



Appendix G

Radiological Airborne Emissions at Oak Ridge National Laboratory

This appendix presents radiological airborne emissions at ORNL for calendar year 2024. Source term information from the ORNL site is obtained from 9 major and 15 minor emission sources. The nine major emission sources (2026, 3020, 3039, 3525, 4501, 7503, 7880, 7911, and 8915) have the potential to emit radionuclides that could result in a dose equal to or greater than 0.1 mrem/year (0.001 mSv/year) to the most exposed member of the public and require continuous emission sampling. The 15 minor emission sources (point and grouped) do not have the potential to cause any member of the public to receive an effective dose equal to or greater than 0.1 mrem/year (0.001 mSv/year). A variety of approved methods are used to evaluate minor source emissions, including in-stack sampling, the use of health physics data and HEPA filter sampling results, surrogate emission estimates, and inventory data with emission factors provided in 40 CFR Part 61, Appendix D.

Table G.1. Radiological airborne emissions from all major and minor sources at ORNL, 2024 (Ci)^a

Isotope	Inhalation class ^b	Chemical form	Stack									Total minor sources	ORNL total
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911	X-8915		
²²⁵ Ac	M	particulate										1.12E-07	1.12E-07
²²⁶ Ac	M	particulate										1.07E-09	1.07E-09
²²⁷ Ac	M	particulate										1.91E-09	1.91E-09
²²⁸ Ac	M	particulate										1.55E-20	1.55E-20
¹⁰⁵ Ag	M	particulate										8.40E-21	8.40E-21
¹⁰⁸ Ag	B	unspecified										2.45E-12	2.45E-12
^{108m} Ag	M	particulate										2.75E-11	2.75E-11
¹¹⁰ Ag	B	unspecified										1.09E-10	1.09E-10
^{110m} Ag	M	particulate										1.73E-08	1.73E-08
¹¹¹ Ag	M	particulate										4.23E-08	4.23E-08
¹¹² Ag	M	particulate										5.62E-10	5.62E-10
²⁶ Al	M	particulate										2.99E-09	2.99E-09
²⁴¹ Am	M	particulate	6.50E-09	2.74E-05	1.47E-07	2.94E-10	5.40E-09	9.34E-09	9.15E-07	1.95E-09		2.95E-07	2.88E-05
²⁴² Am	M	particulate										3.30E-10	3.30E-10
^{242m} Am	M	particulate										3.31E-10	3.31E-10
²⁴³ Am	M	particulate										3.02E-09	3.02E-09
³⁷ Ar	B	unspecified										1.10E-06	1.10E-06
³⁹ Ar	B	unspecified										6.33E-04	6.33E-04
⁴¹ Ar	B	unspecified				7.20E-05				7.94E+02	9.73E+01		8.91E+02
⁷³ As	M	particulate										4.83E-24	4.83E-24
¹⁹⁵ Au	M	particulate										5.78E-22	5.78E-22
¹³³ Ba	M	particulate										9.48E-08	9.48E-08
^{137m} Ba	B	unspecified										3.22E-06	3.22E-06
¹³⁹ Ba	M	particulate	5.64E-02							3.90E-01			4.46E-01
¹⁴⁰ Ba	M	particulate								4.16E-04		4.74E-08	4.16E-04
⁷ Be	M	particulate	2.80E-07	9.68E-08	3.54E-06	8.27E-08	4.19E-06	5.59E-08		4.75E-07		2.84E-06	1.16E-05
¹⁰ Be	M	particulate										1.07E-15	1.07E-15
²⁰⁶ Bi	M	particulate										3.21E-09	3.21E-09
²⁰⁷ Bi	M	particulate										1.62E-18	1.62E-18
²⁰⁸ Bi	B	unspecified										2.66E-19	2.66E-19
²¹⁰ Bi	M	particulate										1.27E-20	1.27E-20
^{210m} Bi	M	particulate										1.58E-19	1.58E-19
²¹² Bi	M	particulate										1.89E-11	1.89E-11
²⁴⁷ Bk	M	particulate										3.66E-24	3.66E-24

Table G.1. Radiological airborne emissions from all sources at ORNL, 2024 (Ci)^a (continued)

Isotope	Inhalation class ^b	Chemical form	Stack									Total minor sources	ORNL total
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911	X-8915		
²⁴⁹ Bk	M	particulate										1.00E-11	1.00E-11
²⁵⁰ Bk	M	particulate										4.31E-22	4.31E-22
⁸² Br	M	particulate										6.58E-10	6.58E-10
¹¹ C	G	dioxide									1.19E+04		1.19E+04
¹⁴ C	M	particulate										3.76E-10	3.76E-10
⁴¹ Ca	M	particulate										7.40E-12	7.40E-12
⁴⁵ Ca	M	particulate										6.34E-11	6.34E-11
¹⁰⁹ Cd	M	particulate										4.56E-10	4.56E-10
¹¹³ Cd	M	particulate										4.06E-16	4.06E-16
^{113m} Cd	M	particulate										1.02E-09	1.02E-09
¹¹⁵ Cd	M	particulate										1.16E-08	1.16E-08
^{115m} Cd	M	particulate										5.88E-16	5.88E-16
¹³⁹ Ce	M	particulate										1.93E-10	1.93E-10
¹⁴¹ Ce	M	particulate										5.31E-09	5.31E-09
¹⁴³ Ce	M	particulate										8.38E-10	8.38E-10
¹⁴⁴ Ce	M	particulate										7.21E-07	7.21E-07
²⁴⁸ Cf	M	particulate										4.25E-24	4.25E-24
²⁴⁹ Cf	M	particulate										3.43E-14	3.43E-14
²⁵⁰ Cf	M	particulate										3.62E-14	3.62E-14
²⁵¹ Cf	M	particulate										1.72E-15	1.72E-15
²⁵² Cf	M	particulate										2.71E-09	2.71E-09
³⁶ Cl	M	particulate										1.39E-04	1.39E-04
²⁴² Cm	M	particulate										2.51E-10	2.51E-10
²⁴³ Cm	M	particulate	1.45E-08	1.09E-08	5.15E-09		1.17E-08	2.36E-08				1.57E-10	6.59E-08
²⁴⁴ Cm	M	particulate	1.45E-08	1.09E-08	5.15E-09		1.17E-08	2.36E-08				2.94E-06	3.01E-06
²⁴⁵ Cm	M	particulate										5.50E-11	5.50E-11
²⁴⁶ Cm	M	particulate										1.49E-11	1.49E-11
²⁴⁷ Cm	M	particulate										1.53E-10	1.53E-10
²⁴⁸ Cm	M	particulate										2.53E-12	2.53E-12
²⁵⁰ Cm	M	particulate										9.31E-22	9.31E-22
⁵⁶ Co	M	particulate										8.95E-16	8.95E-16
⁵⁷ Co	M	particulate										3.90E-10	3.90E-10
⁵⁸ Co	M	particulate										8.25E-12	8.25E-12
⁶⁰ Co	M	particulate			9.16E-08	5.72E-08			2.97E-07			2.02E-06	2.47E-06
^{60m} Co	M	particulate										9.42E-16	9.42E-16
⁵¹ Cr	M	particulate										8.34E-12	8.34E-12

Table G.1. Radiological airborne emissions from all sources at ORNL, 2024 (Ci)^a (continued)

Isotope	Inhalation class ^b	Chemical form	Stack									Total minor sources	ORNL total
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911	X-8915		
¹³⁴ Cs	F	particulate				2.05E-06						7.30E-07	2.78E-06
¹³⁵ Cs	F	particulate										2.21E-11	2.21E-11
¹³⁶ Cs	F	particulate										3.84E-09	3.84E-09
¹³⁷ Cs	F	particulate	2.24E-07	1.21E-05	2.42E-05	5.26E-05		1.39E-07		3.97E-06		2.36E-04	3.29E-04
¹³⁸ Cs	F	particulate								4.12E+02			4.12E+02
¹⁵⁹ Dy	M	particulate										9.59E-16	9.59E-16
²⁵⁴ Es	M	particulate										4.31E-22	4.31E-22
¹⁵⁰ Eu	M	particulate										5.64E-16	5.64E-16
¹⁵² Eu	M	particulate			7.25E-07							1.85E-07	9.10E-07
¹⁵⁴ Eu	M	particulate				6.52E-05						2.54E-07	6.55E-05
¹⁵⁵ Eu	M	particulate										7.79E-08	7.79E-08
¹⁵⁶ Eu	M	particulate										5.57E-21	5.57E-21
⁵⁵ Fe	M	particulate										2.92E-06	2.92E-06
⁵⁹ Fe	M	particulate										1.00E-11	1.00E-11
⁶⁰ Fe	M	particulate										2.12E-15	2.12E-15
¹⁴⁸ Gd	M	particulate										1.69E-10	1.69E-10
¹⁵¹ Gd	M	particulate										6.68E-22	6.68E-22
¹⁵² Gd	M	particulate										1.37E-22	1.37E-22
¹⁵³ Gd	M	particulate										4.09E-11	4.09E-11
⁶⁸ Ge	M	particulate										2.91E-15	2.91E-15
⁷¹ Ge	M	particulate										1.63E-24	1.63E-24
³ H	V	vapor			5.01E-01	4.54E-02	8.99E-03	4.63E-01		8.53E+01	9.12E+02	2.75E+00	1.00E+03
¹⁷² Hf	M	particulate										5.30E-12	5.30E-12
¹⁷⁵ Hf	M	particulate										8.88E-15	8.88E-15
^{178m} Hf	M	particulate										3.08E-11	3.08E-11
^{179m} Hf	M	particulate										1.08E-28	1.08E-28
¹⁸¹ Hf	M	particulate										1.41E-12	1.41E-12
¹⁸² Hf	M	particulate										9.88E-14	9.88E-14
²⁰³ Hg	M	inorganic										6.09E-14	6.09E-14
¹⁶³ Ho	B	unspecified										3.68E-16	3.68E-16
^{166m} Ho	M	particulate										1.57E-12	1.57E-12
¹²⁴ I	F	particulate						1.49E-04					1.49E-04
¹²⁵ I	F	particulate										3.17E-23	3.17E-23
¹²⁶ I	F	particulate			1.25E-02		6.35E-03					1.57E-09	1.89E-02

Table G.1. Radiological airborne emissions from all sources at ORNL, 2024 (Ci)^a (continued)

Isotope	Inhalation class ^b	Chemical form	Stack								Total minor sources	ORNL total	
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911			X-8915
¹²⁹ I	F	particulate				8.39E-07				1.44E-04		9.12E-06	1.54E-04
¹³¹ I	F	particulate				6.47E-05	2.46E-02			4.11E-02		1.68E-08	6.58E-02
¹³² I	F	particulate					3.34E-04			9.60E+00			9.60E+00
¹³³ I	F	particulate								2.58E-01			2.58E-01
¹³⁴ I	F	particulate								8.79E-01			8.79E-01
¹³⁵ I	F	particulate								9.15E-01			9.15E-01
^{113m} In	M	particulate										7.64E-12	7.64E-12
¹¹⁴ In	B	unspecified										1.88E-15	1.88E-15
^{114m} In	M	particulate										2.96E-15	2.96E-15
¹¹⁵ In	M	particulate										6.37E-22	6.37E-22
¹⁹² Ir	M	particulate										2.86E-16	2.86E-16
^{192m} Ir	M	particulate										2.31E-20	2.31E-20
¹⁹⁴ Ir	M	particulate										9.50E-19	9.50E-19
^{194m} Ir	M	particulate										3.66E-19	3.66E-19
⁴⁰ K	M	particulate										3.06E-07	3.06E-07
⁸¹ Kr	B	unspecified										2.01E-07	2.01E-07
^{83m} Kr	B	unspecified										1.73E-09	1.73E-09
⁸⁵ Kr	B	unspecified				3.46E-01				6.82E+02		1.69E+02	8.51E+02
^{85m} Kr	B	unspecified				1.75E-04				6.70E+00	1.11E+02		1.18E+02
⁸⁷ Kr	B	unspecified				2.39E-04				2.40E+01	2.36E+02		2.60E+02
⁸⁸ Kr	B	unspecified				6.93E-05				3.34E+01	8.59E+01		1.19E+02
⁸⁹ Kr	B	unspecified								1.68E+01			1.68E+01
¹³⁷ La	M	particulate										1.27E-17	1.27E-17
¹³⁸ La	M	particulate										5.63E-21	5.63E-21
¹⁴⁰ La	M	particulate										6.16E-08	6.16E-08
¹⁷³ Lu	M	particulate										3.35E-13	3.35E-13
¹⁷⁴ Lu	M	particulate										6.21E-12	6.21E-12
^{174m} Lu	M	particulate										7.88E-16	7.88E-16
¹⁷⁶ Lu	M	particulate										3.29E-21	3.29E-21
¹⁷⁷ Lu	M	particulate										1.22E-16	1.22E-16
^{177m} Lu	M	particulate										4.05E-14	4.05E-14
⁵³ Mn	M	particulate										4.08E-15	4.08E-15
⁵⁴ Mn	M	particulate										2.26E-08	2.26E-08
⁹³ Mo	M	particulate										1.93E-09	1.93E-09
⁹⁹ Mo	M	particulate										1.74E-08	1.74E-08
¹⁰⁰ Mo	*											7.42E-26	7.42E-26

Table G.1. Radiological airborne emissions from all sources at ORNL, 2024 (Ci)^a (continued)

Isotope	Inhalation class ^b	Chemical form	Stack									Total minor sources	ORNL total
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911	X-8915		
²² Na	M	particulate										2.05E-11	2.05E-11
⁹¹ Nb	B	unspecified										1.13E-10	1.13E-10
^{91m} Nb	B	unspecified										4.10E-14	4.10E-14
⁹² Nb	B	unspecified										5.64E-15	5.64E-15
^{92m} Nb	B	unspecified										2.62E-25	2.62E-25
^{93m} Nb	M	particulate										2.42E-09	2.42E-09
⁹⁴ Nb	M	particulate										3.30E-10	3.30E-10
⁹⁵ Nb	M	particulate										1.73E-08	1.73E-08
⁹⁶ Nb	M	particulate										9.67E-11	9.67E-11
⁹⁷ Nb	M	particulate										5.95E-11	5.95E-11
¹⁴⁴ Nd	B	unspecified										3.78E-20	3.78E-20
¹⁴⁷ Nd	M	particulate										2.09E-09	2.09E-09
¹⁵⁰ Nd	*											7.71E-27	7.71E-27
⁵⁹ Ni	M	particulate										9.86E-10	9.86E-10
⁶³ Ni	M	particulate										1.12E-02	1.12E-02
²³⁵ Np	M	particulate										5.29E-15	5.29E-15
²³⁶ Np	M	particulate										1.24E-16	1.24E-16
²³⁷ Np	M	particulate										2.40E-03	2.40E-03
²³⁹ Np	M	particulate										1.10E-07	1.10E-07
¹⁸⁵ Os	M	particulate										3.43E-14	3.43E-14
¹⁹¹ Os	M	particulate					3.12E-02					1.06E-25	3.12E-02
¹⁹⁴ Os	M	particulate										1.81E-13	1.81E-13
³² P	M	particulate										1.05E-15	1.05E-15
³³ P	M	particulate										2.92E-18	2.92E-18
²²⁸ Pa	M	particulate										5.50E-11	5.50E-11
²³⁰ Pa	M	particulate										3.72E-09	3.72E-09
²³¹ Pa	M	particulate										1.68E-14	1.68E-14
²³² Pa	M	particulate										1.40E-10	1.40E-10
²³³ Pa	M	particulate										4.38E-08	4.38E-08
^{234m} Pa	B	unspecified										1.89E-22	1.89E-22
²⁰⁵ Pb	M	particulate										7.22E-20	7.22E-20
²¹⁰ Pb	M	particulate										5.79E-12	5.79E-12
²¹² Pb	M	particulate	8.79E+00	3.88E-01	2.70E+00	6.37E-03	1.50E-02	3.99E-01		8.20E-02		7.51E-02	1.25E+01
²¹⁴ Pb	M	particulate		2.00E-03	1.58E+00	3.56E-04	3.32E-03	2.68E-01		5.58E-02		2.05E-01	2.11E+00

Table G.1. Radiological airborne emissions from all sources at ORNL, 2024 (Ci)^a (continued)

Isotope	Inhalation class ^b	Chemical form	Stack								Total minor sources	ORNL total	
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911			X-8915
¹⁰³ Pd	M	particulate										2.23E-21	2.23E-21
¹⁰⁷ Pd	M	particulate										2.83E-12	2.83E-12
¹⁴³ Pm	M	particulate										2.55E-15	2.55E-15
¹⁴⁴ Pm	M	particulate										1.98E-15	1.98E-15
¹⁴⁵ Pm	M	particulate										3.97E-11	3.97E-11
¹⁴⁶ Pm	M	particulate										6.96E-11	6.96E-11
¹⁴⁷ Pm	M	particulate										1.63E-04	1.63E-04
¹⁴⁸ Pm	M	particulate										3.57E-16	3.57E-16
^{148m} Pm	M	particulate										2.74E-10	2.74E-10
²⁰⁸ Po	B	unspecified										2.49E-13	2.49E-13
²⁰⁹ Po	B	unspecified										7.20E-10	7.20E-10
²¹⁰ Po	B	inorganic										5.13E-12	5.13E-12
¹⁴³ Pr	M	particulate										1.75E-21	1.75E-21
¹⁴⁴ Pr	M	particulate										6.48E-07	6.48E-07
¹⁹³ Pt	M	particulate										3.45E-12	3.45E-12
²³⁶ Pu	M	particulate										5.56E-12	5.56E-12
²³⁷ Pu	M	particulate										3.53E-22	3.53E-22
²³⁸ Pu	M	particulate	4.54E-09	1.77E-05	4.16E-07	1.65E-10	1.44E-09	2.48E-09	9.37E-08	4.74E-09		3.84E-07	1.86E-05
²³⁹ Pu	M	particulate	4.59E-09	1.03E-05	2.08E-07	1.14E-10	1.13E-09	6.60E-09	2.77E-08	2.47E-09		2.07E-06	1.26E-05
²⁴⁰ Pu	M	particulate	4.59E-09	1.03E-05	2.08E-07	1.14E-10	1.13E-09	6.60E-09	2.77E-08	2.47E-09		1.88E-07	1.07E-05
²⁴¹ Pu	M	particulate										3.37E-06	3.37E-06
²⁴² Pu	M	particulate										6.52E-10	6.52E-10
²⁴³ Pu	M	particulate										1.36E-16	1.36E-16
²⁴⁴ Pu	M	particulate										1.19E-10	1.19E-10
²²³ Ra	M	particulate										1.00E-07	1.00E-07
²²⁴ Ra	M	particulate										4.98E-09	4.98E-09
²²⁵ Ra	M	particulate										1.05E-08	1.05E-08
²²⁶ Ra	M	particulate										5.06E-08	5.06E-08
²²⁸ Ra	M	particulate										1.21E-12	1.21E-12
⁸³ Rb	M	particulate										5.82E-19	5.82E-19
⁸⁴ Rb	M	particulate										8.28E-25	8.28E-25
⁸⁶ Rb	M	particulate										2.00E-21	2.00E-21
⁸⁷ Rb	M	particulate										9.19E-16	9.19E-16
¹⁸³ Re	B	unspecified										1.47E-17	1.47E-17
¹⁸⁴ Re	M	particulate										1.04E-14	1.04E-14
^{184m} Re	M	particulate										6.72E-15	6.72E-15

Table G.1. Radiological airborne emissions from all sources at ORNL, 2024 (Ci)^a (continued)

Isotope	Inhalation class ^b	Chemical form	Stack									Total minor sources	ORNL total
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911	X-8915		
¹⁸⁶ Re	M	particulate										1.58E-18	1.58E-18
^{186m} Re	M	particulate										3.12E-15	3.12E-15
¹⁸⁷ Re	M	particulate										1.99E-16	1.99E-16
¹⁸⁸ Re	M	particulate										3.05E-14	3.05E-14
¹⁰¹ Rh	M	particulate										1.19E-15	1.19E-15
¹⁰² Rh	M	particulate										5.51E-12	5.51E-12
^{102m} Rh	M	particulate										1.34E-16	1.34E-16
^{103m} Rh	M	particulate										5.21E-13	5.21E-13
¹⁰⁵ Rh	M	particulate										5.44E-09	5.44E-09
¹⁰⁶ Rh	B	unspecified										4.43E-07	4.43E-07
²¹⁹ Rn	B	unspecified										5.43E-12	5.43E-12
²²² Rn	B	unspecified										1.29E-11	1.29E-11
¹⁰³ Ru	M	particulate										1.65E-08	1.65E-08
¹⁰⁶ Ru	M	particulate										5.16E-07	5.16E-07
³⁵ S	M	particulate										6.07E-13	6.07E-13
^{120m} Sb	M	particulate										1.46E-09	1.46E-09
¹²² Sb	M	particulate										3.00E-09	3.00E-09
¹²⁴ Sb	M	particulate					3.72E-04					2.06E-09	3.72E-04
¹²⁵ Sb	M	particulate					4.26E-05					1.59E-07	4.28E-05
¹²⁶ Sb	M	particulate					7.25E-04					5.26E-09	7.25E-04
^{126m} Sb	M	particulate										2.42E-11	2.42E-11
¹²⁷ Sb	M	particulate										4.53E-09	4.53E-09
⁴⁶ Sc	M	particulate										5.46E-11	5.46E-11
⁷⁵ Se	F	particulate										7.03E-16	7.03E-16
⁷⁹ Se	F	particulate										1.59E-11	1.59E-11
³² Si	M	particulate										3.69E-13	3.69E-13
¹⁴⁵ Sm	M	particulate										1.01E-11	1.01E-11
¹⁴⁶ Sm	M	particulate										2.87E-18	2.87E-18
¹⁴⁷ Sm	M	particulate										1.87E-16	1.87E-16
¹⁴⁸ Sm	B	unspecified										1.32E-21	1.32E-21
¹⁵¹ Sm	M	particulate										3.16E-07	3.16E-07
¹¹³ Sn	M	particulate										8.61E-12	8.61E-12
^{117m} Sn	M	particulate										9.76E-10	9.76E-10
^{119m} Sn	M	particulate										5.59E-09	5.59E-09

Table G.1. Radiological airborne emissions from all sources at ORNL, 2024 (Ci)^a (continued)

Isotope	Inhalation class ^b	Chemical form	Stack									Total minor sources	ORNL total
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911	X-8915		
¹²¹ Sn	M	particulate										3.10E-11	3.10E-11
^{121m} Sn	M	particulate										4.84E-11	4.84E-11
¹²³ Sn	M	particulate										1.00E-11	1.00E-11
¹²⁵ Sn	M	particulate										3.63E-09	3.63E-09
¹²⁶ Sn	M	particulate										2.42E-11	2.42E-11
⁸⁵ Sr	M	particulate										8.92E-17	8.92E-17
⁸⁹ Sr	M	particulate	1.87E-07	3.66E-06	2.98E-05		1.65E-09	3.13E-08		3.90E-05		3.93E-08	7.26E-05
⁹⁰ Sr	M	particulate	1.87E-07	3.66E-06	2.98E-05		1.65E-09	3.13E-08	1.08E-06	3.90E-05		9.84E-05	1.72E-04
⁹¹ Sr	M	particulate										1.19E-13	1.19E-13
¹⁷⁸ Ta	B	unspecified										4.30E-19	4.30E-19
¹⁷⁹ Ta	M	particulate										8.54E-12	8.54E-12
¹⁸² Ta	M	particulate										6.27E-11	6.27E-11
¹⁵⁷ Tb	M	particulate										1.22E-13	1.22E-13
¹⁵⁸ Tb	M	particulate										9.87E-16	9.87E-16
¹⁶⁰ Tb	M	particulate										1.01E-12	1.01E-12
⁹⁶ Tc	M	particulate										1.97E-10	1.97E-10
⁹⁷ Tc	M	particulate										4.76E-18	4.76E-18
^{97m} Tc	M	particulate										3.50E-17	3.50E-17
⁹⁸ Tc	M	particulate										8.36E-17	8.36E-17
⁹⁹ Tc	M	particulate							2.86E-06			8.61E-10	2.86E-06
¹²¹ Te	M	particulate										4.05E-10	4.05E-10
^{121m} Te	M	particulate										5.41E-11	5.41E-11
¹²³ Te	M	particulate										1.70E-13	1.70E-13
^{123m} Te	M	particulate										7.39E-12	7.39E-12
^{125m} Te	M	particulate										3.76E-08	3.76E-08
¹²⁷ Te	M	particulate										6.38E-12	6.38E-12
^{127m} Te	M	particulate										6.51E-12	6.51E-12
¹²⁸ Te	*											4.96E-27	4.96E-27
¹²⁹ Te	M	particulate										2.02E-15	2.02E-15
^{129m} Te	M	particulate										3.10E-15	3.10E-15
^{131m} Te	M	particulate										9.13E-10	9.13E-10
¹³² Te	M	particulate										3.03E-09	3.03E-09
²²⁷ Th	S	particulate										1.54E-08	1.54E-08
²²⁸ Th	S	particulate	1.15E-08	9.21E-08	8.85E-08	8.07E-10	4.73E-09	1.47E-09		2.25E-08		7.27E-08	2.94E-07
²²⁹ Th	S	particulate		2.99E-08						1.29E-09		6.31E-10	3.18E-08
²³⁰ Th	S	particulate	2.19E-09	9.87E-09	1.37E-08	6.89E-11	2.35E-09			5.82E-09		5.56E-09	3.96E-08

Table G.1. Radiological airborne emissions from all sources at ORNL, 2024 (Ci)^a (continued)

Isotope	Inhalation class ^b	Chemical form	Stack									Total minor sources	ORNL total
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911	X-8915		
²³¹ Th	S	particulate										1.67E-10	1.67E-10
²³² Th	S	particulate	4.85E-10	1.41E-08	6.60E-09	1.26E-10	6.28E-10	4.44E-09		7.87E-09		1.63E-06	1.67E-06
²³⁴ Th	S	particulate										1.97E-11	1.97E-11
⁴⁴ Ti	M	particulate										7.52E-12	7.52E-12
²⁰⁴ Tl	M	particulate										4.95E-16	4.95E-16
²⁰⁶ Tl	B	unspecified										1.18E-19	1.18E-19
²⁰⁸ Tl	B	unspecified										3.32E-14	3.32E-14
¹⁷⁰ Tm	M	particulate										8.22E-14	8.22E-14
¹⁷¹ Tm	M	particulate										1.30E-09	1.30E-09
²³² U	M	particulate	3.99E-09	2.89E-07								9.35E-13	2.93E-07
²³³ U	M	particulate	3.59E-08	2.20E-06	7.40E-06	2.65E-10	1.56E-09	1.13E-08		5.25E-09		4.84E-07	1.01E-05
²³⁴ U	M	particulate	3.59E-08	2.20E-06	7.40E-06	2.65E-10	1.56E-09	1.13E-08		5.25E-09		7.95E-05	8.91E-05
²³⁵ U	M	particulate	4.15E-10	1.02E-08	2.43E-08		6.09E-10			8.08E-10		6.85E-06	6.88E-06
²³⁶ U	M	particulate										5.74E-08	5.74E-08
²³⁸ U	M	particulate	2.93E-09	3.40E-08	3.13E-08	4.82E-10	1.73E-09	2.75E-09		1.24E-08		6.10E-05	6.11E-05
²⁴⁰ U	M	particulate										1.76E-18	1.76E-18
⁴⁸ V	M	particulate										2.49E-17	2.49E-17
⁴⁹ V	M	particulate										8.05E-11	8.05E-11
¹⁷⁸ W	M	particulate										4.30E-19	4.30E-19
¹⁸¹ W	M	particulate										1.95E-12	1.95E-12
¹⁸⁵ W	M	particulate										3.44E-11	3.44E-11
¹⁸⁸ W	M	particulate										3.50E-08	3.50E-08
¹²³ Xe	B	unspecified									1.47E+02		1.47E+02
¹²⁵ Xe	B	unspecified									7.92E+01		7.92E+01
¹²⁷ Xe	B	unspecified									3.31E-03	2.72E-06	3.31E-03
^{131m} Xe	B	unspecified				9.51E-03				1.10E+02		2.79E-07	1.10E+02
¹³³ Xe	B	unspecified				8.88E-05				4.39E+00			4.39E+00
^{133m} Xe	B	unspecified				2.03E-04				1.71E+01			1.71E+01
¹³⁵ Xe	B	unspecified								3.13E+01			3.13E+01
^{135m} Xe	B	unspecified				2.81E-05				1.62E+01			1.62E+01
¹³⁷ Xe	B	unspecified								3.07E+01			3.07E+01
¹³⁸ Xe	B	unspecified				8.36E-04				8.54E+01			8.54E+01
⁸⁸ Y	M	particulate							3.02E-07			7.17E-13	3.02E-07
⁹⁰ Y	M	particulate										2.76E-06	2.76E-06
⁹¹ Y	M	particulate										9.75E-12	9.75E-12
⁶⁵ Zn	M	particulate										1.01E-08	1.01E-08

Table G.1. Radiological airborne emissions from all sources at ORNL, 2024 (Ci)^a (continued)

Isotope	Inhalation class ^b	Chemical form	Stack									Total minor sources	ORNL total
			X-2026	X-3020	X-3039	X-3525	X-4501	X-7503	X-7880	X-7911	X-8915		
⁸⁸ Zr	M	particulate										1.68E-15	1.68E-15
⁹³ Zr	M	particulate										1.02E-10	1.02E-10
⁹⁵ Zr	M	particulate										1.47E-08	1.47E-08
⁹⁷ Zr	M	particulate										3.72E-11	3.72E-11
Totals			8.85E+00	3.90E-01	4.79E+00	4.10E-01	9.11E-02	1.13E+00	5.60E-06	2.36E+03	1.36E+04	1.72E+02	1.61E+04

^a Emissions given in curies (Ci). 1 Ci = 3.7E+10 Bq

^b The designation of F, M, or S refers to the lung clearance type: fast (F), moderate (M), or slow (S) for the given radionuclide. G stands for gaseous, V for vapor, and B for blank, unspecified form. An asterisk (*) indicates that inhalation class information was not available.