

3. DOSE

This section provides summary tables for dose calculations completed for the PORTS site. Information is provided for the dose calculation required by the National Emission Standards for Hazardous Air Pollutants for airborne radionuclide emissions. The following tables are provided in this section:

- Table 3.1. Emissions (Ci/year) from DOE PORTS air emission sources – 2009
- Table 3.2. Predicted radiation doses from airborne releases at PORTS – 2009
- Table 3.3. Dose calculations for ambient air monitoring stations – 2009

Table 3.1. Emissions (Ci/year) from DOE PORTS air emission sources – 2009

Radionuclide	X-622 ^{a,b}	X-623 ^{a,b}	X-624 ^{a,b}	X-627 ^{a,b}
Americium-241	4.7E-07	3.5E-08	3.8E-08	1.9E-06
Neptunium-237	2.6E-07	1.7E-08	2.2E-11	9.8E-06
Plutonium-238	1.1E-07	8.2E-12	7.1E-08	2.8E-09
Plutonium-239/240 ^a	2.2E-07	1.8E-08	0	2.4E-06
Technetium-99	3.8E-02	3.6E-03	1.4E-05	1.2E-02
Uranium-233/234 ^a	8.2E-06	2.2E-05	5.9E-06	2.4E-04
Uranium-235	1.1E-06	9.7E-07	4.4E-07	1.2E-05
Uranium-236	1.0E-07	7.1E-08	2.3E-08	1.1E-06
Uranium-238	8.0E-06	4.4E-06	1.5E-06	7.2E-05
Total	3.8E-02	3.7E-03	2.2E-05	1.2E-02

^aMeasurements are provided in scientific notation. The number and sign (+ or -) to the right of the “E” indicate the number of places to the right or left of the decimal point. For example, 3.4E-04 is 0.00034 (the decimal point moves four places to the left); 2.1E+02 is 210 (the decimal point moves two places to the right).

^bEmissions are calculated based on quarterly influent and effluent sampling at each facility and quarterly throughput.

Table 3.2. Predicted radiation doses from airborne releases at PORTS – 2009

Effective dose equivalent to:	DOE releases	All PORTS releases (DOE and USEC)
Maximally exposed individual (mrem/year)	0.019	0.024
Population ^a (person-rem/year)	0.17	0.31

^aPopulation within 50 miles (80 km) of plant site.

Table 3.3. Dose calculations for ambient air monitoring stations – 2009

Station	Parameter ^a	Dose ^b (mrem/year)	Total dose for station ^c	Net dose for station ^d
A3	Americium-241	2.7E-09		
	Neptunium-237	4.3E-09		
	Plutonium-238	4.2E-09		
	Plutonium-239/240	2.9E-09		
	Technetium-99	5.8E-05		
	Uranium-233/234	1.2E-05		
	Uranium-235	4.8E-07		
	Uranium-236	7.8E-08	(0.000081)	(0.000045)
	Uranium-238	1.1E-05	8.1E-05	4.5E-05
A6	Americium-241	5.0E-09		
	Neptunium-237	2.7E-09		
	Plutonium-238	2.0E-09		
	Plutonium-239/240	2.4E-09		
	Technetium-99	2.2E-05		
	Uranium-233/234	6.1E-06		
	Uranium-235	3.8E-07		
	Uranium-236	2.1E-08	(0.000033)	
	Uranium-238	4.2E-06	3.3E-05	0
A8	Americium-241	2.6E-09		
	Neptunium-237	2.1E-12		
	Plutonium-238	2.3E-09		
	Plutonium-239/240	2.1E-09		
	Technetium-99	5.8E-05		
	Uranium-233/234	6.8E-06		
	Uranium-235	4.3E-07		
	Uranium-236	5.3E-08	(0.000070)	(0.000034)
	Uranium-238	5.0E-06	7.0E-05	3.4E-05

Table 3.3. Dose calculations for ambient air monitoring stations – 2009 (continued)

Station	Parameter ^a	Dose ^b (mrem/year)	Total dose for station ^c	Net dose for station ^d
A9	Americium-241	3.8E-09		
	Neptunium-237	1.3E-09		
	Plutonium-238	2.6E-09		
	Plutonium-239/240	2.7E-09		
	Technetium-99	4.3E-05		
	Uranium-233/234	9.7E-06		
	Uranium-235	7.8E-07		
	Uranium-236	4.8E-08	(0.000060)	(0.000024)
	Uranium-238	5.9E-06	6.0E-05	2.4E-05
A10	Americium-241	2.4E-09		
	Neptunium-237	2.9E-09		
	Plutonium-238	2.8E-09		
	Plutonium-239/240	1.7E-09		
	Technetium-99	4.2E-05		
	Uranium-233/234	6.4E-06		
	Uranium-235	3.9E-07		
	Uranium-236	1.9E-07	(0.000054)	(0.000018)
	Uranium-238	4.4E-06	5.4E-05	1.8E-05
A12	Americium-241	4.6E-09		
	Neptunium-237	2.0E-09		
	Plutonium-238	3.0E-09		
	Plutonium-239/240	2.8E-09		
	Technetium-99	5.0E-05		
	Uranium-233/234	7.1E-06		
	Uranium-235	3.1E-07		
	Uranium-236	5.4E-08	(0.000060)	(0.000024)
	Uranium-238	5.5E-06	6.0E-05	2.4E-05
A15	Americium-241	2.7E-09		
	Neptunium-237	4.0E-09		
	Plutonium-238	1.8E-09		
	Plutonium-239/240	1.6E-09		
	Technetium-99	4.8E-05		
	Uranium-233/234	6.9E-06		
	Uranium-235	3.2E-07		
	Uranium-236	3.8E-08	(0.000061)	(0.000025)
	Uranium-238	4.8E-06	6.1E-05	2.5E-05
A23	Americium-241	8.2E-10		
	Neptunium-237	1.4E-09		
	Plutonium-238	4.2E-09		
	Plutonium-239/240	2.0E-09		
	Technetium-99	2.4E-04		
	Uranium-233/234	8.9E-06		
	Uranium-235	5.1E-07		
	Uranium-236	2.3E-07	(0.00026)	(0.00022)
	Uranium-238	6.3E-06	2.6E-04	2.2E-04

Table 3.3. Dose calculations for ambient air monitoring stations – 2009 (continued)

Station	Parameter ^a	Dose ^b (mrem/year)	Total dose for station ^c	Net dose for station ^d
A24	Americium-241	5.7E-09		
	Neptunium-237	0.0E+00		
	Plutonium-238	3.2E-09		
	Plutonium-239/240	9.5E-10		
	Technetium-99	2.7E-04		
	Uranium-233/234	7.7E-06		
	Uranium-235	4.1E-07		
	Uranium-236	1.0E-07	(0.00028)	(0.00024)
A28	Uranium-238	6.0E-06	2.8E-04	2.4E-04
	Americium-241	5.2E-09		
	Neptunium-237	4.5E-09		
	Plutonium-238	2.2E-09		
	Plutonium-239/240	6.9E-13		
	Technetium-99	3.7E-05		
	Uranium-233/234	4.7E-05		
	Uranium-235	2.9E-06		
A29	Uranium-236	3.1E-07	(0.00015)	(0.00011)
	Uranium-238	6.1E-05	1.5E-04	1.1E-04
	Americium-241	3.9E-09		
	Neptunium-237	1.4E-09		
	Plutonium-238	1.2E-09		
	Plutonium-239/240	1.3E-12		
	Technetium-99	3.4E-05		
	Uranium-233/234	4.5E-05		
A36	Uranium-235	2.1E-06		
	Uranium-236	3.2E-07	(0.00014)	(0.00010)
	Uranium-238	5.7E-05	1.4E-04	1.0E-04
	Americium-241	2.5E-09		
	Neptunium-237	2.0E-09		
	Plutonium-238	4.0E-09		
	Plutonium-239/240	2.1E-09		
	Technetium-99	6.4E-05		
A37	Uranium-233/234	1.2E-05		
	Uranium-235	6.3E-07		
	Uranium-236	4.5E-08	(0.000087)	(0.000051)
	Uranium-238	1.0E-05	8.7E-05	5.1E-05
	Americium-241	5.4E-09		
	Neptunium-237	2.3E-09		
	Plutonium-238	3.4E-09		
	Plutonium-239/240	1.3E-09		
A37	Technetium-99	2.6E-05		
	Uranium-233/234	5.1E-06		
	Uranium-235	3.7E-07		
	Uranium-236	3.9E-08	(0.000036)	
	Uranium-238	4.3E-06	3.6E-05	-

Table 3.3. Dose calculations for ambient air monitoring stations – 2009 (continued)

Station	Parameter ^a	Dose ^b (mrem/year)	Total dose for station ^c	Net dose for station ^d
A41	Americium-241	4.8E-09		
	Neptunium-237	3.0E-09		
	Plutonium-238	2.5E-09		
	Plutonium-239/240	2.1E-09		
	Technetium-99	4.3E-05		
	Uranium-233/234	5.0E-06		
	Uranium-235	4.7E-07		
	Uranium-236	2.1E-08	(0.000053)	(0.000017)
	Uranium-238	4.6E-06	5.3E-05	1.7E-05
T7	Americium-241	3.8E-09		
	Neptunium-237	1.4E-09		
	Plutonium-238	3.0E-09		
	Plutonium-239/240	1.3E-09		
	Technetium-99	6.1E-05		
	Uranium-233/234	8.0E-06		
	Uranium-235	4.2E-07		
	Uranium-236	3.6E-08	(0.000075)	(0.000039)
	Uranium-238	5.8E-06	7.5E-05	3.9E-05

^aParameters listed in **bold** type were detected at least once in the samples collected in 2009 (see Table 2.8).

^bThe dose calculation is based on the maximum detection of each parameter at each station. For parameters that were not detected, half of the highest undetected result for the parameter was used to calculate the activity of each parameter in ambient air that is the basis for the dose. Measurements are provided in scientific notation. The number and sign (+ or -) to the right of the “E” indicate the number of places to the right or left of the decimal point. For example, 3.4E-04 is 0.00034 (the decimal point moves four places to the left); 2.1E+02 is 210 (the decimal point moves two places to the right).

^cThe total dose is provided in scientific notation and standard numeric format (in parentheses).

^dThe net dose is calculated by subtracting the total dose at Station A37 (background) from the total dose calculated for each station (the net dose is recorded as zero for stations with a gross dose less than the background station). The net dose is provided in scientific notation and standard numeric format (in parentheses).

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