	-1.48E-02	Aiken Airport	-3.73E-02	Burial Ground (643-26E-2)	1.72E-01
Am-241	13 of 20	**9.57E-03**	Allendale Gate	7.43E-04	F Area (2000 feet west)	**6.11E-03**
Cm-244	2 of 20	**1.48E-03**	Patterson Mill Road	-2.84E-04	Augusta Lock and Dam 614	**3.57E-03**
Gross Beta	20 of 20	**1.65E+01**	Jackson	**5.19E+00**	A-14	**1.70E+01**
Gross Alpha	19 of 20	**1.92E+01**	Allendale Gate	1.31E+00	A-14	**2.48E+01**

Appendix D

Appendix D, page D-12, Appendix Table D-8.

The maximum Am-241 concentration of 5.24E-04 pCi/g should not be bold.

Appendix Table D-8 Summary of Radionuclides in Grassy Vegetation

Vegetation samples were collected from 16 locations in 2022. Bolded values are detected results. Values not bolded indicate the result was less than the analytical method detection limit or the uncertainty is large. All results for Co-60, Cm-244, Pu-239, Gross Alpha, and U-235 were not detected; therefore, they were not reported in this table.

The following locations are sampled: 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, Talatha Gate), and 25-Mile Radius Locations (Aiken Airport, Augusta Lock and Dam 614, and Highway 301 @ State Line). Highway 301 @ State Line is the control location.

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)
H-3	4 of 16	2.01E-02	Darkhorse @ Williston Gate	-2.65E-03	East Talatha	**9.57E-02**
Cs-137	8 of 16	1.11E-01	Burial Ground North	5.49E-03	Barnwell Gate	**4.65E-01**
Sr-89/90	14 of 16	**9.92E-02**	Augusta Lock & Dam 614	1.72E-02	Jackson	**2.08E-01**
U-234	16 of 16	**2.04E-03**	Darkhorse @ Williston Gate	**4.97E-04**	East Talatha	**7.27E-03**
U-238	16 of 16	**2.50E-03**	Darkhorse @ Williston Gate	**6.81E-04**	Burial Ground North	**6.78E-03**
Np-237	1 of 16	-2.26E-04	Barnwell Gate	-1.87E-04	Burial Ground North	**6.16E-04**
Pu-238	4 of 16	1.12E-04	Patterson Mill Road	-5.41E-06	Green Pond	**1.00E-03**
Am-241	1 of 16	9.30E-05	Patterson Mill Road	-4.35E-05	A-14	5.24E-04
Tc-99	1 of 16	-4.35E-02	Barnwell Gate	-8.51E-02	Green Pond	**1.69E-01**
Gross Beta	16 of 16	**8.62E+00**	Patterson Mill Road	**3.41E+00**	Barricade 8	**2.04E+01**

Appendix D

Appendix D, page D-13 through D-14, Appendix Table D-9.

The minimum nonvolatile beta concentration for cabbage (6.56E+00 pCi/g) should be bold. All cabbage maximum values should be bold. For wheat, Uranium-233/234 results are as follows: five samples, four results greater than the detection limit, a mean sample concentration of 1.70E-03 pCi/g, a minimum sample concentration of 5.30E-04 pCi/g, and a maximum sample concentration of 2.96E-03 pCi/g (bold). For wheat, Uranium-238 results are as follows: five samples, three results greater than the detection limit, a mean sample concentration of 1.40E-03 pCi/g, a minimum sample concentration of 6.30E-04 pCi/g, and a maximum sample concentration of 2.97E-03 pCi/g (bold).

Appendix D

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. Six foodstuffs are collected on a rotating three-year cycle. Cabbage and wheat were the rotational crop samples for 2022. 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	Nuclide	Number of Samples	Number of Results > Detection Limit	Mean Sample Conc. (pCi/g)	Minimum Sample Conc. (pCi/g)	Maximum Sample Conc. (pCi/g)
Beef	Cesium-137	5	1	6.16E-03	-6.05E-03	**2.18E-02**
	Nonvolatile Beta	5	5	7.80E-01	**6.63E-01**	**9.08E-01**
	Strontium-90	5	1	2.34E-03	3.77E-04	**5.83E-03**
	Uranium-233/234	5	3	7.97E-05	-3.17E-05	**1.56E-04**
	Uranium-238	5	3	1.10E-04	4.80E-05	**1.76E-04**
Americium-241, Cobalt-60, Curium-243/244, Gross Alpha, Neptunium-237, Plutonium-238, Plutonium-239/240, technetium-99, Tritium, and Uranium-235 were not detected in beef.						
Cabbage	Cesium-137	4	3	2.93E-02	9.51E-03	**4.80E-02**
	Curium-243/244	4	1	1.44E-04	3.05E-05	**4.23E-04**
	Nonvolatile Beta	4	4	1.24E+01	**6.56E+00**	**2.04E+01**
	Strontium-90	4	3	4.58E-02	1.74E-02	**7.60E-02**
	Tritium	5	1	1.48E-02	-6.23E-03	**3.23E-02**
	Uranium-233/234	4	4	1.16E-02	**3.91E-03**	**3.15E-02**
	Uranium-235	4	2	5.95E-04	4.77E-04	**7.73E-04**
	Uranium-238	4	4	1.22E-02	**3.40E-03**	**3.39E-02**
Americium-241, Cobalt-60, Gross Alpha, Neptunium-237, Plutonium-238, Plutonium-239/240, and Technetium-99 were not detected in cabbage.						
Fruit	Americium-241	5	1	6.48E-05	7.91E-06	**1.47E-04**
	Nonvolatile Beta	5	5	1.11E+00	**9.46E-01**	**1.23E+00**
	Plutonium-238	5	4	1.21E-04	7.60E-05	**1.78E-04**
	Strontium-90	5	1	2.72E-03	1.30E-03	**6.78E-03**
	Uranium-233/234	5	3	7.93E-05	2.67E-06	**1.22E-04**
	Uranium-238	5	1	6.01E-05	0.00E+00	**1.06E-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 fruit.						
Greens	Americium-241	5	2	1.30E-03	-1.79E-04	**5.84E-03**
	Cesium-137	5	5	2.55E-02	**1.40E-02**	**3.84E-02**
	Neptunium-237	5	1	6.24E-04	1.12E-05	**2.68E-03**
	Nonvolatile Beta	5	5	2.31E+00	**1.65E+00**	**3.07E+00**
	Plutonium-238	5	1	2.75E-04	1.10E-04	**5.89E-04**
	Plutonium-239/240	5	1	2.72E-04	8.52E-05	**5.88E-04**
	Strontium-90	5	4	1.09E-01	1.91E-02	**1.96E-01**

Appendix D

Food Type	Nuclide	Number of Samples	Number of Results > Detection Limit	Mean Sample Conc. (pCi/g)	Minimum Sample Conc. (pCi/g)	Maximum Sample Conc. (pCi/g)
	Tritium	5	1	8.62E-03	1.15E-03	**2.97E-02**
	Uranium-233/234	5	5	1.35E-02	**2.51E-03**	**5.08E-02**
	Uranium-235	5	1	9.01E-04	1.15E-04	**3.39E-03**
	Uranium-238	5	5	1.39E-02	**2.45E-03**	**5.08E-02**
Cobalt-60, Curium-243/244, Gross Alpha, and Technetium-99 were not detected in greens.						
Wheat	Americium-241	5	1	4.72E-04	1.24E-04	**1.28E-03**
	Curium-243/244	5	1	5.81E-04	-7.86E-05	**2.85E-03**
	Nonvolatile Beta	5	5	3.74E+00	**3.18E+00**	**4.42E+00**
	Plutonium-238	5	1	4.41E-04	2.59E-04	**8.47E-04**
	Plutonium-239/240	5	1	4.27E-04	2.09E-04	**7.12E-04**
	Strontium-90	5	1	2.42E-02	9.32E-03	**5.30E-02**
	Uranium-233/234	5	4	1.70E-03	5.30E-04	**2.96E-03**
	Uranium-238	5	3	1.40E-03	6.30E-04	**2.97E-03**
Cesium-137, Cobalt-60, Gross Alpha, Neptunium-237, Technetium-99, Tritium, and Uranium-235 were not detected in wheat.						

Appendix D, page D-15, Appendix Table D-10.

For SC dairies, the minimum Cs-137 sample concentration is -2.08E+00 pCi/L. For GA dairies, the maximum Sr-90 sample concentration is 1.07E+00 pCi/L (not bold).

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 dairies in the named state that provide samples to SRS.

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 Co-60 and 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	Cs-137	16	3	1.90E+00	-2.08E+00	**7.32E+00**
SC–Dairies (4) Cow Milk	Sr-90	16	2	5.09E-01	-8.08E-01	**2.67E+00**
GA–Dairies (3) Cow Milk	Cs-137	12	1	1.26E+00	-5.51E-01	**3.24E+00**
GA–Dairies (3) Cow Milk	Sr-90	12	1	2.25E-01	-5.89E-01	1.07E+00

Appendix D, page D-16, Appendix Table D-11.

The half-life of Sr-90 is 28.8 years. The half-life of Tc-99 is 2.11E+05 years. The half-life of I-129 is 1.57E+07 years. The half-life of Cs-137 is 30.2 years. The half-life of Eu-154 is 8.6 years.

Appendix Table D-11 Radiation in Liquid Source Releases

All values under the "Reactors," "Separations," "SRNL," and the "Totals" column are reported in curies.[a]

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

Radionuclide	Half-Life Time Interval[b]		Reactors (Ci)	Separations[c] (Ci)	SRNL (Ci)	Totals (Ci)
H-3[d]	12.3	y	1.07E+02	2.41E+02	6.70E-03	3.48E+02
C-14	5,700	y		7.09E-03	0.00E+00	7.09E-03
Sr-90	28.8	y	1.48E-04	1.61E-02		1.63E-02
Tc-99	2.11E+05	y	0.00E+00	1.22E-02	0.00E+00	1.22E-02
I-129	1.57E+07	y	0.00E+00	1.30E-02	0.00E+00	1.30E-02
Cs-137[e]	30.2	y	0.00E+00	9.59E-03	0.00E+00	9.59E-03
Eu-154	8.6	y	0.00E+00	3.49E-03	9.47E-04	4.44E-03
U-234	2.46E+05	y	1.97E-04	6.33E-02	5.06E-05	6.35E-02
U-235	7.04E+08	y	0.00E+00	3.73E-03	3.65E-06	3.73E-03
U-238	4.47E+09	y	5.21E-04	7.15E-02	4.46E-05	7.20E-02
Np-237	2.14E+06	y		9.07E-05		9.07E-05
Pu-238	87.7	y	0.00E+00	2.53E-04	1.70E-07	2.53E-04
Pu-239	2.41E+04	y	0.00E+00	2.72E-05	0.00E+00	2.72E-05
Am-241	432	y	0.00E+00	2.60E-05		2.60E-05
Cm-244	18.1	y	0.00E+00	1.02E-05		1.02E-05
Alpha [f]	N/A		4.09E-03	6.17E-03	1.18E-04	1.04E-02
Beta-Gamma [g]	N/A		3.97E-02	4.20E-03	0.00E+00	4.39E-02
					Sum	**3.48E+02**

[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 D

Appendix D, page D-17, Appendix Table D-12.

For G-010 (Central Sanitary Wastewater Treatment Facility), the results are as follows: 2011 DCS Sum of Fractions excluding tritium is 3.12E-03, 2022 DCS Sum of Fractions is 2.29E-03, and 2022 DCS Sum of Fractions excluding tritium is 1.96E-03.

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

As discussed in Chapter 5, 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-1196-2011 (DOE 2011), establishes numerical standards for DCSs to support implementing DOE Order 458.1. This document was updated in 2022 (DOE 2022). 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. These sums of fractions determined by using both the 2011 and the 2022 standards are included.

Facility (Sampling Location)	Radionuclides Included in the Sum of Fractions	2011 DCS Sum of Fractions	2011 DCS Sum of Fractions Excluding Tritium	2022 DCS Sum of Fractions	2022 DCS Sum of Fractions Excluding Tritium
A Area (TB-2 Outfall at Road 1A)	H-3, U-234, U-235, U-238, Pu-238	6.37E-04	5.73E-04	3.60E-04	3.13E-04
F Area (F-05)	H-3, C-14, Sr-89/90, Tc-99, U-234, U-235 U-238, Pu-238, Pu-239, Am-241, Cm-244	3.01E-03	2.74E-03	1.83E-03	1.63E-03
F Area (FM-3 F-Area Effluent)	H-3, Tc-99, I-129, U-234, U-235, U-238, Pu-238, Pu-239 Am-241, Cm-244	9.56E-03	9.31E-03	2.06E-03	1.87E-03
G-010 (Central Sanitary Wastewater Treatment Facility)	H-3, Sr-89/90, U-234, U-238, Pu-238, Am-241	3.56E-03	3.12E-03	2.29E-03	1.96E-03
H Area (FM-1C H-Area Effluent)	H-3, Sr-89/90, Cs-137, U-234, U-235, U-238, Np-237, Pu-238, Pu-239, Am-241, Cm-244,	1.90E-02	1.85E-02	1.20E-02	1.16E-02
H Area (H-004)	H-3, Sr-89/90, U-234, U-235, U-238, Pu-238, Pu-239	6.51E-03	4.64E-03	3.90E-03	2.53E-03
H-Tank Farm (HP-52 H-Area Tank Farm)	H-3, U-234, U-238, Pu-238, Am-241	7.37E-04	1.69E-04	4.90E-04	7.46E-05
K Area (K Canal)	H-3, Sr-89/90	1.14E-03	2.56E-04	8.12E-04	1.66E-04
S Area (S-004)	H-3, Sr-89/90, U-234, U-235, U-238, Pu-238	2.54E-03	9.21E-04	1.76E-03	5.74E-04
Tritium (HP-15 Tritium Facility Outfall)	H-3	1.48E-02	0.00E+00	1.08E-02	0.00E+00

Appendix D, page D-18 through D-19, Appendix Table D-13.

For rivers, the number of Americum-241 results greater than the detection limit is 4 of 9. The river location with the maximum Americium-241 results is RM-150.2 and the maximum result is 2.14E-03 pCi/g. For streams, the number of results greater than the detection limit are as follows: Americium-241, 12 of 16; Cesium-137, 19 of 21; Cobalt-60, 0 of 21; Curium-243/244, 5 of 16; gross alpha, 21 of 21; Neptunium-237, 3 of 16; nonvolatile beta, 21 of 21; Plutonium-238, 13 of 16; Plutonium-239/240, 13 of 16; Strontium-90, 5 of 16; Uranium-233/234, 15 of 16; Uranium-235, 14 of 16; and Uranium-238, 15 of 16. For the stream control location of U3R-1A, the Plutonium-239/240 value is 3.87E-03 pCi/g (bold). For streams, the maximum results are as follows: Americum-241, < 6.96E-01 pCi/g (not bold); Curium-243/244, < 5.87E-01 pCi/g (not bold); Neptunium-237, < 6.37E-02 pCi/g (not bold); Plutonium-238, < 1.90E+00 pCi/g (not bold); Plutonium-239/240, < 2.01E+00 pCi/g (not bold); Strontium-90, < 1.92E+00 pCi/g (not bold); and Uranium-235, < 5.14E-01 pCi/g (not bold). For the basin control location of U3R-1A, the Strontium-90 value is 7.58E-02 pCi/g (bold). For basins, the maximum results are as follows: Americum-241, < 4.24E-01 pCi/g (not bold); Curium-243/244, < 4.92E-01 pCi/g (not bold); Neptunium-237, < 5.44E-02 pCi/g (not bold); Plutonium-238, < 8.42E-01 pCi/g (not bold); Plutonium-239/240, < 7.78E-01 pCi/g (not bold); and Uranium-235, < 5.11E-01 pCi/g (not bold).

Appendix D

Appendix Table D-13 Summary of Radionuclides in Sediments

SRS collected annual sediment samples at 40 locations in 2022—11 Savannah River, 21 stream, and 8 stormwater basins—totaling 457 analytes. Qualitative results for Americium-241 and Curium-244 at Beaver Dam Creek [BDC], L3R-1A, and Steel Creek [SC] are reported. Locations sampled are as follows: Savannah River locations (mouths of Beaver Dam Creek [BDC] and Steel Creek [SC], River Miles [RM] 118.7, 129, 134, 141, 150.2, 150.4 and 157.2), SRS Stream locations (downstream of R-1, FM-2, FM-3A, FM-6, FM-A7, FM-A7A, FMC @ Rd A, FMC Swamp, L3R-1A , L3R-2, McQB @ MO, PB @ Rd A, PB Swamp, SC-2A, SC-4, TB-5, U3R-3, and U3R-4), and 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

10 River Locations Plus 1 Control
(Some locations only analyzed for Cs-137, Co-60, gross alpha, and nonvolatile beta)

Analyte	Number > DL	Control RM 161.0 (pCi/g)	Location of Maximum Result	Maximum Result (pCi/g)
Americium-241	4 of 9	**2.33E-03**	RM-150.2	**2.14E-03**
Cesium-137	7 of 11	< 6.65E-02	SC-RM	**1.54E+00**
Cobalt-60	0 of 11	< 6.34E-02	All < MDA	All < MDA
Curium-243/244	3 of 9	< 9.03E-04	RM-129	**1.56E-03**
Gross Alpha	11 of 11	**1.31E+01**	RM-157.2	**4.06E+01**
Neptunium-237	0 of 9	< 2.60E-03	All < MDA	All < MDA
Nonvolatile Beta	11 of 11	**2.14E+01**	RM-157.2	**3.24E+01**
Plutonium-238	0 of 9	< 2.67E-03	All < MDA	All < MDA
Plutonium-239/240	3 of 9	< 2.19E-03	RM-157.2	**1.17E-02**
Strontium-90	0 of 9	< 9.02E-02	All < MDA	All < MDA
Uranium-233/234	9 of 9	**1.95E+00**	BDC RM	**2.26E+00**
Uranium-235	9 of 9	**9.09E-02**	BDC RM	**1.04E-01**
Uranium-238	9 of 9	**1.87E+00**	BDC RM	**2.34E+00**

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

Stream Sediment Results

19 Stream Locations Plus 2 Controls
(Some locations only sampled for Cs-137, Co-60, gross alpha and nonvolatile beta)

Analyte	Number >DL	Control TC-1 (pCi/g)	Control U3R-1A (pCi/g)	Location of Maximum Result	Maximum Result (pCi/g)
Americium-241	12 of 16	**3.19E-03**	**1.87E-03**	FM-2	< 6.96E-01
Cesium-137	19 of 21	< 4.66E-02	**8.05E-02**	FM-2	**3.37E+01**
Cobalt-60	0 of 21	< 4.04E-02	< 6.46E-02	All < MDA	All < MDA
Curium-243/244	5 of 16	< 1.07E-03	< 1.05E-03	FM-2	< 5.87E-01
Gross Alpha	21 of 21	**8.99E+00**	**2.86E+01**	U3R-3	**4.12E+01**
Neptunium-237	3 of 16	< 1.78E-03	< 1.32E-03	Downstream of R-1	< 6.37E-02
Nonvolatile Beta	21 of 21	**6.30E+00**	**1.87E+01**	Downstream of R-1	**4.11E+01**
Plutonium-238	13 of 16	**3.30E-03**	< 1.11E-03	Downstream of R-1	< 1.90E+00
Plutonium-239/240	13 of 16	**2.98E-03**	**3.87E-03**	Downstream of R-1	< 2.01E+00
Strontium-90	5 of 16	< 9.05E-02	**7.58E-02**	Downstream of R-1	< 1.92E+00
Uranium-233/234	15 of 16	**7.97E-01**	**1.07E+00**	SC-2A	**3.54E+00**
Uranium-235	14 of 16	**3.03E-02**	**7.75E-02**	Downstream of R-1	< 5.14E-01
Uranium-238	15 of 16	**7.09E-01**	**1.11E+00**	SC-2A	**3.62E+00**

Stormwater Basin Sediment Results

Eight Basin Locations Compared to Two Stream Control Locations

Analyte	Number >DL	Control TC-1 (pCi/g)	Control U3R-1A (pCi/g)	Location of Maximum Result	Maximum Result (pCi/g)
Americium-241	8 of 10	**3.19E-03**	**1.87E-03**	Z-Basin	< 4.24E-01
Cesium-137	6 of 10	< 4.66E-02	**8.05E-02**	Z-Basin	**1.43E+03**
Cobalt-60	0 of 10	< 4.04E-02	< 6.46E-02	All < MDA	All < MDA
Curium-243/244	3 of 10	< 1.07E-03	< 1.05E-03	Z-Basin	< 4.92E-01
Gross Alpha	10 of 10	**8.99E+00**	**2.86E+01**	Pond 400	**2.66E+01**
Neptunium-237	1 of 10	< 1.78E-03	< 1.32E-03	Z-Basin	< 5.44E-02
Nonvolatile Beta	10 of 10	**6.30E+00**	**1.87E+01**	Z-Basin	**1.21E+03**
Plutonium-238	6 of 10	**3.30E-03**	< 1.11E-03	Z-Basin	< 8.42E-01
Plutonium-239/240	8 of 10	**2.98E-03**	**3.87E-03**	Z-Basin	< 7.78E-01
Strontium-90	2 of 10	< 9.05E-02	**7.58E-02**	E-003	**1.90E+00**
Uranium-233/234	9 of 10	**7.97E-01**	**1.07E+00**	Pond 400	**2.13E+00**
Uranium-235	9 of 10	**3.03E-02**	**7.75E-02**	Z-Basin	< 5.11E-01
Uranium-238	9 of 10	**7.09E-01**	**1.11E+00**	Pond 400	**2.06E+00**

Appendix D, page D-22 through D-24, Appendix Table D-15.

The Upper Three Runs Creek River Mouth Tc-99 minimum concentration for flathead is -2.89E+01 pCi/kg.

Appendix Table D-15 Summary of Radionuclides in Freshwater Fish

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. Sr-89/90 is the only analysis performed in both flesh (edible) and bone (nonedible) samples. All Co-60, I-129, and gross alpha results were not detected; therefore, they were not reported in this table.

The analyte mean is set to zero if all composite values per fish species at a single location are less than the MDL or the uncertainty is large. Three composite samples were analyzed for each fish type from each location, except flathead catfish and panfish from Upper Three Runs Creek River Mouth, respectively.

	Cs-137 (Edible)											
	Bass			Catfish			Flathead			Panfish		
Location	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)
Augusta L&D	**2.89E+01**	**1.30E+01**	**5.26E+01**	1.45E+01	1.13E+01	**1.70E+01**	N /A	N/A	N/A	**6.52E+01**	**1.96E+01**	**9.08E+01**
Four Mile Creek River Mouth	**8.24E+01**	**5.45E+01**	**1.22E+02**	**4.33E+01**	**3.49E+01**	**5.67E+01**	3.12E+01	1.66E+01	**4.83E+01**	**7.75E+01**	**3.18E+01**	**1.27E+02**
Hwy 301 Bridge Area	**1.62E+01**	**1.38E+01**	**2.00E+01**	**1.77E+01**	**1.41E+01**	**2.15E+01**	**2.10E+01**	**1.90E+01**	**2.48E+01**	9.93E+00	6.83E+00	**1.40E+01**
Lower Three Runs Creek River Mouth	2.52E+01	1.62E+01	**3.12E+01**	**4.79E+02**	**2.79E+02**	**8.15E+02**	**6.12E+01**	**3.48E+01**	**1.03E+02**	**2.47E+02**	**1.02E+02**	**5.01E+02**
Steel Creek River Mouth	**1.35E+02**	**9.79E+01**	**1.68E+02**	**7.66E+01**	**6.19E+01**	**9.93E+01**	**7.62E+01**	**4.57E+01**	**1.36E+02**	**6.71E+01**	**5.19E+01**	**9.10E+01**
Upper Three Runs Creek River Mouth	**3.69E+01**	**1.64E+01**	**6.73E+01**	0.00E+00	1.09E+01	1.44E+01	**6.38E+01**	**3.45E+01**	**9.17+01**	0.00E+00	7.50E+00	9.91E+00

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

Sr-89/90 (Edible)												
	Bass			Catfish			Flathead			Panfish		
Location	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)
Augusta L&D	0.00E+00	5.17E-01	2.93E+00	0.00E+00	-1.86E+00	4.18E+00	N/A	N/A	N/A	0.00E+00	1.24E+00	2.55E+00
Four Mile Creek River Mouth	2.44E+00	2.20E+00	2.57E+00	2.49E+00	5.91E-01	**5.75E+00**	1.72E+00	2.16E-02	**4.31E+00**	0.00E+00	1.17E+00	1.82E+00
Hwy 301 Bridge Area	0.00E+00	6.07E-01	1.36E+00	0.00E+00	1.95E+00	2.32E+00	0.00E+00	-2.81E-01	2.13E+00	0.00E+00	-3.50E+00	4.93E+00
Lower Three Runs Creek River Mouth	0.00E+00	-5.71E-01	3.02E+00	0.00E+00	1.22E+00	2.13E+00	0.00E+00	-2.89E-01	1.90E+00	0.00E+00	-5.82E-01	4.22E+00
Steel Creek River Mouth	0.00E+00	-5.28E-01	1.62E+00	0.00E+00	-6.92E-01	1.95E+00	0.00E+00	-1.86E-01	1.74E+00	0.00E+00	-6.38E-01	4.87E+00
Upper Three Runs Creek River Mouth	2.29E+00	1.16E+00	**3.78E+00**	0.00E+00	5.90E-02	1.22E+00	0.00E+00	7.37E-01	1.70E-00	1.88E+00	1.51E-01	**3.61E+00**

Sr-89/90 (Nonedible)												
	Bass			Catfish			Flathead			Panfish		
Location	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)
Augusta L&D	**1.02E+02**	**9.22E+01**	**1.18E+02**	**8.04E+01**	**6.22E+01**	**1.03E+02**	N/A	N/A	N/A	**1.16E+02**	**8.51E+01**	**1.37E+02**
Four Mile Creek River Mouth	**5.07E+02**	**1.76E+02**	**1.11E+03**	**1.15E+02**	**7.65E+01**	**1.50E+02**	**8.31E+01**	**5.67E+01**	**1.02E+02**	**3.73E+02**	**1.63E+02**	**5.58E+02**
Hwy 301 Bridge Area	**7.40E+01**	**4.99E+01**	**1.01E+02**	**9.39E+01**	**7.16E+01**	**1.05E+02**	**8.00E+01**	**5.32E+01**	**9.54E+01**	**9.49E+01**	**8.08E+01**	**1.21E+02**
Lower Three Runs Creek River Mouth	**9.36E+01**	**8.37E+01**	**1.02E+02**	**8.53E+01**	**5.98E+01**	**1.02E+02**	**9.54E+01**	**6.59E+01**	**1.25E+02**	**1.13E+02**	**9.28E+01**	**1.34E+02**
Steel Creek River Mouth	**1.54E+02**	**1.06E+02**	**2.12E+02**	**9.38E+01**	**7.49E+01**	**1.15E+02**	**9.20E+01**	**6.53E+01**	**1.15E+02**	**9.53E+01**	**9.13E+01**	**9.75E+01**
Upper Three Runs Creek River Mouth	**1.02E+02**	**7.35E+01**	**1.40E+02**	5.82E+01	5.65E+01	**5.97E+01**	**7.34E+01**	**1.05E-02**	**1.07E+02**	**1.24E+02**	**8.98E+01**	**1.48E+02**

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

Tc-99 (Edible)

Location	Bass			Catfish			Flathead			Panfish		
	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)
Augusta L&D	0.00E+00	2.22E+01	3.22E+01	0.00E+00	-8.87E+00	2.42E+01	N/A	N/A	N/A	0.00E+00	6.04E+00	3.75E+01
Four Mile Creek River Mouth	0.00E+00	-2.76E+01	3.02E+01	0.00E+00	-1.24E+01	1.74E+01	0.00E+00	2.88E+00	6.20E+00	0.00E+00	1.50E-04	1.78E+01
Hwy 301 Bridge Area	0.00E+00	-2.55E+01	1.90E+01	0.00E+00	2.40E+01	3.23E+01	0.00E+00	-1.90E+00	1.64E+01	0.00E+00	-5.33E+00	1.56E+01
Lower Three Runs Creek River Mouth	5.20E+01	3.03E+01	**6.81E+01**	0.00E+00	2.27E+01	4.29E+01	0.00E+00	1.64E+01	3.24E+01	0.00E+00	1.05E+01	5.67E+01
Steel Creek River Mouth	0.00E+00	3.29E+01	5.16E+01	0.00E+00	2.25E+01	5.39E+01	0.00E+00	2.16E+01	3.51E+01	0.00E+00	3.75E+01	5.06E+01
Upper Three Runs Creek River Mouth	0.00E+00	-1.43E+01	1.64E+00	0.00E+00	-2.28E+01	2.61E+01	0.00E+00	-2.89E+01	7.85E+00	0.00E+00	-8.57E+00	8.14E+00

Gross Beta (Edible)

Location	Bass			Catfish			Flathead			Panfish		
	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)	Mean (pCi/kg)	Minimum (pCi/kg)	Maximum (pCi/kg)
Augusta L&D	**1.31E+03**	**1.15E+03**	**1.51E+03**	**1.23E+03**	**1.03E+03**	**1.39E+03**	N/A	N/A	N/A	**1.25E+03**	**1.12E+03**	**1.42E+03**
Four Mile Creek River Mouth	**1.32E+03**	**1.21E+03**	**1.51E+03**	**1.31E+03**	**1.19E+03**	**1.37E+03**	**1.35E+03**	**1.12E+03**	**1.53E+03**	**1.21E+03**	**1.08E+03**	**1.28E+03**
Hwy 301 Bridge Area	**8.59E+02**	**7.85E+02**	**9.39E+02**	**7.92E+02**	**6.40E+02**	**9.56E+02**	**8.96E+02**	**7.28E+02**	**9.86E+02**	**1.01E+03**	**9.46E+02**	**1.06E+03**
Lower Three Runs Creek River Mouth	**9.84E+02**	**7.86E+02**	**1.28E+03**	**8.31E+02**	**7.81E+02**	**9.11E+02**	**8.12E+02**	**7.32E+02**	**9.08E+02**	**8.94E+02**	**7.76E+02**	**1.11E+03**
Steel Creek River Mouth	**7.68E+02**	**6.58E+02**	**8.35E+02**	**7.91E+02**	**5.78E+02**	**9.27E+02**	**9.09E+02**	**8.79E+02**	**9.32E+02**	**7.78E+02**	**6.20E+02**	**8.73E+02**
Upper Three Runs Creek River Mouth	**1.08E+03**	**9.77E+02**	**1.21E+03**	**1.22E+03**	**1.16E+03**	**1.35E+03**	**1.30E+03**	**1.20E+03**	**1.46E+03**	**9.82E+02**	**8.14E+02**	**1.15E+03**