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 in 2004
- Table 3.2. Predicted radiation doses from airborne releases at PORTS in 2004
- Table 3.3. Dose calculations for ambient air monitoring stations in 2004

Table 3.1. Emissions (Ci/year) from DOE PORTS air emission sources in 2004

Radionuclide	X-622 GWTF [a, b]		X-623 GWTF [a, b]	X-624 GWTF [a, b]	X-627 GWTF [a, b]
	Air stripper	Clarifier			
Americium-241	9.3E-08	4.8E-08	1.1E-06	1.2E-06	8.7E-08
Neptunium-237	3.9E-08	6.9E-09	1.1E-06	1.8E-06	1.9E-07
Plutonium-238	4.1E-08	1.4E-08	7.2E-07	8.2E-07	4.9E-08
Plutonium-239/240	2.6E-08	7.1E-09	6.3E-07	1.0E-06	2.8E-08
Technetium-99	9.5E-07	9.1E-08	5.7E-05	5.6E-05	5.4E-08
Uranium-233/234	-	-	1.6E-06	1.6E-06	5.1E-07
Uranium-234	2.8E-05	1.9E-06	-	-	-
Uranium-235/236	-	-	-	-	5.6E-08
Uranium-235	6.3E-08	4.2E-09	3.6E-07	5.8E-07	-
Uranium-236	-	-	4.8E-07	5.7E-07	-
Uranium-238	1.8E-07	1.2E-08	7.5E-07	8.2E-07	2.2E-07
Total	2.9E-05	2.1E-06	6.4E-05	6.4E-05	1.2E-06

GWTF – groundwater treatment facility.

[a]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).

[b]Emissions are based on the results of the most recent air emissions testing completed for each facility (2004 for X-627, 2002 for X-622, and 2001 for X-623 and X-624). The highest emissions of each nuclide were assumed to be emitted from each facility during each hour of operation for the facility in 2004.

Table 3.2. Predicted radiation doses from airborne releases at PORTS in 2004

Effective dose equivalent to:	DOE releases	All PORTS releases (DOE and USEC)
Maximally exposed individual (mrem/year)	0.0063	0.031
Population[a] (person-rem/year)	0.020	0.16
Nearest community[b] (person-rem/year)	0.0043	0.022

[a]Population within 50 miles (80 km) of plant site.
[b]Piketon, Ohio [for modeling purposes assumed to be 2 miles (3500 m) north of the plant site].

Table 3.3. Dose calculations for ambient air monitoring stations in 2004

Station	Parameter[a]	Dose[b] (mrem/year)	Total dose for station[c]	Net dose for station[d]
A3	Americium-241	5.9E-10		
	Neptunium-237	1.0E-09		
	Plutonium-238	2.1E-09		
	Plutonium-239/240	5.5E-10		
	Technetium-99	1.3E-04		
	Uranium-233/234	1.7E-06		
	Uranium-235	7.4E-08		
	Uranium-236	1.1E-08	(0.00013)	(0.000057)
	Uranium-238	1.9E-06	1.3E-04	5.7E-05
A6	Americium-241	7.2E-10		
	Neptunium-237	1.2E-09		
	Plutonium-238	5.3E-09		
	Plutonium-239/240	3.3E-09		
	Technetium-99	8.0E-05		
	Uranium-233/234	2.6E-07		
	Uranium-235	2.4E-08		
	Uranium-236	1.4E-09	(0.000080)	(0.0000070)
	Uranium-238	3.1E-07	8.0E-05	7.0E-06
A8	Americium-241	5.9E-10		
	Neptunium-237	9.7E-10		
	Plutonium-238	1.4E-09		
	Plutonium-239/240	5.5E-10		
	Technetium-99	8.3E-05		
	Uranium-233/234	1.6E-06		
	Uranium-235	6.3E-08		
	Uranium-236	1.7E-08	(0.000087)	(0.000014)
	Uranium-238	1.9E-06	8.7E-05	1.4E-05

Table 3.3. Dose calculations for ambient air monitoring stations in 2004 (continued)

Station	Parameter[a]	Dose[b] (mrem/year)	Total dose for station[c]	Net dose for station[d]
A9	Americium-241	7.6E-10		
	Neptunium-237	1.1E-09		
	Plutonium-238	2.1E-09		
	Plutonium-239/240	1.5E-09		
	Technetium-99	1.4E-04		
	Uranium-233/234	6.1E-07		
	Uranium-235	3.7E-08		
	Uranium-236	9.0E-09	(0.00014)	(0.000067)
	Uranium-238	7.0E-07	1.4E-04	6.7E-05
A10	Americium-241	6.4E-10		
	Neptunium-237	9.9E-10		
	Plutonium-238	6.6E-09		
	Plutonium-239/240	1.1E-09		
	Technetium-99	1.1E-04		
	Uranium-233/234	1.0E-06		
	Uranium-235	5.8E-08		
	Uranium-236	2.5E-09	(0.00011)	(0.000037)
	Uranium-238	1.2E-06	1.1E-04	3.7E-05
A12	Americium-241	6.0E-10		
	Neptunium-237	9.0E-10		
	Plutonium-238	1.6E-09		
	Plutonium-239/240	1.1E-09		
	Technetium-99	1.2E-04		
	Uranium-233/234	2.0E-06		
	Uranium-235	1.0E-07		
	Uranium-236	1.6E-08	(0.00013)	0.000057)
	Uranium-238	2.2E-06	1.3E-04	5.7E-05
A15	Americium-241	7.7E-10		
	Neptunium-237	6.2E-10		
	Plutonium-238	2.0E-09		
	Plutonium-239/240	1.2E-09		
	Technetium-99	8.6E-05		
	Uranium-233/234	1.1E-06		
	Uranium-235	5.5E-08		
	Uranium-236	1.7E-08	0.000089)	(0.000016)
	Uranium-238	1.1E-06	8.9E-05	1.6E-05
A23	Americium-241	7.6E-10		
	Neptunium-237	7.2E-10		
	Plutonium-238	1.6E-09		
	Plutonium-239/240	9.4E-10		
	Technetium-99	5.0E-04		
	Uranium-233/234	1.2E-06		
	Uranium-235	4.3E-08		
	Uranium-236	1.1E-08	(0.00050)	(0.00043)
	Uranium-238	1.4E-06	5.0E-04	4.3E-04

Table 3.3. Dose calculations for ambient air monitoring stations in 2004 (continued)

Station	Parameter[a]	Dose[b] (mrem/year)	Total dose for station[c]	Net dose for station[d]
A24	Americium-241	4.3E-10		
	Neptunium-237	1.1E-09		
	Plutonium-238	1.4E-09		
	Plutonium-239/240	6.8E-10		
	Technetium-99	1.3E-04		
	Uranium-233/234	1.9E-06		
	Uranium-235	1.0E-07		
	Uranium-236	6.7E-09	(0.00013)	(0.000057)
	Uranium-238	2.2E-06	1.3E-04	5.7E-05
A28	Americium-241	4.2E-10		
	Neptunium-237	6.4E-10		
	Plutonium-238	1.4E-09		
	Plutonium-239/240	1.0E-09		
	Technetium-99	9.7E-05		
	Uranium-233/234	1.8E-07		
	Uranium-235	1.6E-08		
	Uranium-236	1.7E-09	(0.000098)	(0.000025)
	Uranium-238	2.2E-07	9.8E-05	2.5E-05
A29	Americium-241	7.2E-10		
	Neptunium-237	8.0E-10		
	Plutonium-238	2.3E-09		
	Plutonium-239/240	1.5E-09		
	Technetium-99	1.0E-04		
	Uranium-233/234	1.1E-06		
	Uranium-235	3.5E-08		
	Uranium-236	2.6E-09	(0.00010)	(0.000027)
	Uranium-238	1.1E-06	1.0E-04	2.7E-05
A36	Americium-241	4.2E-10		
	Neptunium-237	9.1E-10		
	Plutonium-238	5.5E-09		
	Plutonium-239/240	9.5E-10		
	Technetium-99	1.4E-04		
	Uranium-233/234	5.6E-06		
	Uranium-235	3.6E-07		
	Uranium-236	2.3E-08	(0.00015)	(0.000077)
	Uranium-238	6.4E-06	1.5E-04	7.7E-05
A37	Americium-241	7.0E-10		
	Neptunium-237	1.2E-09		
	Plutonium-238	1.4E-09		
	Plutonium-239/240	6.6E-10		
	Technetium-99	7.2E-05		
	Uranium-233/234	1.8E-07		
	Uranium-235	1.2E-08		
	Uranium-236	1.9E-09	(0.000073)	
	Uranium-238	2.7E-07	7.3E-05	-

Table 3.3. Dose calculations for ambient air monitoring stations in 2004 (continued)

Station	Parameter[a]	Dose[b] (mrem/year)	Total dose for station[c]	Net dose for station[d]
A41	Americium-241	4.3E-10		
	Neptunium-237	8.6E-10		
	Plutonium-238	1.6E-09		
	Plutonium-239/240	1.2E-09		
	Technetium-99	9.8E-05		
	Uranium-233/234	5.0E-07		
	Uranium-235	2.6E-08		
	Uranium-236	2.2E-09	(0.000099)	(0.000026)
	Uranium-238	5.3E-07	9.9E-05	2.6E-05
T7	Americium-241	6.0E-10		
	Neptunium-237	7.5E-10		
	Plutonium-238	1.4E-09		
	Plutonium-239/240	6.0E-10		
	Technetium-99	1.1E-04		
	Uranium-233/234	1.5E-06		
	Uranium-235	7.7E-08		
	Uranium-236	5.6E-09	(0.00012)	(0.000047)
	Uranium-238	1.8E-06	1.2E-04	4.7E-05

[a]Parameters listed in **bold** type were detected at least once in the samples collected in 2004 (see Table 2.6).

[b]The dose calculation is based on the maximum detection of each parameter at each station. For parameters that were not detected, half the maximum detection limit for the parameter was used to calculate the concentration 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).

[c]The total dose is provided in scientific notation and standard numeric format (in parentheses).

[d]The 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 provided in scientific notation and standard numeric format (in parentheses).

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