Table 9.6c. Estimated radiation doses (mrad/d) from surface soil for red-tailed hawk, wild turkey, and mink at WOC

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
East Seep										
Actinium-228	7.80E-01	2.68E-13	7.72E-04	7.72E-04	5.00E-08	7.72E-03	7.72E-03	3.42E-07	1.59E-02	1.59E-02
Bismuth-214	7.90E-01	8.59E-05	1.23E-03	1.32E-03	1.29E-02	1.23E-02	2.52E-02	1.43E-04	2.52E-02	2.53E-02
Cesium-137	7.00E+05	5.62E+03	4.08E+02	6.03E+03	7.41E+03	4.08E+03	1.15E+04	9.11E+02	8.35E+03	9.26E+03
Cobalt-60	9.28E+00	2.95E-02	2.41E-02	5.36E-02	1.73E-02	2.41E-01	2.58E-01	1.43E-02	4.91E-01	5.05E-01
Lead-212	7.05E+00	1.34E-03	1.17E-02	1.30E-02	1.14E-01	1.17E-01	2.31E-01	1.55E-03	2.34E-01	2.36E-01
Lead-214	8.80E-01	1.07E-06	1.59E-03	1.59E-03	9.46E-05	1.59E-02	1.60E-02	1.17E-04	3.25E-02	3.26E-02
Plutonium-238	1.40E-02	1.05E-07	4.05E-10	1.05E-07	5.55E-05	4.05E-09	5.55E-05	1.32E-06	4.05E-09	1.33E-06
Plutonium-239/40	4.40E-02	9.43E-07	2.40E-09	9.45E-07	2.45E-03	2.40E-08	2.45E-03	3.97E-06	2.40E-08	3.99E-06
Potassium-40	2.53E+01	3.27E+00	4.14E-03	3.28E+00	5.83E+00	4.14E-02	5.87E+00	1.49E+00	8.39E-02	1.57E+00
Strontium-90	4.32E+01	1.63E-01	1.92E-04	1.63E-01	5.67E-01	1.92E-03	5.69E-01	7.39E-02	1.92E-03	7.58E-02
Thallium-208	2.16E+00	3.16E-01	7.49E-03	3.23E-01	4.67E-02	7.49E-02	1.22E-01	1.43E-01	1.53E-01	2.97E-01
Thorium-228	9.60E+00	1.80E-04	1.60E-02	1.62E-02	1.48E-01	1.60E-01	3.08E-01	5.32E-03	3.21E-01	3.26E-01
Thorium-230	8.30E-01	2.28E-06	1.90E-07	2.47E-06	1.87E-03	1.90E-06	1.87E-03	6.72E-05	1.90E-06	6.91E-05
Thorium-232	8.10E-01	1.91E-06	8.01E-04	8.03E-04	1.57E-03	8.01E-03	9.59E-03	5.65E-05	1.65E-02	1.65E-02
Thorium-234	3.45E+00	1.18E+01	7.18E-05	1.18E+01	1.42E+03	7.18E-04	1.42E+03	1.33E-01	7.18E-04	1.33E-01
Uranium-232	1.08E+01	6.37E-01	1.87E-06	6.37E-01	7.69E+01	1.87E-05	7.69E+01	7.17E-03	1.87E-05	7.19E-03
Uranium-233/234	2.08E+02	1.11E+01	5.40E-05	1.11E+01	1.35E+03	5.40E-04	1.35E+03	1.25E-01	5.40E-04	1.26E-01
Uranium-235	2.51E+00	1.23E-01	3.37E-04	1.23E-01	1.48E+01	3.37E-03	1.48E+01	1.38E-03	7.58E-03	8.97E-03
Uranium-238	1.05E+01	4.94E-01	2.47E-04	4.94E-01	5.76E+01	2.47E-03	5.76E+01	5.57E-03	4.26E-03	9.83E-03
Total		5.65E+03	4.08E+02	6.05E+03	1.03E+04	4.08E+03	1.44E+04	9.13E+02	8.35E+03	9.26E+03
Haw Ridge										
Cobalt-60	4.70E+00	1.49E-02	1.22E-02	2.71E-02	4.45E-03	1.22E-01	1.27E-01	7.26E-03	2.49E-01	2.56E-01
Cesium-137	2.00E+03	1.61E+01	1.16E+00	1.72E+01	7.98E+00	1.16E+01	1.96E+01	2.60E+00	2.38E+01	2.64E+01
Potassium-40	1.60E+01	2.07E+00	2.62E-03	2.07E+00	3.66E+00	2.62E-02	3.69E+00	9.39E-01	5.30E-02	9.92E-01
Total		1.81E+01	1.18E+00	1.93E+01	1.16E+01	1.18E+01	2.34E+01	3.55E+00	2.41E+01	2.77E+01
HF-2										
Cobalt-60	1.94E+02	6.16E-01	5.04E-01	1.12E+00	1.84E-01	5.04E+00	5.22E+00	3.00E-01	1.03E+01	1.06E+01

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Strontium-90	7.40E-02	2.79E-04	3.28E-07	2.79E-04	8.60E-04	3.28E-06	8.64E-04	1.27E-04	3.28E-06	1.30E-04
Thorium-228	1.40E+00	2.63E-05	2.33E-03	2.36E-03	6.72E-03	2.33E-02	3.00E-02	7.76E-04	4.68E-02	4.76E-02
Thorium-230	1.30E+00	3.57E-06	2.98E-07	3.87E-06	9.11E-04	2.98E-06	9.14E-04	1.05E-04	2.98E-06	1.08E-04
Thorium-232	1.40E+00	3.31E-06	1.38E-03	1.39E-03	8.45E-04	1.38E-02	1.47E-02	9.76E-05	2.85E-02	2.86E-02
Uranium-233/234	1.10E+00	5.89E-02	2.85E-07	5.89E-02	6.87E+00	2.85E-06	6.87E+00	6.64E-04	2.85E-06	6.66E-04
Uranium-235	1.10E-01	5.38E-03	1.48E-05	5.39E-03	6.27E-01	1.48E-04	6.27E-01	6.06E-05	3.32E-04	3.93E-04
Uranium-238	8.70E-01	4.09E-02	2.05E-05	4.10E-02	4.77E+00	2.05E-04	4.77E+00	4.61E-04	3.53E-04	8.14E-04
Total		7.21E-01	5.08E-01	1.23E+00	1.25E+01	5.08E+00	1.75E+01	3.02E-01	1.03E+01	1.06E+01
HFIR										
Cobalt-60	4.64E+00	1.47E-02	1.21E-02	2.68E-02	4.40E-03	1.21E-01	1.25E-01	7.16E-03	2.45E-01	2.53E-01
Cesium-137	5.07E+01	4.07E-01	2.95E-02	4.36E-01	2.02E-01	2.95E-01	4.98E-01	6.60E-02	6.04E-01	6.70E-01
Potassium-40	1.95E+01	2.52E+00	3.19E-03	2.52E+00	4.46E+00	3.19E-02	4.49E+00	1.14E+00	6.46E-02	1.21E+00
Strontium-90	2.50E+04	9.42E+01	1.11E-01	9.43E+01	2.91E+02	1.11E+00	2.92E+02	4.28E+01	1.11E+00	4.39E+01
Thorium-228	6.50E+01	1.22E-03	1.08E-01	1.09E-01	3.12E-01	1.08E+00	1.39E+00	3.60E-02	2.17E+00	2.21E+00
Uranium-234	3.50E+00	1.85E-01	2.68E-07	1.85E-01	2.16E+01	2.68E-06	2.16E+01	2.09E-03	2.68E-06	2.09E-03
Uranium-238	2.10E+00	9.88E-02	4.95E-05	9.89E-02	1.15E+01	4.95E-04	1.15E+01	1.11E-03	8.52E-04	1.97E-03
Total		9.74E+01	2.64E-01	9.76E+01	3.29E+02	2.64E+00	3.31E+02	4.40E+01	4.20E+00	4.82E+01
HFIR East										
Potassium-40	2.00E+01	2.59E+00	3.28E-03	2.59E+00	4.58E+00	3.28E-02	4.61E+00	1.17E+00	6.63E-02	1.24E+00
Total		2.59E+00	3.28E-03	2.59E+00	4.58E+00	3.28E-02	4.61E+00	1.17E+00	6.63E-02	1.24E+00
HRE										
Actinium-228	1.27E+00	4.36E-13	1.26E-03	1.26E-03	8.14E-08	1.26E-02	1.26E-02	5.57E-07	2.58E-02	2.58E-02
Bismuth-214	7.41E-01	8.06E-05	1.16E-03	1.24E-03	1.21E-02	1.16E-02	2.36E-02	1.34E-04	2.36E-02	2.37E-02
Cesium-137	3.84E+03	3.08E+01	2.24E+00	3.31E+01	4.06E+01	2.24E+01	6.30E+01	5.00E+00	4.58E+01	5.08E+01
Cobalt-60	4.35E-01	1.38E-03	1.13E-03	2.51E-03	8.12E-04	1.13E-02	1.21E-02	6.72E-04	2.30E-02	2.37E-02
Europium-154	1.25E+00	1.98E-04	1.84E-03	2.04E-03	7.18E-04	1.84E-02	1.91E-02	9.02E-05	3.51E-02	3.52E-02
Potassium-40	1.82E+01	2.35E+00	2.98E-03	2.36E+00	4.20E+00	2.98E-02	4.23E+00	1.07E+00	6.03E-02	1.13E+00

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Radium-226	1.03E+00	3.04E-03	1.86E-03	4.91E-03	1.18E-01	1.86E-02	1.37E-01	1.80E-03	3.81E-02	3.99E-02
Radium-228	1.37E+00	1.43E-07		1.43E-07	5.56E-06		5.56E-06	8.50E-08		8.50E-08
Strontium-90	2.03E+02	7.65E-01	9.00E-04	7.65E-01	2.67E+00	9.00E-03	2.67E+00	3.47E-01	9.00E-03	3.56E-01
Thallium-208	4.39E-01	6.42E-02	1.52E-03	6.57E-02	9.49E-03	1.52E-02	2.47E-02	2.91E-02	3.12E-02	6.03E-02
Thorium-228	5.50E-01	1.03E-05	9.16E-04	9.26E-04	8.49E-03	9.16E-03	1.77E-02	3.05E-04	1.84E-02	1.87E-02
Thorium-230	1.30E-01	3.57E-07	2.98E-08	3.87E-07	2.93E-04	2.98E-07	2.94E-04	1.05E-05	2.98E-07	1.08E-05
Thorium-232	1.50E+00	3.55E-06	1.48E-03	1.49E-03	2.91E-03	1.48E-02	1.78E-02	1.05E-04	3.05E-02	3.06E-02
Thorium-234	2.56E+00	1.33E+00	9.27E-05	1.33E+00	1.60E+02	9.27E-04	1.60E+02	1.50E-02	1.86E-03	1.68E-02
Uranium-233/234	2.43E+01	1.30E+00	6.31E-06	1.30E+00	1.57E+02	6.31E-05	1.57E+02	1.47E-02	6.31E-05	1.47E-02
Uranium-235	5.55E-01	2.71E-02	7.46E-05	2.72E-02	3.28E+00	7.46E-04	3.28E+00	3.06E-04	1.68E-03	1.98E-03
Uranium-238	1.29E+00	6.07E-02	3.04E-05	6.07E-02	7.08E+00	3.04E-04	7.08E+00	6.84E-04	5.23E-04	1.21E-03
Total		3.67E+01	2.25E+00	3.90E+01	3.76E+02	2.25E+01	3.98E+02	6.48E+00	4.61E+01	5.26E+01
Intermediate Pond										
Americium-241	3.06E+01	4.45E-03	2.57E-04	4.71E-03	1.90E+00	2.57E-03	1.90E+00	3.83E-03	1.34E-02	1.72E-02
Curium-244	5.72E+00	3.43E-05	1.38E-07	3.44E-05	3.74E-02	1.38E-06	3.74E-02	5.81E-04	1.38E-06	5.83E-04
Cobalt-60	1.31E+01	4.16E-02	3.40E-02	7.56E-02	1.24E-02	3.40E-01	3.53E-01	2.02E-02	6.93E-01	7.13E-01
Cesium-137	6.35E+03	5.10E+01	3.70E+00	5.47E+01	2.53E+01	3.70E+01	6.23E+01	8.26E+00	7.57E+01	8.40E+01
Plutonium-238	2.20E+00	1.65E-05	6.36E-08	1.66E-05	7.03E-03	6.36E-07	7.03E-03	2.08E-04	6.36E-07	2.08E-04
Plutonium-239/40	9.49E+01	2.03E-03	5.17E-06	2.04E-03	5.22E+00	5.17E-05	5.22E+00	8.56E-03	5.17E-05	8.61E-03
Strontium-90	2.48E+02	9.34E-01	1.10E-03	9.35E-01	2.88E+00	1.10E-02	2.89E+00	4.24E-01	1.10E-02	4.35E-01
Technetium-99	4.66E+00	4.58E-07	1.12E-07	5.70E-07	9.16E-04	1.12E-06	9.17E-04	6.10E-07	1.12E-06	1.73E-06
Thorium-228	5.08E+00	9.55E-05	8.46E-03	8.55E-03	2.44E-02	8.46E-02	1.09E-01	2.82E-03	1.70E-01	1.73E-01
Thorium-230	1.86E+01	5.11E-05	4.26E-06	5.53E-05	1.30E-02	4.26E-05	1.31E-02	1.51E-03	4.26E-05	1.55E-03
Thorium-232	5.28E+00	1.25E-05	5.22E-03	5.24E-03	3.19E-03	5.22E-02	5.54E-02	3.68E-04	1.07E-01	1.08E-01
Uranium-233/234	3.89E+01	2.08E+00	1.01E-05	2.08E+00	2.43E+02	1.01E-04	2.43E+02	2.35E-02	1.01E-04	2.36E-02
Uranium-235	5.29E+00	2.59E-01	7.11E-04	2.59E-01	3.02E+01	7.11E-03	3.02E+01	2.91E-03	1.60E-02	1.89E-02
Uranium-238	1.24E+01	5.84E-01	2.92E-04	5.84E-01	6.80E+01	2.92E-03	6.80E+01	6.57E-03	5.03E-03	1.16E-02
Total		5.49E+01	3.75E+00	5.86E+01	3.77E+02	3.75E+01	4.14E+02	8.76E+00	7.67E+01	8.55E+01

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Lower WOC										
Americium-241	6.38E+00	9.29E-04	5.35E-05	9.82E-04	3.95E-01	5.35E-04	3.96E-01	7.98E-04	2.80E-03	3.60E-03
Curium-244	2.28E+00	1.37E-05	5.51E-08	1.37E-05	1.49E-02	5.51E-07	1.49E-02	2.32E-04	5.51E-07	2.32E-04
Cobalt-60	1.55E+01	4.92E-02	4.03E-02	8.95E-02	1.47E-02	4.03E-01	4.17E-01	2.39E-02	8.20E-01	8.44E-01
Cesium-137	8.68E+02	6.97E+00	5.05E-01	7.47E+00	3.46E+00	5.05E+00	8.52E+00	1.13E+00	1.03E+01	1.15E+01
Plutonium-238	1.14E+00	8.54E-06	3.30E-08	8.58E-06	3.64E-03	3.30E-07	3.64E-03	1.08E-04	3.30E-07	1.08E-04
Plutonium-239/40	4.51E+01	9.66E-04	2.46E-06	9.69E-04	2.48E+00	2.46E-05	2.48E+00	4.07E-03	2.46E-05	4.09E-03
Strontium-90	3.10E+01	1.17E-01	1.37E-04	1.17E-01	3.60E-01	1.37E-03	3.62E-01	5.30E-02	1.37E-03	5.44E-02
Technetium-99	1.47E+01	1.44E-06	3.53E-07	1.80E-06	2.89E-03	3.53E-06	2.89E-03	1.92E-06	3.53E-06	5.45E-06
Thorium-228	3.80E+00	7.14E-05	6.33E-03	6.40E-03	1.82E-02	6.33E-02	8.15E-02	2.11E-03	1.27E-01	1.29E-01
Thorium-230	4.84E+00	1.33E-05	1.11E-06	1.44E-05	3.39E-03	1.11E-05	3.40E-03	3.92E-04	1.11E-05	4.03E-04
Thorium-232	1.80E+00	4.25E-06	1.78E-03	1.78E-03	1.09E-03	1.78E-02	1.89E-02	1.26E-04	3.66E-02	3.67E-02
Uranium-233/234	4.94E+00	2.65E-01	1.28E-06	2.65E-01	3.08E+01	1.28E-05	3.08E+01	2.98E-03	1.28E-05	2.99E-03
Uranium-235	6.15E-01	3.01E-02	8.27E-05	3.02E-02	3.51E+00	8.27E-04	3.51E+00	3.39E-04	1.86E-03	2.20E-03
Uranium-238	2.10E+00	9.88E-02	4.95E-05	9.89E-02	1.15E+01	4.95E-04	1.15E+01	1.11E-03	8.52E-04	1.97E-03
Total		7.53E+00	5.54E-01	8.08E+00	5.26E+01	5.54E+00	5.82E+01	1.22E+00	1.13E+01	1.26E+01
MB-15										
Cobalt-60	4.20E+04	1.33E+02	1.09E+02	2.42E+02	3.98E+01	1.09E+03	1.13E+03	6.48E+01	2.22E+03	2.29E+03
Cesium-137	3.80E+02	3.05E+00	2.21E-01	3.27E+00	1.52E+00	2.21E+00	3.73E+00	4.95E-01	4.53E+00	5.02E+00
Total		1.36E+02	1.09E+02	2.46E+02	4.13E+01	1.09E+03	1.13E+03	6.53E+01	2.23E+03	2.29E+03
MV Drive										
Carbon-14	1.80E-01	2.35E-04	4.64E-10	2.35E-04	4.20E-04	4.64E-09	4.20E-04	1.07E-04	4.64E-09	1.07E-04
Cobalt-60	1.20E+00	3.81E-03	3.12E-03	6.93E-03	1.14E-03	3.12E-02	3.23E-02	1.85E-03	6.35E-02	6.53E-02
Cesium-137	3.20E+02	2.57E+00	1.86E-01	2.75E+00	1.28E+00	1.86E+00	3.14E+00	4.16E-01	3.81E+00	4.23E+00
Potassium-40	1.20E+01	1.55E+00	1.97E-03	1.55E+00	2.75E+00	1.97E-02	2.77E+00	7.05E-01	3.98E-02	7.44E-01
Tritium	8.50E+00	2.66E-03		2.66E-03	2.68E-03		2.68E-03	1.21E-03		1.21E-03
Total		4.13E+00	1.91E-01	4.32E+00	4.03E+00	1.91E+00	5.94E+00	1.12E+00	3.92E+00	5.04E+00

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
NHF										
Americium-241	1.10E-01	1.60E-05	9.23E-07	1.69E-05	6.82E-03	9.23E-06	6.83E-03	1.38E-05	4.83E-05	6.20E-05
Carbon-14	2.07E+00	2.70E-03	5.34E-09	2.70E-03	4.83E-03	5.34E-08	4.83E-03	1.23E-03	5.34E-08	1.23E-03
Cesium-137	1.40E-01	1.12E-03	8.15E-05	1.21E-03	5.59E-04	8.15E-04	1.37E-03	1.82E-04	1.67E-03	1.85E-03
Potassium-40	2.66E+01	3.44E+00	4.36E-03	3.44E+00	6.09E+00	4.36E-02	6.13E+00	1.56E+00	8.82E-02	1.65E+00
Plutonium-238	2.60E-01	1.95E-06	7.52E-09	1.96E-06	8.31E-04	7.52E-08	8.31E-04	2.46E-05	7.52E-08	2.46E-05
Plutonium-239/40	5.00E-02	1.07E-06	2.72E-09	1.07E-06	2.75E-03	2.72E-08	2.75E-03	4.51E-06	2.72E-08	4.54E-06
Radium-226	9.50E-01	2.81E-03	1.72E-03	4.53E-03	4.06E-02	1.72E-02	5.78E-02	1.66E-03	3.52E-02	3.68E-02
Radium-228	1.70E+00	1.78E-07		1.78E-07	2.57E-06		2.57E-06	1.05E-07		1.05E-07
Strontium-90	9.10E-01	3.43E-03	4.04E-06	3.43E-03	1.06E-02	4.04E-05	1.06E-02	1.56E-03	4.04E-05	1.60E-03
Thorium-228	2.42E+00	4.55E-05	4.03E-03	4.08E-03	1.16E-02	4.03E-02	5.19E-02	1.34E-03	8.09E-02	8.22E-02
Thorium-230	1.28E+00	3.51E-06	2.93E-07	3.81E-06	8.97E-04	2.93E-06	9.00E-04	1.04E-04	2.93E-06	1.07E-04
Thorium-232	1.55E+00	3.66E-06	1.53E-03	1.54E-03	9.36E-04	1.53E-02	1.63E-02	1.08E-04	3.15E-02	3.16E-02
Tritium	7.99E+00	2.50E-03		2.50E-03	2.52E-03		2.52E-03	1.14E-03		1.14E-03
Uranium-233/234	9.70E-01	5.20E-02	2.52E-07	5.20E-02	6.06E+00	2.52E-06	6.06E+00	5.85E-04	2.52E-06	5.88E-04
Uranium-235/236	8.00E-02	4.95E-02	1.08E-05	4.95E-02	5.78E+00	1.08E-04	5.78E+00	5.58E-04	2.42E-04	8.00E-04
Uranium-238	9.80E-01	4.61E-02	2.31E-05	4.61E-02	5.38E+00	2.31E-04	5.38E+00	5.19E-04	3.98E-04	9.17E-04
Total		3.60E+00	1.18E-02	3.61E+00	2.34E+01	1.18E-01	2.35E+01	1.57E+00	2.38E-01	1.81E+00
Pit 4 South										
Americium-241	1.10E-01	1.60E-05	9.23E-07	1.69E-05	6.82E-03	9.23E-06	6.83E-03	1.38E-05	4.83E-05	6.20E-05
Cobalt-60	2.34E+02	7.43E-01	6.08E-01	1.35E+00	2.22E-01	6.08E+00	6.30E+00	3.61E-01	1.24E+01	1.27E+01
Cesium-137	1.34E+01	1.08E-01	7.80E-03	1.15E-01	5.35E-02	7.80E-02	1.32E-01	1.74E-02	1.60E-01	1.77E-01
Plutonium-238	6.70E-03	5.02E-08	1.94E-10	5.04E-08	2.14E-05	1.94E-09	2.14E-05	6.33E-07	1.94E-09	6.35E-07
Plutonium-239/40	2.90E-02	6.21E-07	1.58E-09	6.23E-07	1.59E-03	1.58E-08	1.59E-03	2.62E-06	1.58E-08	2.63E-06
Strontium-90	1.00E+00	3.77E-03	4.43E-06	3.77E-03	1.16E-02	4.43E-05	1.17E-02	1.71E-03	4.43E-05	1.76E-03
Thorium-228	6.40E+00	1.20E-04	1.07E-02	1.08E-02	3.07E-02	1.07E-01	1.37E-01	3.55E-03	2.14E-01	2.17E-01
Thorium-230	1.20E+00	3.29E-06	2.75E-07	3.57E-06	8.41E-04	2.75E-06	8.44E-04	9.72E-05	2.75E-06	9.99E-05
Thorium-232	1.50E+00	3.55E-06	1.48E-03	1.49E-03	9.05E-04	1.48E-02	1.57E-02	1.05E-04	3.05E-02	3.06E-02
Uranium-233/234	8.50E+00	4.55E-01	2.21E-06	4.55E-01	5.31E+01	2.21E-05	5.31E+01	5.13E-03	2.21E-05	5.15E-03

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Uranium-235	9.80E-02	4.79E-03	1.32E-05	4.81E-03	5.59E-01	1.32E-04	5.59E-01	5.40E-05	2.96E-04	3.50E-04
Uranium-238	3.10E-01	1.46E-02	7.30E-06	1.46E-02	1.70E+00	7.30E-05	1.70E+00	1.64E-04	1.26E-04	2.90E-04
Total		1.33E+00	6.28E-01	1.96E+00	5.57E+01	6.28E+00	6.19E+01	3.90E-01	1.28E+01	1.32E+01
SWSA 5 Seep A										
Actinium-228	1.90E+00	6.53E-13	1.88E-03	1.88E-03	3.75E-08	1.88E-02	1.88E-02	8.33E-07	3.86E-02	3.86E-02
Americium-241	1.24E+00	1.80E-04	1.04E-05	1.91E-04	7.69E-02	1.04E-04	7.70E-02	1.55E-04	5.44E-04	6.99E-04
Bismuth-214	6.90E-01	7.50E-05	1.08E-03	1.15E-03	4.13E-03	1.08E-02	1.49E-02	1.25E-04	2.20E-02	2.21E-02
Calcium-45	3.00E+01	9.61E-04	3.60E-07	9.61E-04	1.23E-02	3.60E-06	1.23E-02	1.56E-03	3.60E-06	1.56E-03
Carbon-14	1.51E+00	1.97E-03	3.90E-09	1.97E-03	3.53E-03	3.90E-08	3.53E-03	8.94E-04	3.90E-08	8.94E-04
Cesium-137	3.15E+00	2.53E-02	1.83E-03	2.71E-02	1.26E-02	1.83E-02	3.09E-02	4.10E-03	3.76E-02	4.17E-02
Iodine-129	3.40E+00	1.69E-04	8.44E-06	1.78E-04	1.88E-05	8.44E-05	1.03E-04	2.19E-02	9.98E-04	2.29E-02
Lead-212	1.90E+00	3.61E-04	3.14E-03	3.50E-03	1.09E-02	3.14E-02	4.23E-02	4.18E-04	6.31E-02	6.35E-02
Lead-214	9.80E-01	1.84E-04	1.77E-03	1.95E-03	5.55E-03	1.77E-02	2.32E-02	2.13E-04	3.62E-02	3.64E-02
Potassium-40	2.19E+01	2.83E+00	3.59E-03	2.84E+00	5.01E+00	3.59E-02	5.05E+00	1.29E+00	7.26E-02	1.36E+00
Plutonium-238	3.20E-01	2.40E-06	9.26E-09	2.41E-06	1.02E-03	9.26E-08	1.02E-03	3.02E-05	9.26E-08	3.03E-05
Plutonium-239/40	1.77E+00	3.79E-05	9.64E-08	3.80E-05	9.73E-02	9.64E-07	9.73E-02	1.60E-04	9.64E-07	1.61E-04
Radium-223	5.70E-01	3.98E-04	6.33E-05	4.61E-04	5.76E-03	6.33E-04	6.39E-03	2.36E-04	1.45E-03	1.69E-03
Radium-224	3.40E+00	1.11E-02	5.66E-03	1.68E-02	1.61E-01	5.66E-02	2.18E-01	6.59E-03	1.14E-01	1.20E-01
Radium-226	1.01E+00	2.99E-03	1.83E-03	4.81E-03	4.32E-02	1.83E-02	6.15E-02	1.77E-03	3.74E-02	3.91E-02
Radium-228	1.65E+00	1.73E-07		1.73E-07	2.50E-06		2.50E-06	1.02E-07		1.02E-07
Radon-219	7.30E-01									
Strontium-90	1.33E+02	5.01E-01	5.90E-04	5.02E-01	1.55E+00	5.90E-03	1.55E+00	2.28E-01	5.90E-03	2.33E-01
Thorium-228	1.54E+00	2.89E-05	2.56E-03	2.59E-03	7.39E-03	2.56E-02	3.30E-02	8.54E-04	5.15E-02	5.23E-02
Thorium-230	1.65E+00	4.53E-06	3.78E-07	4.91E-06	1.16E-03	3.78E-06	1.16E-03	1.34E-04	3.78E-06	1.37E-04
Thorium-232	1.59E+00	3.76E-06	1.57E-03	1.58E-03	9.60E-04	1.57E-02	1.67E-02	1.11E-04	3.23E-02	3.24E-02
Thallium-208	1.40E+00	2.05E-01	4.86E-03	2.09E-01	2.34E-02	4.86E-02	7.20E-02	9.29E-02	9.94E-02	1.92E-01
Tin-126	1.80E-01	5.17E-08	5.10E-06	5.15E-06	5.35E-06	5.10E-05	5.63E-05	5.04E-08	1.61E-04	1.61E-04
Tritium	2.95E+02	9.24E-02		9.24E-02	9.32E-02		9.32E-02	4.20E-02		4.20E-02
Uranium-232	1.50E-01	8.84E-03	2.60E-08	8.84E-03	1.03E+00	2.60E-07	1.03E+00	9.96E-05	2.60E-07	9.99E-05

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Uranium-233/234	5.65E+00	3.03E-01	1.47E-06	3.03E-01	3.53E+01	1.47E-05	3.53E+01	3.41E-03	1.47E-05	3.42E-03
Uranium-238	1.02E+00	4.80E-02	2.40E-05	4.80E-02	5.60E+00	2.40E-04	5.60E+00	5.41E-04	4.14E-04	9.55E-04
Total		4.03E+00	3.05E-02	4.06E+00	4.90E+01	3.05E-01	4.93E+01	1.69E+00	6.14E-01	2.31E+00
SWSA 5 Seep B West										
Americium-241	6.78E+00	9.87E-04	5.69E-05	1.04E-03	4.20E-01	5.69E-04	4.21E-01	8.48E-04	2.97E-03	3.82E-03
Carbon-14	2.77E+01	3.61E-02	7.15E-08	3.61E-02	6.47E-02	7.15E-07	6.47E-02	1.64E-02	7.15E-07	1.64E-02
Curium-244	3.56E+01	2.13E-04	8.60E-07	2.14E-04	2.33E-01	8.60E-06	2.33E-01	3.62E-03	8.60E-06	3.63E-03
Cobalt-60	2.24E+02	7.11E-01	5.82E-01	1.29E+00	2.12E-01	5.82E+00	6.03E+00	3.46E-01	1.19E+01	1.22E+01
Cesium-137	1.37E+01	1.10E-01	7.98E-03	1.18E-01	5.47E-02	7.98E-02	1.34E-01	1.78E-02	1.63E-01	1.81E-01
Potassium-40	3.20E+01	4.14E+00	5.24E-03	4.14E+00	7.32E+00	5.24E-02	7.37E+00	1.88E+00	1.06E-01	1.98E+00
Plutonium-238	8.90E-01	6.67E-06	2.57E-08	6.70E-06	2.84E-03	2.57E-07	2.84E-03	8.41E-05	2.57E-07	8.43E-05
Plutonium-239/40	1.46E+00	3.13E-05	7.95E-08	3.14E-05	8.03E-02	7.95E-07	8.03E-02	1.32E-04	7.95E-07	1.32E-04
Radium-226	3.50E+00	1.03E-02	6.33E-03	1.67E-02	1.50E-01	6.33E-02	2.13E-01	6.13E-03	1.30E-01	1.36E-01
Radium-228	8.60E+00	9.00E-07		9.00E-07	1.30E-05		1.30E-05	5.33E-07		5.33E-07
Strontium-90	1.03E+04	3.88E+01	4.57E-02	3.88E+01	1.20E+02	4.57E-01	1.20E+02	1.76E+01	4.57E-01	1.81E+01
Thorium-228	1.91E+00	3.59E-05	3.18E-03	3.22E-03	9.16E-03	3.18E-02	4.10E-02	1.06E-03	6.38E-02	6.49E-02
Thorium-230	1.23E+01	3.38E-05	2.82E-06	3.66E-05	8.62E-03	2.82E-05	8.65E-03	9.96E-04	2.82E-05	1.02E-03
Thorium-232	1.55E+00	3.66E-06	1.53E-03	1.54E-03	9.36E-04	1.53E-02	1.63E-02	1.08E-04	3.15E-02	3.16E-02
Tritium	1.90E+03	5.95E-01		5.95E-01	6.00E-01		6.00E-01	2.70E-01		2.70E-01
Uranium-232	5.30E-01	3.12E-02	9.17E-08	3.12E-02	3.64E+00	9.17E-07	3.64E+00	3.52E-04	9.17E-07	3.53E-04
Uranium-233	1.05E+01	5.62E-01	2.72E-06	5.62E-01	6.56E+01	2.72E-05	6.56E+01	6.33E-03	2.72E-05	6.36E-03
Uranium-238	9.60E-01	4.52E-02	2.26E-05	4.52E-02	5.27E+00	2.26E-04	5.27E+00	5.09E-04	3.90E-04	8.98E-04
Total		4.50E+01	6.52E-01	4.57E+01	2.03E+02	6.52E+00	2.10E+02	2.02E+01	1.28E+01	3.30E+01
SWSA 5 Seep B East										
Actinium-228	1.10E+00	3.78E-13	1.09E-03	1.09E-03	2.17E-08	1.09E-02	1.09E-02	4.82E-07	2.24E-02	2.24E-02
Carbon-14	2.05E+00	2.67E-03	5.29E-09	2.67E-03	4.79E-03	5.29E-08	4.79E-03	1.21E-03	5.29E-08	1.21E-03
Cesium-137	6.53E+03	5.24E+01	3.80E+00	5.62E+01	2.61E+01	3.80E+01	6.41E+01	8.50E+00	7.78E+01	8.63E+01
Barium-137m	6.20E+03	1.63E+01	3.80E+00	2.01E+01	8.83E+00	3.80E+01	4.68E+01	2.64E+00	7.78E+01	8.05E+01

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Lead-212	1.40E+00	2.66E-04	2.32E-03	2.58E-03	8.04E-03	2.32E-02	3.12E-02	3.08E-04	4.65E-02	4.68E-02
Lead-214	9.10E-01	1.70E-04	1.64E-03	1.81E-03	5.15E-03	1.64E-02	2.16E-02	7.82E-05	3.36E-02	3.37E-02
Potassium-40	1.95E+01	2.52E+00	3.19E-03	2.52E+00	4.46E+00	3.19E-02	4.49E+00	1.14E+00	6.46E-02	1.21E+00
Radium-226	1.10E+00	3.25E-03	1.99E-03	5.24E-03	4.70E-02	1.99E-02	6.69E-02	1.93E-03	4.07E-02	4.26E-02
Radium-228	1.10E+00	1.15E-07		1.15E-07	1.67E-06		1.67E-06	6.82E-08		6.82E-08
Strontium-90	2.80E+01	1.05E-01	1.24E-04	1.06E-01	3.26E-01	1.24E-03	3.27E-01	4.79E-02	1.24E-03	4.91E-02
Thorium-228	1.50E+00	2.82E-05	2.50E-03	2.53E-03	7.20E-03	2.50E-02	3.22E-02	8.32E-04	5.01E-02	5.10E-02
Thorium-232	1.10E+00	2.60E-06	1.09E-03	1.09E-03	6.64E-04	1.09E-02	1.15E-02	7.67E-05	2.24E-02	2.24E-02
Thallium-208	1.40E+00	2.05E-01	4.86E-03	2.09E-01	2.34E-02	4.86E-02	7.20E-02	9.29E-02	9.94E-02	1.92E-01
Tritium	5.28E+01	1.65E-02		1.65E-02	1.67E-02		1.67E-02	7.51E-03		7.51E-03
Total		7.16E+01	7.62E+00	7.92E+01	3.98E+01	7.62E+01	1.16E+02	1.24E+01	1.56E+02	1.69E+02
SWSA 5 Seep C										
Americium-241	1.10E+00	1.60E-04	9.23E-06	1.69E-04	6.82E-02	9.23E-05	6.83E-02	1.38E-04	4.83E-04	6.20E-04
Calcium-45	5.30E+02	1.70E-02	6.36E-06	1.70E-02	2.17E-01	6.36E-05	2.17E-01	2.76E-02	6.36E-05	2.76E-02
Carbon-14	4.55E+01	5.94E-02	1.17E-07	5.94E-02	1.06E-01	1.17E-06	1.06E-01	2.70E-02	1.17E-06	2.70E-02
Curium-244	5.65E+00	3.38E-05	1.36E-07	3.40E-05	3.69E-02	1.36E-06	3.69E-02	5.74E-04	1.36E-06	5.76E-04
Cobalt-60	2.75E+00	8.73E-03	7.15E-03	1.59E-02	2.61E-03	7.15E-02	7.41E-02	4.25E-03	1.45E-01	1.50E-01
Cesium-137	4.30E+02	3.45E+00	2.50E-01	3.70E+00	1.72E+00	2.50E+00	4.22E+00	5.60E-01	5.13E+00	5.69E+00
Lead-212	3.81E-01	7.23E-05	6.30E-04	7.02E-04	2.19E-03	6.30E-03	8.49E-03	8.38E-05	1.26E-02	1.27E-02
Potassium-40	1.90E+01	2.46E+00	3.11E-03	2.46E+00	4.35E+00	3.11E-02	4.38E+00	1.12E+00	6.30E-02	1.18E+00
Plutonium-238	6.73E-01	5.04E-06	1.95E-08	5.06E-06	2.15E-03	1.95E-07	2.15E-03	6.36E-05	1.95E-07	6.38E-05
Plutonium-239/40	1.91E-01	4.09E-06	1.04E-08	4.10E-06	1.05E-02	1.04E-07	1.05E-02	1.72E-05	1.04E-07	1.73E-05
Radium-226	1.29E+00	3.81E-03	2.33E-03	6.15E-03	5.52E-02	2.33E-02	7.85E-02	2.26E-03	4.77E-02	5.00E-02
Radium-228	1.58E+00	1.65E-07		1.65E-07	2.39E-06		2.39E-06	9.80E-08		9.80E-08
Strontium-90	1.58E+03	5.95E+00	7.01E-03	5.96E+00	1.84E+01	7.01E-02	1.84E+01	2.70E+00	7.01E-02	2.77E+00
Technetium-99	4.17E+00	4.10E-07	1.00E-07	5.10E-07	8.20E-04	1.00E-06	8.21E-04	5.45E-07	1.00E-06	1.55E-06
Thorium-228	1.88E+00	3.53E-05	3.13E-03	3.17E-03	9.02E-03	3.13E-02	4.03E-02	1.04E-03	6.28E-02	6.39E-02
Thorium-230	2.45E+00	6.72E-06	5.61E-07	7.29E-06	1.72E-03	5.61E-06	1.72E-03	1.98E-04	5.61E-06	2.04E-04
Thorium-232	1.73E+00	4.09E-06	1.71E-03	1.72E-03	1.04E-03	1.71E-02	1.82E-02	1.21E-04	3.52E-02	3.53E-02

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Tritium	5.52E+02	1.73E-01		1.73E-01	1.74E-01		1.74E-01	7.85E-02		7.85E-02
Uranium-233/234	2.11E+00	1.13E-01	5.48E-07	1.13E-01	1.32E+01	5.48E-06	1.32E+01	1.27E-03	5.48E-06	1.28E-03
Uranium-235	1.80E-01	8.80E-03	2.42E-05	8.83E-03	1.03E+00	2.42E-04	1.03E+00	9.92E-05	5.44E-04	6.43E-04
Uranium-235/236	6.29E-02	8.55E-02	8.49E-06	8.55E-02	9.97E+00	8.49E-05	9.97E+00	9.63E-04	1.90E-04	1.15E-03
Uranium-238	1.77E+00	8.33E-02	4.17E-05	8.33E-02	9.71E+00	4.17E-04	9.71E+00	9.38E-04	7.18E-04	1.66E-03
Total		1.24E+01	2.76E-01	1.27E+01	5.90E+01	2.76E+00	6.18E+01	4.52E+00	5.57E+00	1.01E+01
SWSA 5 Trib 1										
Actinium-228	2.17E+00	7.46E-13	2.15E-03	2.15E-03	4.28E-08	2.15E-02	2.15E-02	9.51E-07	4.41E-02	4.41E-02
Americium-241	4.95E-01	7.20E-05	4.15E-06	7.62E-05	3.07E-02	4.15E-05	3.07E-02	6.19E-05	2.17E-04	2.79E-04
Bismuth-212	2.60E+00	8.05E-05	4.99E-04	5.80E-04	4.43E-03	4.99E-03	9.42E-03	1.34E-04	1.02E-02	1.03E-02
Bismuth-214	9.40E-01	1.02E-04	1.47E-03	1.57E-03	5.63E-03	1.47E-02	2.03E-02	1.70E-04	2.99E-02	3.01E-02
Carbon-14	8.00E-01	1.04E-03	2.06E-09	1.04E-03	1.87E-03	2.06E-08	1.87E-03	4.74E-04	2.06E-08	4.74E-04
Cesium-134	4.00E-02	2.49E-04	6.41E-05	3.13E-04	1.37E-04	6.41E-04	7.77E-04	4.04E-05	1.31E-03	1.35E-03
Cobalt-60	9.11E+01	2.89E-01	2.37E-01	5.26E-01	8.63E-02	2.37E+00	2.45E+00	1.41E-01	4.82E+00	4.96E+00
Cesium-137	3.27E+03	2.62E+01	1.90E+00	2.81E+01	1.31E+01	1.90E+01	3.21E+01	4.26E+00	3.90E+01	4.32E+01
Curium-243	1.80E-01	1.08E-06	1.95E-05	2.06E-05	1.17E-03	1.95E-04	1.37E-03	1.83E-05	4.54E-04	4.72E-04
Iodine-129	5.70E+00	2.83E-04	1.42E-05	2.98E-04	3.14E-05	1.42E-04	1.73E-04	3.68E-02	1.67E-03	3.84E-02
Lead-212	1.24E+00	2.35E-04	2.05E-03	2.29E-03	7.12E-03	2.05E-02	2.76E-02	2.73E-04	4.12E-02	4.14E-02
Lead-214	1.13E+00	2.12E-04	2.04E-03	2.25E-03	6.40E-03	2.04E-02	2.68E-02	9.71E-05	4.17E-02	4.18E-02
Potassium-40	2.39E+01	3.09E+00	3.91E-03	3.09E+00	5.47E+00	3.91E-02	5.51E+00	1.40E+00	7.92E-02	1.48E+00
Plutonium-238	3.50E+00	2.62E-05	1.01E-07	2.63E-05	1.12E-02	1.01E-06	1.12E-02	3.31E-04	1.01E-06	3.32E-04
Radium-223	5.60E-01	3.91E-04	6.22E-05	4.53E-04	5.66E-03	6.22E-04	6.28E-03	2.32E-04	1.43E-03	1.66E-03
Radium-226	1.43E+00	4.23E-03	2.59E-03	6.81E-03	6.12E-02	2.59E-02	8.70E-02	2.50E-03	5.29E-02	5.54E-02
Radium-228	1.70E+00	1.78E-07		1.78E-07	2.57E-06		2.57E-06	1.05E-07		1.05E-07
Strontium-90	2.60E+01	9.79E-02	1.15E-04	9.80E-02	3.02E-01	1.15E-03	3.03E-01	4.45E-02	1.15E-03	4.56E-02
Thorium-228	1.66E+00	3.12E-05	2.76E-03	2.80E-03	7.96E-03	2.76E-02	3.56E-02	9.20E-04	5.55E-02	5.64E-02
Thorium-230	9.36E-01	2.57E-06	2.14E-07	2.78E-06	6.56E-04	2.14E-06	6.58E-04	7.58E-05	2.14E-06	7.79E-05
Thorium-232	1.79E+00	4.23E-06	1.77E-03	1.78E-03	1.08E-03	1.77E-02	1.88E-02	1.25E-04	3.64E-02	3.65E-02
Thallium-208	1.50E+00	2.19E-01	5.20E-03	2.24E-01	2.51E-02	5.20E-02	7.71E-02	9.95E-02	1.06E-01	2.06E-01

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Thorium-234	7.30E+00	6.27E-07	7.79E-04	7.79E-04	6.91E-05	7.79E-03	7.86E-03	1.03E-06	1.57E-02	1.57E-02
Tin-126	4.60E-01	1.32E-07	1.30E-05	1.32E-05	1.37E-05	1.30E-04	1.44E-04	1.29E-07	4.12E-04	4.12E-04
Tritium	4.82E+00	1.51E-03		1.51E-03	1.52E-03		1.52E-03	6.86E-04		6.86E-04
Uranium-233/234	4.00E+00	2.14E-01	1.04E-06	2.14E-01	2.50E+01	1.04E-05	2.50E+01	2.41E-03	1.04E-05	2.42E-03
Uranium-238	3.87E+00	1.82E-01	9.11E-05	1.82E-01	2.12E+01	9.11E-04	2.12E+01	2.05E-03	1.57E-03	3.62E-03
Total		3.03E+01	2.17E+00	3.25E+01	6.53E+01	2.17E+01	8.70E+01	5.99E+00	4.43E+01	5.03E+01
SWSA 5 WOC										
Actinium-228	1.80E+00	6.19E-13	1.78E-03	1.78E-03	3.55E-08	1.78E-02	1.78E-02	7.89E-07	3.66E-02	3.66E-02
Americium-241	1.58E-01	2.30E-05	1.33E-06	2.43E-05	9.79E-03	1.33E-05	9.81E-03	1.98E-05	6.93E-05	8.91E-05
Carbon-14	1.99E+00	2.60E-03	5.14E-09	2.60E-03	4.65E-03	5.14E-08	4.65E-03	1.18E-03	5.14E-08	1.18E-03
Curium-244	1.51E-01	9.05E-07	3.65E-09	9.08E-07	9.87E-04	3.65E-08	9.87E-04	1.53E-05	3.65E-08	1.54E-05
Cobalt-60	5.34E+00	1.69E-02	1.39E-02	3.08E-02	5.06E-03	1.39E-01	1.44E-01	8.24E-03	2.83E-01	2.91E-01
Cobalt-57	2.30E+00	1.02E-03	2.19E-04	1.24E-03	2.93E-04	2.19E-03	2.49E-03	4.95E-04	5.28E-03	5.78E-03
Cesium-137	4.91E+02	3.94E+00	2.86E-01	4.23E+00	1.96E+00	2.86E+00	4.82E+00	6.39E-01	5.85E+00	6.49E+00
Curium-242	1.78E-02	1.12E-07	5.79E-10	1.13E-07	1.22E-04	5.79E-09	1.22E-04	1.90E-06	5.79E-09	1.91E-06
Lead-212	5.84E-01	1.11E-04	9.66E-04	1.08E-03	3.35E-03	9.66E-03	1.30E-02	1.28E-04	1.94E-02	1.95E-02
Lead-214	1.12E+00	2.10E-04	2.02E-03	2.23E-03	6.34E-03	2.02E-02	2.65E-02	9.62E-05	4.14E-02	4.15E-02
Potassium-40	1.57E+01	2.03E+00	2.57E-03	2.03E+00	3.59E+00	2.57E-02	3.62E+00	9.22E-01	5.20E-02	9.74E-01
Plutonium-238	2.90E-01	2.17E-06	8.39E-09	2.18E-06	9.27E-04	8.39E-08	9.27E-04	2.74E-05	8.39E-08	2.75E-05
Plutonium-239/40	2.22E-02	4.76E-07	1.21E-09	4.77E-07	1.22E-03	1.21E-08	1.22E-03	2.00E-06	1.21E-08	2.01E-06
Radium-226	1.21E+00	3.58E-03	2.19E-03	5.77E-03	5.17E-02	2.19E-02	7.36E-02	2.12E-03	4.48E-02	4.69E-02
Radium-228	2.10E+00	2.20E-07		2.20E-07	3.18E-06		3.18E-06	1.30E-07		1.30E-07
Sodium-22	1.50E+00	1.04E+01	3.39E-03	1.04E+01	6.38E-01	3.39E-02	6.72E-01	4.72E+00	6.93E-02	4.79E+00
Strontium-90	6.69E+02	2.52E+00	2.97E-03	2.52E+00	7.78E+00	2.97E-02	7.81E+00	1.14E+00	2.97E-02	1.17E+00
Technetium-99	1.90E-01	1.87E-08	4.56E-09	2.32E-08	3.73E-05	4.56E-08	3.74E-05	2.49E-08	4.56E-08	7.05E-08
Thorium-228	1.50E+00	2.82E-05	2.50E-03	2.53E-03	7.20E-03	2.50E-02	3.22E-02	8.32E-04	5.01E-02	5.10E-02
Thorium-230	1.33E+00	3.65E-06	3.05E-07	3.96E-06	9.32E-04	3.05E-06	9.35E-04	1.08E-04	3.05E-06	1.11E-04
Thorium-232	1.30E+00	3.07E-06	1.29E-03	1.29E-03	7.85E-04	1.29E-02	1.36E-02	9.07E-05	2.64E-02	2.65E-02
Thallium-208	2.00E+00	2.92E-01	6.94E-03	2.99E-01	3.35E-02	6.94E-02	1.03E-01	1.33E-01	1.42E-01	2.75E-01

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Tritium	1.28E+01	4.01E-03		4.01E-03	4.04E-03		4.04E-03	1.82E-03		1.82E-03
Uranium-233/234	9.76E-01	5.23E-02	2.53E-07	5.23E-02	6.10E+00	2.53E-06	6.10E+00	5.89E-04	2.53E-06	5.91E-04
Uranium-235	4.39E-02	2.15E-03	5.90E-06	2.15E-03	2.50E-01	5.90E-05	2.50E-01	2.42E-05	1.33E-04	1.57E-04
Uranium-235/236	1.11E-01	5.00E-02	1.49E-05	5.00E-02	5.83E+00	1.49E-04	5.83E+00	5.63E-04	3.36E-04	8.99E-04
Uranium-238	9.57E-01	4.50E-02	2.25E-05	4.51E-02	5.25E+00	2.25E-04	5.25E+00	5.07E-04	3.88E-04	8.96E-04
Total		1.94E+01	3.27E-01	1.97E+01	3.15E+01	3.27E+00	3.48E+01	7.58E+00	6.65E+00	1.42E+01
SWSA 4 Main										
Cesium-137	8.80E+04	7.06E+02	5.12E+01	7.58E+02	9.31E+02	5.12E+02	1.44E+03	1.15E+02	1.05E+03	1.16E+03
Potassium-40	1.30E+01	1.68E+00	2.13E-03	1.68E+00	3.00E+00	2.13E-02	3.02E+00	7.63E-01	4.31E-02	8.06E-01
Strontium-90	1.10E+04	4.14E+01	4.88E-02	4.15E+01	1.44E+02	4.88E-01	1.45E+02	1.88E+01	4.88E-01	1.93E+01
Tritium	6.70E+02	2.10E-01		2.10E-01	2.25E-01		2.25E-01	9.53E-02		9.53E-02
Total		7.50E+02	5.13E+01	8.01E+02	1.08E+03	5.13E+02	1.59E+03	1.34E+02	1.05E+03	1.18E+03
SWSA 5 N WOC										
Actinium-228	2.10E+00	7.22E-13	2.08E-03	2.08E-03	4.14E-08	2.08E-02	2.08E-02	9.21E-07	4.27E-02	4.27E-02
Bismuth-212	1.90E+00	5.88E-05	3.65E-04	4.24E-04	3.24E-03	3.65E-03	6.89E-03	9.80E-05	7.45E-03	7.55E-03
Bismuth-214	8.10E-01	8.81E-05	1.27E-03	1.35E-03	4.85E-03	1.27E-02	1.75E-02	1.47E-04	2.58E-02	2.59E-02
Carbon-14	4.01E-01	5.23E-04	1.03E-09	5.23E-04	9.37E-04	1.03E-08	9.37E-04	2.38E-04	1.03E-08	2.38E-04
Iodine-129	4.40E+00	2.19E-04	1.09E-05	2.30E-04	2.43E-05	1.09E-04	1.34E-04	2.84E-02	1.29E-03	2.97E-02
Lead-212	1.60E+00	3.04E-04	2.65E-03	2.95E-03	9.18E-03	2.65E-02	3.56E-02	3.52E-04	5.31E-02	5.35E-02
Lead-214	1.07E+00	2.00E-04	1.93E-03	2.13E-03	6.06E-03	1.93E-02	2.54E-02	9.19E-05	3.95E-02	3.96E-02
Potassium-40	3.08E+01	3.98E+00	5.04E-03	3.99E+00	7.05E+00	5.04E-02	7.10E+00	1.81E+00	1.02E-01	1.91E+00
Radium-226	9.50E-01	2.81E-03	1.72E-03	4.53E-03	4.06E-02	1.72E-02	5.78E-02	1.66E-03	3.52E-02	3.68E-02
Radium-228	2.10E+00	2.20E-07		2.20E-07	3.18E-06		3.18E-06	1.30E-07		1.30E-07
Strontium-90	3.13E-01	1.18E-03	1.39E-06	1.18E-03	3.64E-03	1.39E-05	3.65E-03	5.35E-04	1.39E-05	5.49E-04
Thorium-228	2.00E+00	3.76E-05	3.33E-03	3.37E-03	9.60E-03	3.33E-02	4.29E-02	1.11E-03	6.68E-02	6.79E-02
Thorium-232	2.10E+00	4.96E-06	2.08E-03	2.08E-03	1.27E-03	2.08E-02	2.20E-02	1.46E-04	4.27E-02	4.28E-02
Thallium-208	1.80E+00	2.63E-01	6.24E-03	2.69E-01	3.01E-02	6.24E-02	9.26E-02	1.19E-01	1.28E-01	2.47E-01
Thorium-234	1.90E+00	4.57E-07	5.59E-04	5.60E-04	4.93E-05	5.59E-03	5.64E-03	5.54E-07	1.15E-02	1.15E-02

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Tin-126	3.40E-01	9.77E-08	9.63E-06	9.72E-06	1.01E-05	9.63E-05	1.06E-04	9.53E-08	3.05E-04	3.05E-04
Tritium	1.06E+01	3.32E-03		3.32E-03	3.35E-03		3.35E-03	1.51E-03		1.51E-03
Total		4.25E+00	2.73E-02	4.28E+00	7.16E+00	2.73E-01	7.43E+00	1.96E+00	5.56E-01	2.52E+00
SWSA 6 East										
Cobalt-60	5.33E+01	1.69E-01	1.38E-01	3.08E-01	5.05E-02	1.38E+00	1.44E+00	8.23E-02	2.82E+00	2.90E+00
Cesium-137	2.14E+00	1.72E-02	1.25E-03	1.84E-02	8.54E-03	1.25E-02	2.10E-02	2.79E-03	2.55E-02	2.83E-02
Potassium-40	2.57E+01	3.32E+00	4.21E-03	3.33E+00	5.88E+00	4.21E-02	5.92E+00	1.51E+00	8.52E-02	1.59E+00
Radium-224	1.52E+00	4.97E-03	2.53E-03	7.50E-03	7.20E-02	2.53E-02	9.73E-02	2.95E-03	5.08E-02	5.37E-02
Radium-226	8.00E-01	2.36E-03	1.45E-03	3.81E-03	3.42E-02	1.45E-02	4.87E-02	1.40E-03	2.96E-02	3.10E-02
Radium-228	1.52E+00	1.59E-07		1.59E-07	2.30E-06		2.30E-06	9.43E-08		9.43E-08
Strontium-90	6.22E+00	2.34E-02	2.76E-05	2.35E-02	7.23E-02	2.76E-04	7.26E-02	1.06E-02	2.76E-04	1.09E-02
Thorium-228	1.45E+00	2.72E-05	2.41E-03	2.44E-03	6.96E-03	2.41E-02	3.11E-02	8.04E-04	4.84E-02	4.93E-02
Thorium-230	1.27E+00	3.49E-06	2.91E-07	3.78E-06	8.90E-04	2.91E-06	8.93E-04	1.03E-04	2.91E-06	1.06E-04
Thorium-232	1.11E+00	2.62E-06	1.10E-03	1.10E-03	6.70E-04	1.10E-02	1.17E-02	7.74E-05	2.26E-02	2.26E-02
Thorium-234	3.96E-01	5.77E-02	1.88E-06	5.77E-02	4.16E+00	1.88E-05	4.16E+00	1.05E-02	1.88E-05	1.05E-02
Tritium	7.10E+01	2.22E-02		2.22E-02	2.24E-02		2.24E-02	1.01E-02		1.01E-02
Uranium-234	6.70E-01	3.54E-02	5.14E-08	3.54E-02	4.13E+00	5.14E-07	4.13E+00	3.99E-04	5.14E-07	4.00E-04
Uranium-235/236	6.00E-01	6.44E-02	8.07E-05	6.45E-02	7.51E+00	8.07E-04	7.52E+00	7.26E-04	1.81E-03	2.54E-03
Uranium-238	7.54E-01	3.55E-02	1.78E-05	3.55E-02	4.14E+00	1.78E-04	4.14E+00	4.00E-04	3.06E-04	7.06E-04
Total		3.76E+00	1.52E-01	3.91E+00	2.61E+01	1.52E+00	2.76E+01	1.63E+00	3.08E+00	4.72E+00
SWSA 6 South										
Americium-241	6.00E-01	8.73E-05	5.03E-06	9.24E-05	3.72E-02	5.03E-05	3.72E-02	7.50E-05	2.63E-04	3.38E-04
Potassium-40	1.81E+01	2.34E+00	2.96E-03	2.34E+00	4.14E+00	2.96E-02	4.17E+00	1.06E+00	6.00E-02	1.12E+00
Plutonium-238	6.00E-01	4.50E-06	1.74E-08	4.51E-06	1.92E-03	1.74E-07	1.92E-03	5.67E-05	1.74E-07	5.69E-05
Plutonium-239/40	6.00E-01	1.29E-05	3.27E-08	1.29E-05	3.30E-02	3.27E-07	3.30E-02	5.41E-05	3.27E-07	5.44E-05
Radium-224	1.40E+00	4.58E-03	2.33E-03	6.91E-03	6.63E-02	2.33E-02	8.96E-02	2.72E-03	4.68E-02	4.95E-02
Radium-226	8.30E-01	2.45E-03	1.50E-03	3.95E-03	3.55E-02	1.50E-02	5.05E-02	1.45E-03	3.07E-02	3.22E-02
Radium-228	1.46E+00	1.53E-07		1.53E-07	2.21E-06		2.21E-06	9.05E-08		9.05E-08

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Thorium-228	1.04E+00	1.95E-05	1.73E-03	1.75E-03	4.99E-03	1.73E-02	2.23E-02	5.77E-04	3.48E-02	3.53E-02
Thorium-230	1.00E+00	2.74E-06	2.29E-07	2.97E-06	7.01E-04	2.29E-06	7.03E-04	8.10E-05	2.29E-06	8.33E-05
Thorium-232	1.07E+00	2.53E-06	1.06E-03	1.06E-03	6.46E-04	1.06E-02	1.12E-02	7.46E-05	2.18E-02	2.18E-02
Thorium-234	1.12E+00	7.01E-02	8.59E-05	7.02E-02	8.17E+00	8.59E-04	8.17E+00	7.89E-04	1.87E-03	2.65E-03
Uranium-234	7.70E-01	4.07E-02	5.91E-08	4.07E-02	4.75E+00	5.91E-07	4.75E+00	4.59E-04	5.91E-07	4.59E-04
Uranium-235/236	6.00E-01	6.84E-02	8.07E-05	6.85E-02	7.98E+00	8.07E-04	7.98E+00	7.71E-04	1.81E-03	2.58E-03
Uranium-238	8.40E-01	3.95E-02	1.98E-05	3.95E-02	4.61E+00	1.98E-04	4.61E+00	4.45E-04	3.41E-04	7.86E-04
Total		2.57E+00	9.78E-03	2.58E+00	2.98E+01	9.78E-02	2.99E+01	1.07E+00	1.98E-01	1.27E+00
W6MS3										
Americium-241	8.90E-01	1.30E-04	7.46E-06	1.37E-04	5.52E-02	7.46E-05	5.52E-02	1.11E-04	3.90E-04	5.02E-04
Curium-244	6.00E-01	3.59E-06	1.45E-08	3.61E-06	3.92E-03	1.45E-07	3.92E-03	6.10E-05	1.45E-07	6.11E-05
Cobalt-60	1.06E-01	3.36E-04	2.75E-04	6.12E-04	1.00E-04	2.75E-03	2.85E-03	1.64E-04	5.61E-03	5.77E-03
Cesium-137	6.01E-01	4.82E-03	3.50E-04	5.17E-03	2.40E-03	3.50E-03	5.90E-03	7.82E-04	7.16E-03	7.95E-03
Curium-242	6.00E-01	3.78E-06	1.95E-08	3.80E-06	4.12E-03	1.95E-07	4.12E-03	6.42E-05	1.95E-07	6.44E-05
Potassium-40	2.39E+01	3.09E+00	3.91E-03	3.09E+00	5.47E+00	3.91E-02	5.51E+00	1.40E+00	7.92E-02	1.48E+00
Plutonium-238	6.00E-01	4.50E-06	1.74E-08	4.51E-06	1.92E-03	1.74E-07	1.92E-03	5.67E-05	1.74E-07	5.69E-05
Plutonium-239/40	6.00E-01	1.29E-05	3.27E-08	1.29E-05	3.30E-02	3.27E-07	3.30E-02	5.41E-05	3.27E-07	5.44E-05
Radium-224	1.27E+00	4.16E-03	2.11E-03	6.27E-03	6.01E-02	2.11E-02	8.13E-02	2.46E-03	4.24E-02	4.49E-02
Radium-226	8.21E-01	2.43E-03	1.49E-03	3.91E-03	3.51E-02	1.49E-02	5.00E-02	1.44E-03	3.04E-02	3.18E-02
Radium-228	1.34E+00	1.40E-07		1.40E-07	2.03E-06		2.03E-06	8.31E-08		8.31E-08
Strontium-90	2.55E+01	9.60E-02	1.13E-04	9.62E-02	2.96E-01	1.13E-03	2.98E-01	4.36E-02	1.13E-03	4.48E-02
Technetium-99	9.00E-01	8.85E-08	2.16E-08	1.10E-07	1.77E-04	2.16E-07	1.77E-04	1.18E-07	2.16E-07	3.34E-07
Thorium-228	1.25E+00	2.35E-05	2.08E-03	2.10E-03	6.00E-03	2.08E-02	2.68E-02	6.93E-04	4.18E-02	4.25E-02
Thorium-230	1.59E+00	4.36E-06	3.64E-07	4.73E-06	1.11E-03	3.64E-06	1.12E-03	1.29E-04	3.64E-06	1.32E-04
Thorium-232	9.37E-01	2.21E-06	9.27E-04	9.29E-04	5.66E-04	9.27E-03	9.84E-03	6.53E-05	1.91E-02	1.91E-02
Thorium-234	1.50E+00	2.69E-01	7.09E-06	2.69E-01	1.27E+01	7.09E-05	1.27E+01	7.45E-02	7.09E-05	7.46E-02
Tritium	5.15E+02	1.61E-01		1.61E-01	1.63E-01		1.63E-01	7.33E-02		7.33E-02
Uranium-234	2.04E+00	1.08E-01	1.56E-07	1.08E-01	1.26E+01	1.56E-06	1.26E+01	1.22E-03	1.56E-06	1.22E-03
Uranium-235/236	6.00E-01	7.82E-02	8.07E-05	7.83E-02	9.12E+00	8.07E-04	9.12E+00	8.81E-04	1.81E-03	2.69E-03

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Uranium-238	1.05E+00	4.94E-02	2.47E-05	4.94E-02	5.76E+00	2.47E-04	5.76E+00	5.57E-04	4.26E-04	9.83E-04
Total		3.86E+00	1.14E-02	3.88E+00	4.63E+01	1.14E-01	4.65E+01	1.60E+00	2.29E-01	1.83E+00
W6MS1										
Americium-241	6.00E-01	8.73E-05	5.03E-06	9.24E-05	3.72E-02	5.03E-05	3.72E-02	7.50E-05	2.63E-04	3.38E-04
Cobalt-60	1.80E-01	5.71E-04	4.68E-04	1.04E-03	1.71E-04	4.68E-03	4.85E-03	2.78E-04	9.52E-03	9.80E-03
Cesium-137	6.48E-01	5.20E-03	3.77E-04	5.58E-03	2.59E-03	3.77E-03	6.36E-03	8.43E-04	7.73E-03	8.57E-03
Potassium-40	2.65E+01	3.43E+00	4.34E-03	3.43E+00	6.06E+00	4.34E-02	6.11E+00	1.56E+00	8.79E-02	1.64E+00
Plutonium-238	6.00E-01	4.50E-06	1.74E-08	4.51E-06	1.92E-03	1.74E-07	1.92E-03	5.67E-05	1.74E-07	5.69E-05
Plutonium-239/40	6.00E-01	1.29E-05	3.27E-08	1.29E-05	3.30E-02	3.27E-07	3.30E-02	5.41E-05	3.27E-07	5.44E-05
Radium-224	1.32E+00	4.32E-03	2.20E-03	6.52E-03	6.25E-02	2.20E-02	8.45E-02	2.56E-03	4.41E-02	4.66E-02
Radium-226	8.27E-01	2.44E-03	1.50E-03	3.94E-03	3.54E-02	1.50E-02	5.03E-02	1.45E-03	3.06E-02	3.20E-02
Radium-228	1.33E+00	1.39E-07		1.39E-07	2.01E-06		2.01E-06	8.25E-08		8.25E-08
Thorium-228	1.13E+00	2.12E-05	1.88E-03	1.90E-03	5.42E-03	1.88E-02	2.42E-02	6.26E-04	3.78E-02	3.84E-02
Thorium-230	8.40E-01	2.31E-06	1.92E-07	2.50E-06	5.89E-04	1.92E-06	5.91E-04	6.80E-05	1.92E-06	6.99E-05
Thorium-232	7.40E-01	1.75E-06	7.32E-04	7.34E-04	4.47E-04	7.32E-03	7.77E-03	5.16E-05	1.50E-02	1.51E-02
Thorium-234	1.52E+00	1.80E-01	7.10E-06	1.80E-01	5.99E+00	7.10E-05	5.99E+00	5.95E-02	7.10E-05	5.95E-02
Tritium	4.14E+02	1.30E-01		1.30E-01	1.31E-01		1.31E-01	5.89E-02		5.89E-02
Uranium-234	9.50E-01	5.03E-02	7.29E-08	5.03E-02	5.86E+00	7.29E-07	5.86E+00	5.66E-04	7.29E-07	5.67E-04
Uranium-235/236	6.00E-01	7.36E-02	8.07E-05	7.37E-02	8.58E+00	8.07E-04	8.58E+00	8.29E-04	1.81E-03	2.64E-03
Uranium-238	9.50E-01	4.47E-02	2.24E-05	4.47E-02	5.21E+00	2.24E-04	5.21E+00	5.04E-04	3.86E-04	8.89E-04
Total		3.92E+00	1.16E-02	3.93E+00	3.20E+01	1.16E-01	3.21E+01	1.68E+00	2.35E-01	1.92E+00
WCTRIB-1										
Cobalt-60	3.00E+02	9.52E-01	7.80E-01	1.73E+00	2.84E-01	7.80E+00	8.08E+00	4.63E-01	1.59E+01	1.63E+01
Cesium-137	8.50E+03	6.82E+01	4.95E+00	7.32E+01	3.39E+01	4.95E+01	8.34E+01	1.11E+01	1.01E+02	1.12E+02
Strontium-90	6.80E+02	2.56E+00	3.02E-03	2.56E+00	7.91E+00	3.02E-02	7.94E+00	1.16E+00	3.02E-02	1.19E+00
Total		7.17E+01	5.73E+00	7.75E+01	4.21E+01	5.73E+01	9.94E+01	1.27E+01	1.17E+02	1.30E+02
West Seep										

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Actinium-228	1.19E+00	4.09E-13	1.18E-03	1.18E-03	7.63E-08	1.18E-02	1.18E-02	5.22E-07	2.42E-02	2.42E-02
Americium-241	8.39E-01	1.22E-04	7.04E-06	1.29E-04	5.33E-02	7.04E-05	5.34E-02	1.05E-04	3.68E-04	4.73E-04
Bismuth-214	6.40E-01	6.96E-05	1.00E-03	1.07E-03	1.04E-02	1.00E-02	2.04E-02	1.16E-04	2.04E-02	2.05E-02
Cesium-137	4.34E+02	3.48E+00	2.53E-01	3.74E+00	4.59E+00	2.53E+00	7.12E+00	5.65E-01	5.17E+00	5.74E+00
Curium-243/244	2.40E-02	1.44E-07	2.60E-06	2.74E-06	1.66E-04	2.60E-05	1.92E-04	2.44E-06	6.06E-05	6.30E-05
Curium-245/246	3.35E-02	1.86E-07	2.16E-06	2.35E-06	2.14E-04	2.16E-05	2.36E-04	3.15E-06	5.62E-05	5.93E-05
Cobalt-57	2.00E-02	8.85E-06	1.91E-06	1.08E-05	5.02E-06	1.91E-05	2.41E-05	4.31E-06	4.59E-05	5.03E-05
Cobalt-60	7.20E+04	2.29E+02	1.87E+02	4.16E+02	1.34E+02	1.87E+03	2.01E+03	1.11E+02	3.81E+03	3.92E+03
Europium-152	-6.30E-02	-5.26E-06	-8.47E-05	-8.99E-05	-2.01E-05	-8.47E-04	-8.67E-04	-2.40E-06	-1.63E-03	-1.63E-03
Lead-212	1.34E+00	2.54E-04	2.22E-03	2.47E-03	2.17E-02	2.22E-02	4.38E-02	2.95E-04	4.45E-02	4.48E-02
Lead-214	7.50E-01	9.14E-07	1.35E-03	1.35E-03	8.06E-05	1.35E-02	1.36E-02	9.95E-05	2.77E-02	2.78E-02
Plutonium-238	8.13E-02	6.09E-07	2.35E-09	6.12E-07	3.22E-04	2.35E-08	3.22E-04	7.68E-06	2.35E-08	7.70E-06
Plutonium-239/40	1.10E+00	2.36E-05	5.99E-08	2.36E-05	6.13E-02	5.99E-07	6.13E-02	9.92E-05	5.99E-07	9.98E-05
Potassium-40	2.12E+01	2.74E+00	3.47E-03	2.75E+00	4.89E+00	3.47E-02	4.92E+00	1.24E+00	7.03E-02	1.31E+00
Radium-224	2.46E+00	8.05E-03	4.09E-03	1.21E-02	3.12E-01	4.09E-02	3.53E-01	4.77E-03	8.22E-02	8.69E-02
Radium-226	7.87E-01	2.33E-03	1.42E-03	3.75E-03	9.02E-02	1.42E-02	1.04E-01	1.38E-03	2.91E-02	3.05E-02
Radium-228	1.40E+00	1.47E-07		1.47E-07	5.68E-06		5.68E-06	8.68E-08		8.68E-08
Strontium-90	1.88E+02	7.08E-01	8.34E-04	7.09E-01	2.47E+00	8.34E-03	2.48E+00	3.22E-01	8.34E-03	3.30E-01
Thallium-208	4.60E-01	6.72E-02	1.60E-03	6.88E-02	9.94E-03	1.60E-02	2.59E-02	3.05E-02	3.27E-02	6.32E-02
Thorium-228	1.39E+00	2.61E-05	2.31E-03	2.34E-03	2.15E-02	2.31E-02	4.46E-02	7.71E-04	4.64E-02	4.72E-02
Thorium-230	9.81E-01	2.69E-06	2.25E-07	2.92E-06	2.21E-03	2.25E-06	2.21E-03	7.94E-05	2.25E-06	8.17E-05
Thorium-232	1.20E+00	2.84E-06	1.19E-03	1.19E-03	2.33E-03	1.19E-02	1.42E-02	8.37E-05	2.44E-02	2.45E-02
Thorium-234	1.55E+00	4.06E-02	7.20E-06	4.06E-02	1.30E+00	7.20E-05	1.30E+00	1.38E-02	7.20E-05	1.39E-02
Tritium	9.62E+01	3.01E-02		3.01E-02	3.23E-02		3.23E-02	1.37E-02		1.37E-02
Uranium-232	1.78E-01	1.05E-02	3.08E-08	1.05E-02	1.27E+00	3.08E-07	1.27E+00	1.18E-04	3.08E-07	1.19E-04
Uranium-233/234	4.51E+00	2.42E-01	1.17E-06	2.42E-01	2.92E+01	1.17E-05	2.92E+01	2.72E-03	1.17E-05	2.73E-03
Uranium-234	1.19E+00	6.30E-02	9.13E-08	6.30E-02	7.60E+00	9.13E-07	7.60E+00	7.09E-04	9.13E-07	7.10E-04
Uranium-235	3.80E-01	1.86E-02	5.11E-05	1.86E-02	2.24E+00	5.11E-04	2.25E+00	2.09E-04	1.15E-03	1.36E-03
Uranium-238	1.82E+00	8.56E-02	4.29E-05	8.57E-02	9.99E+00	4.29E-04	9.99E+00	9.65E-04	7.39E-04	1.70E-03
Total		2.36E+02	1.87E+02	4.23E+02	1.99E+02	1.87E+03	2.07E+03	1.13E+02	3.81E+03	3.93E+03

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
SWSA 5 Drainage D-2										
Actinium-228	2.30E+00	7.90E-13	2.28E-03	2.28E-03	4.54E-08	2.28E-02	2.28E-02	1.01E-06	4.68E-02	4.68E-02
Bismuth-214	8.20E-01	8.92E-05	1.28E-03	1.37E-03	4.91E-03	1.28E-02	1.77E-02	1.49E-04	2.61E-02	2.63E-02
Calcium-45	1.30E+01	4.16E-04	1.56E-07	4.17E-04	5.32E-03	1.56E-06	5.32E-03	6.76E-04	1.56E-06	6.78E-04
Carbon-14	4.60E-01	6.00E-04	1.19E-09	6.00E-04	1.07E-03	1.19E-08	1.07E-03	2.72E-04	1.19E-08	2.72E-04
Cesium-137	1.99E+01	1.60E-01	1.16E-02	1.71E-01	7.94E-02	1.16E-01	1.95E-01	2.59E-02	2.37E-01	2.63E-01
Iodine-129	3.30E+00	1.64E-04	8.20E-06	1.72E-04	1.82E-05	8.20E-05	1.00E-04	2.13E-02	9.69E-04	2.23E-02
Lead-210	6.10E+00									
Lead-212	9.23E-01	1.75E-04	1.53E-03	1.70E-03	5.30E-03	1.53E-02	2.06E-02	2.03E-04	3.06E-02	3.08E-02
Lead-214	1.40E+00	2.62E-04	2.52E-03	2.79E-03	7.93E-03	2.52E-02	3.32E-02	1.20E-04	5.17E-02	5.18E-02
Potassium-40	2.01E+01	2.60E+00	3.29E-03	2.60E+00	4.60E+00	3.29E-02	4.63E+00	1.18E+00	6.66E-02	1.25E+00
Radium-226	7.90E-01	2.33E-03	1.43E-03	3.76E-03	3.38E-02	1.43E-02	4.81E-02	1.38E-03	2.92E-02	3.06E-02
Radium-228	1.88E+00	1.97E-07		1.97E-07	2.85E-06		2.85E-06	1.17E-07		1.17E-07
Strontium-90	1.28E+02	4.82E-01	5.68E-04	4.83E-01	1.49E+00	5.68E-03	1.49E+00	2.19E-01	5.68E-03	2.25E-01
Technetium-99	1.18E+00	1.16E-07	2.83E-08	1.44E-07	2.32E-04	2.83E-07	2.32E-04	1.54E-07	2.83E-07	4.38E-07
Thorium-228	1.50E+00	2.82E-05	2.50E-03	2.53E-03	7.20E-03	2.50E-02	3.22E-02	8.32E-04	5.01E-02	5.10E-02
Thorium-232	2.15E+00	5.08E-06	2.13E-03	2.13E-03	1.30E-03	2.13E-02	2.26E-02	1.50E-04	4.37E-02	4.39E-02
Thallium-208	1.40E+00	2.05E-01	4.86E-03	2.09E-01	2.34E-02	4.86E-02	7.20E-02	9.29E-02	9.94E-02	1.92E-01
Tritium	2.29E+01	7.18E-03		7.18E-03	7.23E-03		7.23E-03	3.26E-03		3.26E-03
Total		3.46E+00	3.40E-02	3.49E+00	6.26E+00	3.40E-01	6.60E+00	1.55E+00	6.88E-01	2.23E+00
WAG 7 WOC										
Actinium-228	1.09E+00	3.75E-13	1.08E-03	1.08E-03	6.99E-08	1.08E-02	1.08E-02	4.78E-07	2.22E-02	2.22E-02
Americium-241	1.11E-01	1.62E-05	9.31E-07	1.71E-05	7.05E-03	9.31E-06	7.06E-03	1.39E-05	4.87E-05	6.26E-05
Bismuth-214	6.50E-01	7.07E-05	1.02E-03	1.09E-03	1.06E-02	1.02E-02	2.07E-02	1.18E-04	2.07E-02	2.08E-02
Cesium-137	5.62E+03	4.51E+01	3.45E+00	4.86E+01	5.95E+01	3.45E+01	9.39E+01	7.31E+00	7.05E+01	7.78E+01
Curium-243/244	1.08E+00	6.47E-06	1.17E-04	1.23E-04	7.47E-03	1.17E-03	8.64E-03	1.10E-04	2.72E-03	2.83E-03
Cobalt-57	9.00E-02	3.98E-05	8.58E-06	4.84E-05	2.26E-05	8.58E-05	1.08E-04	1.94E-05	2.07E-04	2.26E-04
Cobalt-60	2.02E-01	6.41E-04	5.25E-04	1.17E-03	3.77E-04	5.25E-03	5.63E-03	3.12E-04	1.07E-02	1.10E-02

Table 9.6c. (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Red-tailed Hawk Internal	Red-tailed Hawk External	Red-tailed Hawk Total	Wild Turkey Internal	Wild Turkey External	Wild Turkey Total	Mink Internal	Mink External	Mink Total
Plutonium-238	2.42E-01	1.81E-06	7.00E-09	1.82E-06	9.59E-04	7.00E-08	9.59E-04	2.29E-05	7.00E-08	2.29E-05
Plutonium-239/40	5.10E-02	1.09E-06	2.78E-09	1.10E-06	2.84E-03	2.78E-08	2.84E-03	4.60E-06	2.78E-08	4.63E-06
Potassium-40	2.60E+01	3.36E+00	4.26E-03	3.37E+00	5.99E+00	4.26E-02	6.04E+00	1.53E+00	8.62E-02	1.61E+00
Thorium-228	5.00E-01	9.40E-06	8.33E-04	8.42E-04	7.72E-03	8.33E-03	1.60E-02	2.77E-04	1.67E-02	1.70E-02
Thorium-230	4.10E-01	1.13E-06	9.39E-08	1.22E-06	9.25E-04	9.39E-07	9.26E-04	3.32E-05	9.39E-07	3.41E-05
Thorium-232	4.00E-01	9.45E-07	3.96E-04	3.97E-04	7.77E-04	3.96E-03	4.73E-03	2.79E-05	8.13E-03	8.16E-03
Uranium-233/234	1.10E+00	5.89E-02	2.85E-07	5.89E-02	7.12E+00	2.85E-06	7.12E+00	6.64E-04	2.85E-06	6.66E-04
Uranium-235	8.30E-02	4.06E-03	1.12E-05	4.07E-03	4.90E-01	1.12E-04	4.90E-01	4.57E-05	2.51E-04	2.96E-04
Uranium-238	1.23E+00	5.79E-02	2.90E-05	5.79E-02	6.75E+00	2.90E-04	6.75E+00	6.52E-04	4.99E-04	1.15E-03
Total		4.86E+01	3.45E+00	5.20E+01	7.98E+01	3.45E+01	1.14E+02	8.84E+00	7.07E+01	7.95E+01
WOC										
Americium-241	2.86E+00	4.16E-04	2.40E-05	4.40E-04	1.77E-01	2.40E-04	1.78E-01	3.58E-04	1.25E-03	1.61E-03
Curium-244	3.22E+00	1.93E-05	7.78E-08	1.94E-05	2.10E-02	7.78E-07	2.10E-02	3.27E-04	7.78E-07	3.28E-04
Cobalt-60	4.56E+00	1.45E-02	1.18E-02	2.63E-02	4.32E-03	1.18E-01	1.23E-01	7.04E-03	2.41E-01	2.48E-01
Cesium-137	3.57E+02	2.87E+00	2.08E-01	3.07E+00	1.43E+00	2.08E+00	3.50E+00	4.65E-01	4.26E+00	4.72E+00
Plutonium-238	1.04E+00	7.79E-06	3.01E-08	7.82E-06	3.32E-03	3.01E-07	3.32E-03	9.82E-05	3.01E-07	9.85E-05
Plutonium-239/40	8.07E+00	1.73E-04	4.40E-07	1.73E-04	4.44E-01	4.40E-06	4.44E-01	7.28E-04	4.40E-06	7.32E-04
Strontium-90	2.16E+01	8.14E-02	9.58E-05	8.14E-02	2.51E-01	9.58E-04	2.52E-01	3.70E-02	9.58E-04	3.79E-02
Technetium-99	3.94E+00	3.87E-07	9.46E-08	4.82E-07	7.75E-04	9.46E-07	7.75E-04	5.15E-07	9.46E-07	1.46E-06
Thorium-228	2.81E+00	5.28E-05	4.68E-03	4.73E-03	1.35E-02	4.68E-02	6.03E-02	1.56E-03	9.39E-02	9.55E-02
Thorium-230	5.50E+00	1.51E-05	1.26E-06	1.64E-05	3.85E-03	1.26E-05	3.87E-03	4.45E-04	1.26E-05	4.58E-04
Thorium-232	1.80E+00	4.25E-06	1.78E-03	1.78E-03	1.09E-03	1.78E-02	1.89E-02	1.26E-04	3.66E-02	3.67E-02
Uranium-233/234	3.24E+00	1.74E-01	8.41E-07	1.74E-01	2.02E+01	8.41E-06	2.02E+01	1.95E-03	8.41E-06	1.96E-03
Uranium-235	2.49E-01	1.22E-02	3.35E-05	1.22E-02	1.42E+00	3.35E-04	1.42E+00	1.37E-04	7.52E-04	8.89E-04
Uranium-238	2.97E+00	1.40E-01	7.00E-05	1.40E-01	1.63E+01	7.00E-04	1.63E+01	1.57E-03	1.21E-03	2.78E-03
Total		3.29E+00	2.26E-01	3.51E+00	4.03E+01	2.26E+00	4.26E+01	5.16E-01	4.63E+00	5.15E+00

[a] Dose from each radionuclide includes all short-lived daughter products

[b] Representative concentration is the minimum of the UCL95 and the maximum detect.

Table 9.7 Estimated radiation doses (mrad/d) to piscivorous wildlife exposed to radionuclides in surfacewater at WOC

Radionuclide[a]	Soil Activity[b] (pCi/L)	Mink Internal	Mink External	Mink Total	Otter Internal	Otter External	Otter Total	Kingfisher Internal	Kingfisher External	Kingfisher Total	Heron Internal	Heron External	Heron Total	Osprey Internal	Osprey External	Osprey Total
HF-2																
Cobalt-60	7.90E+00	1.72E-02	1.39E-04	1.73E-02	3.60E-02	2.60E-04	3.63E-02	3.14E-02	1.14E-04	3.15E-02	3.60E-02	2.60E-04	3.63E-02	3.14E-02	3.46E-05	3.15E-02
Cesium-137	5.04E+00	1.91E-01	1.92E-05	1.91E-01	3.65E-01	3.60E-05	3.65E-01	3.50E-01	1.58E-05	3.50E-01	3.65E-01	3.60E-05	3.65E-01	3.50E-01	4.80E-06	3.50E-01
Strontium-90	4.64E+00	3.63E-03	1.12E-07	3.63E-03	6.56E-03	2.10E-07	6.56E-03	6.56E-03	9.25E-08	6.56E-03	6.56E-03	2.10E-07	6.56E-03	6.56E-03	2.80E-08	6.56E-03
Tritium	1.39E+04	6.60E-03		6.60E-03	8.54E-03		8.54E-03	8.54E-03		8.54E-03	8.54E-03		8.54E-03	8.54E-03		8.54E-03
Total		2.19E-01	1.58E-04	2.19E-01	4.16E-01	2.96E-04	4.16E-01	3.97E-01	1.30E-04	3.97E-01	4.16E-01	2.96E-04	4.16E-01	3.97E-01	3.95E-05	3.97E-01
HFIR South																
Strontium-90	2.00E+00	1.56E-03	4.83E-08	1.56E-03	2.83E-03	9.06E-08	2.83E-03	2.83E-03	3.99E-08	2.83E-03	2.83E-03	9.06E-08	2.83E-03	2.83E-03	1.21E-08	2.83E-03
Tritium	3.20E+04	1.52E-02		1.52E-02	1.97E-02		1.97E-02	1.97E-02		1.97E-02	1.97E-02		1.97E-02	1.97E-02		1.97E-02
Total		1.68E-02	4.83E-08	1.68E-02	2.25E-02	9.06E-08	2.25E-02	2.25E-02	3.99E-08	2.25E-02	2.25E-02	9.06E-08	2.25E-02	2.25E-02	1.21E-08	2.25E-02
HRE																
Strontium-90	1.22E+03	9.54E-01	2.95E-05	9.54E-01	1.72E+00	5.53E-05	1.72E+00	1.72E+00	2.43E-05	1.72E+00	1.72E+00	5.53E-05	1.72E+00	1.72E+00	7.37E-06	1.72E+00
Tritium	1.00E+03	4.75E-04		4.75E-04	6.14E-04		6.14E-04	6.14E-04		6.14E-04	6.14E-04		6.14E-04	6.14E-04		6.14E-04
Total		9.54E-01	2.95E-05	9.55E-01	1.72E+00	5.53E-05	1.72E+00	1.72E+00	2.43E-05	1.72E+00	1.72E+00	5.53E-05	1.72E+00	1.72E+00	7.37E-06	1.72E+00
Intermediate Pond																
Cobalt-60	4.97E+00	1.08E-02	8.72E-05	1.09E-02	2.27E-02	1.63E-04	2.28E-02	1.98E-02	7.19E-05	1.98E-02	2.27E-02	1.63E-04	2.28E-02	1.98E-02	2.18E-05	1.98E-02
Cesium-137	1.10E+02	4.18E+00	4.19E-04	4.18E+00	7.97E+00	7.85E-04	7.97E+00	7.65E+00	3.45E-04	7.65E+00	7.97E+00	7.85E-04	7.97E+00	7.65E+00	1.05E-04	7.65E+00
Strontium-90	9.40E+01	7.35E-02	2.27E-06	7.35E-02	1.33E-01	4.26E-06	1.33E-01	1.33E-01	1.87E-06	1.33E-01	1.33E-01	4.26E-06	1.33E-01	1.33E-01	5.68E-07	1.33E-01
Tritium	7.73E+03	3.67E-03		3.67E-03	4.75E-03		4.75E-03	4.75E-03		4.75E-03	4.75E-03		4.75E-03	4.75E-03		4.75E-03
Total		4.27E+00	5.08E-04	4.27E+00	8.13E+00	9.53E-04	8.13E+00	7.80E+00	4.19E-04	7.81E+00	8.13E+00	9.53E-04	8.13E+00	7.80E+00	1.27E-04	7.80E+00
Little No-Name																
Strontium-90	2.38E+01	1.86E-02	5.75E-07	1.86E-02	3.36E-02	1.08E-06	3.36E-02	3.36E-02	4.75E-07	3.36E-02	3.36E-02	1.08E-06	3.36E-02	3.36E-02	1.44E-07	3.36E-02
Tritium	1.15E+03	5.46E-04		5.46E-04	7.07E-04		7.07E-04	7.07E-04		7.07E-04	7.07E-04		7.07E-04	7.07E-04		7.07E-04
Total		1.92E-02	5.75E-07	1.92E-02	3.43E-02	1.08E-06	3.43E-02	3.43E-02	4.75E-07	3.43E-02	3.43E-02	1.08E-06	3.43E-02	3.43E-02	1.44E-07	3.43E-02
Lower WOC																
Cobalt-60	6.12E+00	1.33E-02	1.07E-04	1.34E-02	2.79E-02	2.01E-04	2.81E-02	2.44E-02	8.85E-05	2.44E-02	2.79E-02	2.01E-04	2.81E-02	2.44E-02	2.68E-05	2.44E-02
Cesium-137	5.12E+01	1.94E+00	1.95E-04	1.94E+00	3.71E+00	3.65E-04	3.71E+00	3.56E+00	1.61E-04	3.56E+00	3.71E+00	3.65E-04	3.71E+00	3.56E+00	4.87E-05	3.56E+00
Plutonium-238	2.00E-01	1.79E-06	1.46E-10	1.79E-06	2.81E-06	2.74E-10	2.81E-06	2.81E-06	1.20E-10	2.81E-06	2.81E-06	2.74E-10	2.81E-06	2.81E-06	3.65E-11	2.81E-06
Strontium-90	3.89E+02	3.04E-01	9.40E-06	3.04E-01	5.50E-01	1.76E-05	5.50E-01	5.50E-01	7.76E-06	5.50E-01	5.50E-01	1.76E-05	5.50E-01	5.50E-01	2.35E-06	5.50E-01

Table 9.7 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Mink Internal	Mink External	Mink Total	Otter Internal	Otter External	Otter Total	Kingfisher Internal	Kingfisher External	Kingfisher Total	Heron Internal	Heron External	Heron Total	Osprey Internal	Osprey External	Osprey Total
Thorium-228	1.30E+00	3.70E-03	1.45E-05	3.71E-03	6.60E-03	2.73E-05	6.63E-03	6.60E-03	1.20E-05	6.61E-03	6.60E-03	2.73E-05	6.63E-03	6.60E-03	3.63E-06	6.60E-03
Thorium-230	2.20E-01	9.15E-05	5.55E-10	9.15E-05	1.63E-04	1.04E-09	1.63E-04	1.63E-04	4.58E-10	1.63E-04	1.63E-04	1.04E-09	1.63E-04	1.63E-04	1.39E-10	1.63E-04
Tritium	4.93E+05	2.34E-01		2.34E-01	3.03E-01		3.03E-01	3.03E-01		3.03E-01	3.03E-01		3.03E-01	3.03E-01		3.03E-01
Uranium-234	1.59E+00	7.51E-04	1.78E-09	7.51E-04	1.28E-03	3.34E-09	1.28E-03	1.28E-03	1.47E-09	1.28E-03	1.28E-03	3.34E-09	1.28E-03	1.28E-03	4.45E-10	1.28E-03
Uranium-238	6.50E-01	2.73E-04	1.12E-07	2.73E-04	4.65E-04	2.10E-07	4.65E-04	4.65E-04	9.26E-08	4.65E-04	4.65E-04	2.10E-07	4.65E-04	4.65E-04	2.81E-08	4.65E-04
Total		2.50E+00	3.26E-04	2.50E+00	4.60E+00	6.12E-04	4.60E+00	4.44E+00	2.69E-04	4.45E+00	4.60E+00	6.12E-04	4.60E+00	4.44E+00	8.16E-05	4.45E+00
MB-15																
Cobalt-60	4.90E+02	1.07E+00	8.59E-03	1.08E+00	2.23E+00	1.61E-02	2.25E+00	1.95E+00	7.09E-03	1.96E+00	2.23E+00	1.61E-02	2.25E+00	1.95E+00	2.15E-03	1.95E+00
Strontium-90	2.60E+01	2.03E-02	6.28E-07	2.03E-02	3.67E-02	1.18E-06	3.67E-02	3.67E-02	5.18E-07	3.67E-02	3.67E-02	1.18E-06	3.67E-02	3.67E-02	1.57E-07	3.67E-02
Tritium	6.23E+04	2.96E-02		2.96E-02	3.83E-02		3.83E-02	3.83E-02		3.83E-02	3.83E-02		3.83E-02	3.83E-02		3.83E-02
Total		1.12E+00	8.59E-03	1.13E+00	2.31E+00	1.61E-02	2.32E+00	2.02E+00	7.09E-03	2.03E+00	2.31E+00	1.61E-02	2.32E+00	2.02E+00	2.15E-03	2.03E+00
SWSA 5 Seep A																
Strontium-90	1.32E+03	1.03E+00	3.19E-05	1.03E+00	1.87E+00	5.98E-05	1.87E+00	1.87E+00	2.63E-05	1.87E+00	1.87E+00	5.98E-05	1.87E+00	1.87E+00	7.97E-06	1.87E+00
Tritium	1.10E+06	5.22E-01		5.22E-01	6.76E-01		6.76E-01	6.76E-01		6.76E-01	6.76E-01		6.76E-01	6.76E-01		6.76E-01
Total		1.55E+00	3.19E-05	1.55E+00	2.54E+00	5.98E-05	2.54E+00	2.54E+00	2.63E-05	2.54E+00	2.54E+00	5.98E-05	2.54E+00	2.54E+00	7.97E-06	2.54E+00
SWSA 5 Seep B West																
Strontium-90	1.91E+02	1.49E-01	4.62E-06	1.49E-01	2.70E-01	8.65E-06	2.70E-01	2.70E-01	3.81E-06	2.70E-01	2.70E-01	8.65E-06	2.70E-01	2.70E-01	1.15E-06	2.70E-01
Tritium	6.23E+05	2.96E-01		2.96E-01	3.83E-01		3.83E-01	3.83E-01		3.83E-01	3.83E-01		3.83E-01	3.83E-01		3.83E-01
Total		4.45E-01	4.62E-06	4.45E-01	6.53E-01	8.65E-06	6.53E-01	6.53E-01	3.81E-06	6.53E-01	6.53E-01	8.65E-06	6.53E-01	6.53E-01	1.15E-06	6.53E-01
SWSA 5 Seep B East																
Strontium-90	1.09E+03	8.52E-01	2.63E-05	8.52E-01	1.54E+00	4.94E-05	1.54E+00	1.54E+00	2.17E-05	1.54E+00	1.54E+00	4.94E-05	1.54E+00	1.54E+00	6.59E-06	1.54E+00
Tritium	1.52E+06	7.22E-01		7.22E-01	9.34E-01		9.34E-01	9.34E-01		9.34E-01	9.34E-01		9.34E-01	9.34E-01		9.34E-01
Total		1.57E+00	2.63E-05	1.57E+00	2.47E+00	4.94E-05	2.47E+00	2.47E+00	2.17E-05	2.47E+00	2.47E+00	4.94E-05	2.47E+00	2.47E+00	6.59E-06	2.47E+00
SWSA 5 Seep C																
Strontium-90	4.33E+02	3.39E-01	1.05E-05	3.39E-01	6.12E-01	1.96E-05	6.12E-01	6.12E-01	8.63E-06	6.12E-01	6.12E-01	1.96E-05	6.12E-01	6.12E-01	2.62E-06	6.12E-01
Tritium	1.14E+06	5.41E-01		5.41E-01	7.00E-01		7.00E-01	7.00E-01		7.00E-01	7.00E-01		7.00E-01	7.00E-01		7.00E-01
Total		8.80E-01	1.05E-05	8.80E-01	1.31E+00	1.96E-05	1.31E+00	1.31E+00	8.63E-06	1.31E+00	1.31E+00	1.96E-05	1.31E+00	1.31E+00	2.62E-06	1.31E+00

Table 9.7 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Mink Internal	Mink External	Mink Total	Otter Internal	Otter External	Otter Total	Kingfisher Internal	Kingfisher External	Kingfisher Total	Heron Internal	Heron External	Heron Total	Osprey Internal	Osprey External	Osprey Total
SWSA 5 Trib 1																
Americium-241	5.00E-01	9.76E-05	6.02E-08	9.76E-05	1.74E-04	1.13E-07	1.74E-04	1.74E-04	4.96E-08	1.74E-04	1.74E-04	1.13E-07	1.74E-04	1.74E-04	1.50E-08	1.74E-04
Carbon-14	5.18E+03		1.46E-07	1.46E-07		2.73E-07	2.73E-07		1.20E-07	1.20E-07		2.73E-07	2.73E-07		3.64E-08	3.64E-08
Curium-244	5.10E+00	5.26E-04	3.75E-09	5.26E-04	9.38E-04	7.04E-09	9.38E-04	9.38E-04	3.10E-09	9.38E-04	9.38E-04	7.04E-09	9.38E-04	9.38E-04	9.38E-10	9.38E-04
Cobalt-60	1.27E+02	2.77E-01	2.23E-03	2.79E-01	5.79E-01	4.18E-03	5.83E-01	5.05E-01	1.84E-03	5.07E-01	5.79E-01	4.18E-03	5.83E-01	5.05E-01	5.57E-04	5.06E-01
Cesium-137	4.94E+01	1.88E+00	1.88E-04	1.88E+00	3.58E+00	3.53E-04	3.58E+00	3.43E+00	1.55E-04	3.43E+00	3.58E+00	3.53E-04	3.58E+00	3.43E+00	4.70E-05	3.43E+00
Plutonium-238	2.10E-01	1.88E-06	1.53E-10	1.88E-06	2.95E-06	2.87E-10	2.95E-06	2.95E-06	1.26E-10	2.95E-06	2.95E-06	2.87E-10	2.95E-06	2.95E-06	3.83E-11	2.95E-06
Strontium-90	5.98E+03	4.68E+00	1.45E-04	4.68E+00	8.45E+00	2.71E-04	8.45E+00	8.45E+00	1.19E-04	8.45E+00	8.45E+00	2.71E-04	8.45E+00	8.45E+00	3.61E-05	8.45E+00
Tritium	1.23E+04	5.84E-03		5.84E-03	7.56E-03		7.56E-03	7.56E-03		7.56E-03	7.56E-03		7.56E-03	7.56E-03		7.56E-03
Uranium-232	2.18E+01	1.15E-02	4.49E-08	1.15E-02	1.95E-02	8.42E-08	1.95E-02	1.95E-02	3.71E-08	1.95E-02	1.95E-02	8.42E-08	1.95E-02	1.95E-02	1.12E-08	1.95E-02
Uranium-233/234	2.62E+02	1.25E-01	4.52E-07	1.25E-01	2.13E-01	8.47E-07	2.13E-01	2.13E-01	3.73E-07	2.13E-01	2.13E-01	8.47E-07	2.13E-01	2.13E-01	1.13E-07	2.13E-01
Uranium-238	4.82E+00	2.02E-03	8.32E-07	2.03E-03	3.45E-03	1.56E-06	3.45E-03	3.45E-03	6.87E-07	3.45E-03	3.45E-03	1.56E-06	3.45E-03	3.45E-03	2.08E-07	3.45E-03
Total		6.97E+00	2.56E-03	6.98E+00	1.29E+01	4.80E-03	1.29E+01	1.26E+01	2.11E-03	1.26E+01	1.29E+01	4.80E-03	1.29E+01	1.26E+01	6.40E-04	1.26E+01
SWSA 5 WOC																
Americium-241	3.90E-01	7.61E-05	4.69E-08	7.61E-05	1.36E-04	8.80E-08	1.36E-04	1.36E-04	3.87E-08	1.36E-04	1.36E-04	8.80E-08	1.36E-04	1.36E-04	1.17E-08	1.36E-04
Carbon-14	9.65E+04		2.71E-06	2.71E-06		5.08E-06	5.08E-06		2.24E-06	2.24E-06		5.08E-06	5.08E-06		6.78E-07	6.78E-07
Curium-244	1.62E+01	1.67E-03	1.19E-08	1.67E-03	2.98E-03	2.24E-08	2.98E-03	2.98E-03	9.84E-09	2.98E-03	2.98E-03	2.24E-08	2.98E-03	2.98E-03	2.98E-09	2.98E-03
Cobalt-60	1.54E+02	3.35E-01	2.70E-03	3.38E-01	7.02E-01	5.06E-03	7.07E-01	6.13E-01	2.23E-03	6.15E-01	7.02E-01	5.06E-03	7.07E-01	6.13E-01	6.75E-04	6.13E-01
Cesium-137	3.16E+04	1.20E+03	1.20E-01	1.20E+03	2.29E+03	2.26E-01	2.29E+03	2.20E+03	9.92E-02	2.20E+03	2.29E+03	2.26E-01	2.29E+03	2.20E+03	3.01E-02	2.20E+03
Potassium-40	6.22E+01	1.69E-03	6.93E-05	1.75E-03	1.70E-03	1.30E-04	1.83E-03	1.69E-03	5.71E-05	1.74E-03	1.70E-03	1.30E-04	1.83E-03	1.69E-03	1.73E-05	1.70E-03
Plutonium-238	7.00E-01	6.26E-06	5.11E-10	6.26E-06	9.83E-06	9.58E-10	9.83E-06	9.83E-06	4.21E-10	9.83E-06	9.83E-06	9.58E-10	9.83E-06	9.83E-06	1.28E-10	9.83E-06
Radium-228	2.00E+01	2.22E-05		2.22E-05	4.00E-05		4.00E-05	4.00E-05		4.00E-05	4.00E-05		4.00E-05	4.00E-05		4.00E-05
Strontium-90	9.36E+04	7.32E+01	2.26E-03	7.32E+01	1.32E+02	4.24E-03	1.32E+02	1.32E+02	1.87E-03	1.32E+02	1.32E+02	4.24E-03	1.32E+02	1.32E+02	5.65E-04	1.32E+02
Technetium-99	4.32E+01	1.33E-06	8.68E-09	1.34E-06	2.35E-06	1.63E-08	2.36E-06	2.35E-06	7.16E-09	2.35E-06	2.35E-06	1.63E-08	2.36E-06	2.35E-06	2.17E-09	2.35E-06
Thorium-228	1.07E+00	3.05E-03	1.20E-05	3.06E-03	5.43E-03	2.24E-05	5.45E-03	5.43E-03	9.87E-06	5.44E-03	5.43E-03	2.24E-05	5.45E-03	5.43E-03	2.99E-06	5.43E-03
Thorium-230	4.94E-01	2.05E-04	1.25E-09	2.05E-04	3.66E-04	2.34E-09	3.66E-04	3.66E-04	1.03E-09	3.66E-04	3.66E-04	2.34E-09	3.66E-04	3.66E-04	3.11E-10	3.66E-04
Tritium	3.50E+04	1.66E-02		1.66E-02	2.15E-02		2.15E-02	2.15E-02		2.15E-02	2.15E-02		2.15E-02	2.15E-02		2.15E-02
Uranium-232	3.70E+00	1.95E-03	7.62E-09	1.95E-03	3.32E-03	1.43E-08	3.32E-03	3.32E-03	6.29E-09	3.32E-03	3.32E-03	1.43E-08	3.32E-03	3.32E-03	1.91E-09	3.32E-03
Uranium-233/234	1.02E+02	4.88E-02	1.76E-07	4.88E-02	8.30E-02	3.30E-07	8.30E-02	8.30E-02	1.45E-07	8.30E-02	8.30E-02	3.30E-07	8.30E-02	8.30E-02	4.40E-08	8.30E-02
Uranium-235/236	3.80E-01	5.56E-04	3.87E-07	5.57E-04	9.48E-04	7.26E-07	9.48E-04	9.47E-04	3.19E-07	9.48E-04	9.48E-04	7.26E-07	9.48E-04	9.47E-04	9.68E-08	9.48E-04
Uranium-238	9.40E-01	3.95E-04	1.62E-07	3.95E-04	6.72E-04	3.04E-07	6.73E-04	6.72E-04	1.34E-07	6.72E-04	6.72E-04	3.04E-07	6.73E-04	6.72E-04	4.06E-08	6.72E-04
Total		1.27E+03	1.25E-01	1.27E+03	2.42E+03	2.35E-01	2.42E+03	2.33E+03	1.03E-01	2.33E+03	2.42E+03	2.35E-01	2.42E+03	2.33E+03	3.13E-02	2.33E+03

Table 9.7 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Mink Internal	Mink External	Mink Total	Otter Internal	Otter External	Otter Total	Kingfisher Internal	Kingfisher External	Kingfisher Total	Heron Internal	Heron External	Heron Total	Osprey Internal	Osprey External	Osprey Total
SWSA 5 N WOC																
Strontium-90	1.18E+02	9.23E-02	2.85E-06	9.23E-02	1.67E-01	5.35E-06	1.67E-01	1.67E-01	2.35E-06	1.67E-01	1.67E-01	5.35E-06	1.67E-01	1.67E-01	7.13E-07	1.67E-01
Tritium	1.25E+04	5.94E-03		5.94E-03	7.68E-03		7.68E-03	7.68E-03		7.68E-03	7.68E-03		7.68E-03	7.68E-03		7.68E-03
Total		9.82E-02	2.85E-06	9.82E-02	1.74E-01	5.35E-06	1.74E-01	1.74E-01	2.35E-06	1.74E-01	1.74E-01	5.35E-06	1.74E-01	1.74E-01	7.13E-07	1.74E-01
SWSA 6 East																
Cobalt-60	5.50E+02	1.20E+00	9.64E-03	1.21E+00	2.51E+00	1.81E-02	2.52E+00	2.19E+00	7.96E-03	2.20E+00	2.51E+00	1.81E-02	2.52E+00	2.19E+00	2.41E-03	2.19E+00
Cesium-137	1.12E+01	4.25E-01	4.26E-05	4.25E-01	8.11E-01	7.99E-05	8.11E-01	7.79E-01	3.52E-05	7.79E-01	8.11E-01	7.99E-05	8.11E-01	7.79E-01	1.07E-05	7.79E-01
Tritium	1.90E+05	9.02E-02		9.02E-02	1.17E-01		1.17E-01	1.17E-01		1.17E-01	1.17E-01		1.17E-01	1.17E-01		1.17E-01
Total		1.71E+00	9.69E-03	1.72E+00	3.43E+00	1.82E-02	3.45E+00	3.08E+00	7.99E-03	3.09E+00	3.43E+00	1.82E-02	3.45E+00	3.08E+00	2.42E-03	3.09E+00
W6MS3																
Americium-241	1.76E+00	3.43E-04	2.12E-07	3.44E-04	6.13E-04	3.97E-07	6.13E-04	6.13E-04	1.75E-07	6.13E-04	6.13E-04	3.97E-07	6.13E-04	6.13E-04	5.29E-08	6.13E-04
Curium-244	1.35E+02	1.39E-02	9.94E-08	1.39E-02	2.48E-02	1.86E-07	2.48E-02	2.48E-02	8.20E-08	2.48E-02	2.48E-02	1.86E-07	2.48E-02	2.48E-02	2.48E-08	2.48E-02
Cobalt-60	3.49E+00	7.60E-03	6.12E-05	7.66E-03	1.59E-02	1.15E-04	1.60E-02	1.39E-02	5.05E-05	1.39E-02	1.59E-02	1.15E-04	1.60E-02	1.39E-02	1.53E-05	1.39E-02
Cesium-137	3.65E+00	1.39E-01	1.39E-05	1.39E-01	2.64E-01	2.61E-05	2.64E-01	2.54E-01	1.15E-05	2.54E-01	2.64E-01	2.61E-05	2.64E-01	2.54E-01	3.47E-06	2.54E-01
Curium-242	7.88E+00	8.56E-04	6.71E-09	8.56E-04	1.53E-03	1.26E-08	1.53E-03	1.53E-03	5.53E-09	1.53E-03	1.53E-03	1.26E-08	1.53E-03	1.53E-03	1.68E-09	1.53E-03
Europium-152	2.78E+01	1.75E-03	2.19E-04	1.97E-03	3.57E-03	4.10E-04	3.98E-03	3.15E-03	1.81E-04	3.33E-03	3.57E-03	4.10E-04	3.98E-03	3.15E-03	5.47E-05	3.21E-03
Europium-154	5.74E+00	6.85E-04	4.89E-05	7.33E-04	1.33E-03	9.16E-05	1.42E-03	1.23E-03	4.03E-05	1.27E-03	1.33E-03	9.16E-05	1.42E-03	1.23E-03	1.22E-05	1.25E-03
Europium-155	1.15E+01	2.78E-04	4.13E-06	2.82E-04	5.14E-04	7.74E-06	5.22E-04	5.00E-04	3.41E-06	5.04E-04	5.14E-04	7.74E-06	5.22E-04	5.00E-04	1.03E-06	5.01E-04
Europium-156	2.89E+02	4.85E-02	2.70E-03	5.12E-02	9.23E-02	5.06E-03	9.74E-02	8.73E-02	2.23E-03	8.96E-02	9.23E-02	5.06E-03	9.74E-02	8.73E-02	6.75E-04	8.80E-02
Potassium-40	2.53E+02	6.86E-03	2.82E-04	7.14E-03	6.90E-03	5.28E-04	7.42E-03	6.86E-03	2.32E-04	7.09E-03	6.90E-03	5.28E-04	7.42E-03	6.86E-03	7.04E-05	6.93E-03
Plutonium-238	1.08E+00	9.66E-06	7.88E-10	9.66E-06	1.52E-05	1.48E-09	1.52E-05	1.52E-05	6.50E-10	1.52E-05	1.52E-05	1.48E-09	1.52E-05	1.52E-05	1.97E-10	1.52E-05
Radium-224	2.10E+01	7.28E-01	2.35E-04	7.28E-01	1.31E+00	4.40E-04	1.31E+00	1.31E+00	1.93E-04	1.31E+00	1.31E+00	4.40E-04	1.31E+00	1.31E+00	5.86E-05	1.31E+00
Radium-228	2.09E+01	2.32E-05		2.32E-05	4.17E-05		4.17E-05	4.17E-05		4.17E-05	4.17E-05		4.17E-05	4.17E-05		4.17E-05
Strontium-90	5.26E+02	4.11E-01	1.27E-05	4.11E-01	7.43E-01	2.38E-05	7.43E-01	7.43E-01	1.05E-05	7.43E-01	7.43E-01	2.38E-05	7.43E-01	7.43E-01	3.18E-06	7.43E-01
Thorium-228	9.03E-01	2.57E-03	1.01E-05	2.58E-03	4.58E-03	1.89E-05	4.60E-03	4.58E-03	8.33E-06	4.59E-03	4.58E-03	1.89E-05	4.60E-03	4.58E-03	2.52E-06	4.59E-03
Thorium-230	7.07E-01	2.94E-04	1.78E-09	2.94E-04	5.24E-04	3.34E-09	5.24E-04	5.24E-04	1.47E-09	5.24E-04	5.24E-04	3.34E-09	5.24E-04	5.24E-04	4.46E-10	5.24E-04
Thorium-232	5.69E-01	2.04E-04	3.79E-06	2.07E-04	3.63E-04	7.10E-06	3.71E-04	3.63E-04	3.13E-06	3.66E-04	3.63E-04	7.10E-06	3.71E-04	3.63E-04	9.47E-07	3.64E-04
Thorium-234	2.66E+02	1.09E+00	1.30E-05	1.09E+00	1.41E+00	2.44E-05	1.41E+00	1.41E+00	1.07E-05	1.41E+00	1.41E+00	2.44E-05	1.41E+00	1.41E+00	3.25E-06	1.41E+00
Tritium	2.30E+06	1.09E+00		1.09E+00	1.41E+00		1.41E+00	1.41E+00		1.41E+00	1.41E+00		1.41E+00	1.41E+00		1.41E+00
Uranium-234	6.62E-01	3.13E-04	7.41E-10	3.13E-04	5.32E-04	1.39E-09	5.32E-04	5.32E-04	6.12E-10	5.32E-04	5.32E-04	1.39E-09	5.32E-04	5.32E-04	1.85E-10	5.32E-04
Total		3.55E+00	3.60E-03	3.55E+00	5.30E+00	6.76E-03	5.31E+00	5.28E+00	2.97E-03	5.28E+00	5.30E+00	6.76E-03	5.31E+00	5.28E+00	9.01E-04	5.28E+00

Table 9.7 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Mink Internal	Mink External	Mink Total	Otter Internal	Otter External	Otter Total	Kingfisher Internal	Kingfisher External	Kingfisher Total	Heron Internal	Heron External	Heron Total	Osprey Internal	Osprey External	Osprey Total
W6MS1																
Cesium-137	3.45E+00	1.31E-01	1.31E-05	1.31E-01	2.50E-01	2.46E-05	2.50E-01	2.40E-01	1.08E-05	2.40E-01	2.50E-01	2.46E-05	2.50E-01	2.40E-01	3.28E-06	2.40E-01
Europium-154	3.42E+00	4.08E-04	2.91E-05	4.37E-04	7.91E-04	5.46E-05	8.45E-04	7.35E-04	2.40E-05	7.59E-04	7.91E-04	5.46E-05	8.45E-04	7.35E-04	7.28E-06	7.42E-04
Radium-224	1.83E+01	6.34E-01	2.04E-04	6.35E-01	1.14E+00	3.83E-04	1.14E+00	1.14E+00	1.69E-04	1.14E+00	1.14E+00	3.83E-04	1.14E+00	1.14E+00	5.11E-05	1.14E+00
Strontium-90	3.30E+00	2.58E-03	7.97E-08	2.58E-03	4.66E-03	1.50E-07	4.66E-03	4.66E-03	6.58E-08	4.66E-03	4.66E-03	1.50E-07	4.66E-03	4.66E-03	1.99E-08	4.66E-03
Tritium	5.57E+05	2.65E-01		2.65E-01	3.42E-01		3.42E-01	3.42E-01		3.42E-01	3.42E-01		3.42E-01	3.42E-01		3.42E-01
Total		1.03E+00	2.47E-04	1.03E+00	1.74E+00	4.63E-04	1.74E+00	1.73E+00	2.04E-04	1.73E+00	1.74E+00	4.63E-04	1.74E+00	1.73E+00	6.17E-05	1.73E+00
WOC																
Cobalt-60	2.35E+00	5.12E-03	4.12E-05	5.16E-03	1.07E-02	7.73E-05	1.08E-02	9.35E-03	3.40E-05	9.38E-03	1.07E-02	7.73E-05	1.08E-02	9.35E-03	1.03E-05	9.36E-03
Cesium-137	1.01E+02	3.84E+00	3.85E-04	3.84E+00	7.32E+00	7.21E-04	7.32E+00	7.02E+00	3.17E-04	7.02E+00	7.32E+00	7.21E-04	7.32E+00	7.02E+00	9.61E-05	7.02E+00
Strontium-90	1.31E+02	1.02E-01	3.17E-06	1.02E-01	1.85E-01	5.94E-06	1.85E-01	1.85E-01	2.61E-06	1.85E-01	1.85E-01	5.94E-06	1.85E-01	1.85E-01	7.91E-07	1.85E-01
Tritium	5.28E+04	2.51E-02		2.51E-02	3.24E-02		3.24E-02	3.24E-02		3.24E-02	3.24E-02		3.24E-02	3.24E-02		3.24E-02
Total		3.97E+00	4.29E-04	3.97E+00	7.54E+00	8.04E-04	7.54E+00	7.25E+00	3.54E-04	7.25E+00	7.54E+00	8.04E-04	7.54E+00	7.25E+00	1.07E-04	7.25E+00
WOCE																
Cobalt-60	4.66E+00	1.02E-02	8.17E-05	1.02E-02	2.12E-02	1.53E-04	2.14E-02	1.85E-02	6.74E-05	1.86E-02	2.12E-02	1.53E-04	2.14E-02	1.85E-02	2.04E-05	1.86E-02
Cesium-137	6.10E+01	2.32E+00	2.32E-04	2.32E+00	4.42E+00	4.35E-04	4.42E+00	4.24E+00	1.92E-04	4.24E+00	4.42E+00	4.35E-04	4.42E+00	4.24E+00	5.81E-05	4.24E+00
Strontium-90	4.27E+01	3.34E-02	1.03E-06	3.34E-02	6.03E-02	1.93E-06	6.03E-02	6.03E-02	8.51E-07	6.03E-02	6.03E-02	1.93E-06	6.03E-02	6.03E-02	2.58E-07	6.03E-02
Tritium	6.38E+04	3.03E-02		3.03E-02	3.92E-02		3.92E-02	3.92E-02		3.92E-02	3.92E-02		3.92E-02	3.92E-02		3.92E-02
Total		2.39E+00	3.15E-04	2.39E+00	4.54E+00	5.91E-04	4.54E+00	4.36E+00	2.60E-04	4.36E+00	4.54E+00	5.91E-04	4.54E+00	4.36E+00	7.87E-05	4.36E+00
West Seep																
Strontium-90	5.10E+00	3.99E-03	1.23E-07	3.99E-03	7.21E-03	2.31E-07	7.21E-03	7.21E-03	1.02E-07	7.21E-03	7.21E-03	2.31E-07	7.21E-03	7.21E-03	3.08E-08	7.21E-03
Tritium	1.69E+05	8.03E-02		8.03E-02	1.04E-01		1.04E-01	1.04E-01		1.04E-01	1.04E-01		1.04E-01	1.04E-01		1.04E-01
Total		8.43E-02	1.23E-07	8.43E-02	1.11E-01	2.31E-07	1.11E-01	1.11E-01	1.02E-07	1.11E-01	1.11E-01	2.31E-07	1.11E-01	1.11E-01	3.08E-08	1.11E-01

[a] Dose from each radionuclide includes all short-lived daughter products

[b] Representative concentration is the minimum of the UCL95 and the maximum detect.

Table 9.8 Estimated radiation doses (mrad/d) to aquatic organisms exposed to radionuclides in surfacewater at WOC

Radionuclide[a]	Soil Activity[b] (pCi/L)	Large invertebrates Internal	External	Total	Large fish Internal	External	Total
East Seep							
Americium-241	9.40E-01	2.77E-04	1.59E-09	2.77E-04	8.33E-06	9.92E-10	8.33E-06
Cesium-137	9.59E+00	1.30E-04	2.87E-07	1.31E-04	3.18E-04	2.58E-07	3.18E-04
Cobalt-60	5.75E+02	3.59E-02	7.61E-05	3.60E-02	2.73E-03	7.06E-05	2.80E-03
Curium-243	2.82E+00	8.92E-04	2.00E-08	8.92E-04	2.68E-05	1.77E-08	2.69E-05
Plutonium-238	5.00E-02	1.47E-06	1.97E-12	1.47E-06	5.86E-08	3.20E-13	5.86E-08
Strontium-90	4.96E+01	8.97E-04		8.97E-04	1.79E-04		1.79E-04
Thorium-228	1.10E+00	9.63E-04	9.04E-08	9.63E-04	5.80E-05	8.28E-08	5.81E-05
Thorium-230	1.50E-01	1.87E-05	5.92E-12	1.87E-05	1.12E-06	9.59E-13	1.12E-06
Thorium-232	3.00E-02	3.61E-06	1.54E-09	3.61E-06	2.21E-07	1.40E-09	2.22E-07
Tritium	3.01E+04	9.63E-06		9.63E-06	9.63E-06		9.63E-06
Uranium-232	2.25E+02	6.38E-03	8.87E-09	6.38E-03	6.38E-04	1.44E-09	6.38E-04
Uranium-234	4.14E+03	1.05E-01	1.63E-07	1.05E-01	1.05E-02	2.65E-08	1.05E-02
Uranium-235	1.50E+01	3.69E-04	1.43E-07	3.69E-04	3.71E-05	1.18E-07	3.72E-05
Uranium-238	1.01E+02	2.74E-03	6.79E-08	2.74E-03	2.75E-04	2.68E-08	2.75E-04
Total		1.54E-01	7.69E-05	1.54E-01	1.48E-02	7.11E-05	1.49E-02
HF-2							
Americium-241	8.12E-02	2.39E-05	1.37E-10	2.39E-05	7.20E-07	8.57E-11	7.20E-07
Carbon-14	2.36E+02	2.24E-03		2.24E-03	2.80E-03		2.80E-03
Cesium-137	5.31E+00	7.22E-05	1.59E-07	7.23E-05	1.76E-04	1.43E-07	1.76E-04
Cobalt-60	7.96E+00	4.98E-04	1.05E-06	4.99E-04	3.78E-05	9.77E-07	3.88E-05
Iodine-129	9.60E+02	1.37E-03	1.14E-06	1.37E-03	1.61E-04	5.37E-07	1.61E-04
Radium-228	1.52E+01	4.13E-06		4.13E-06	6.89E-07		6.89E-07
Strontium-90	2.15E+01	3.89E-04		3.89E-04	7.78E-05		7.78E-05
Technetium-99	6.23E+00	1.68E-07		1.68E-07	6.71E-07		6.71E-07
Thorium-228	8.24E-01	7.21E-04	6.77E-08	7.21E-04	4.34E-05	6.20E-08	4.35E-05
Thorium-230	3.57E+00	4.46E-04	1.41E-10	4.46E-04	2.68E-05	2.28E-11	2.68E-05
Thorium-232	1.34E+00	1.61E-04	6.87E-08	1.61E-04	9.85E-06	6.24E-08	9.91E-06
Tritium	1.32E+04	4.22E-06		4.22E-06	4.22E-06		4.22E-06
Uranium-233/234	8.12E-01	2.09E-05	1.60E-11	2.09E-05	2.09E-06	2.60E-12	2.09E-06
Uranium-238	7.39E-01	2.01E-05	4.97E-10	2.01E-05	2.01E-06	1.96E-10	2.01E-06
Total		5.97E-03	2.49E-06	5.97E-03	3.35E-03	1.78E-06	3.35E-03
HFIR East							
Strontium-90	7.00E+00	1.27E-04		1.27E-04	2.53E-05		2.53E-05
Tritium	2.00E+03	6.40E-07		6.40E-07	6.40E-07		6.40E-07
Total		1.27E-04	0.00E+00	1.27E-04	2.60E-05	0.00E+00	2.60E-05
HRE							
Americium-241	3.03E+00	8.93E-04	5.12E-09	8.93E-04	2.69E-05	3.20E-09	2.69E-05
Calcium-45	9.90E+02	1.63E-04		1.63E-04	1.63E-04		1.63E-04
Carbon-14	4.61E+02	4.38E-03		4.38E-03	5.48E-03		5.48E-03

Table 9.8 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Large invertebrates Internal	External	Total	Large fish Internal	External	Total
Curium-244	5.76E-01	1.78E-04	2.27E-11	1.78E-04	5.35E-06	3.68E-12	5.35E-06
Strontium-90	1.87E+03	3.38E-02		3.38E-02	6.76E-03		6.76E-03
Technetium-99	1.25E+01	3.36E-07		3.36E-07	1.35E-06		1.35E-06
Thorium-228	1.39E+00	1.22E-03	1.14E-07	1.22E-03	7.33E-05	1.05E-07	7.34E-05
Thorium-230	3.27E+00	4.08E-04	1.29E-10	4.08E-04	2.45E-05	2.09E-11	2.45E-05
Thorium-232	2.87E+00	3.45E-04	1.47E-07	3.45E-04	2.11E-05	1.34E-07	2.12E-05
Tritium	1.26E+03	4.03E-07		4.03E-07	4.03E-07		4.03E-07
Uranium-233/234	1.37E-01	3.52E-06	2.70E-12	3.52E-06	3.52E-07	4.38E-13	3.52E-07
Total		4.14E-02	2.67E-07	4.14E-02	1.26E-02	2.42E-07	1.26E-02
Intermediate Pond							
Cesium-137	1.09E+02	1.48E-03	3.26E-06	1.48E-03	3.62E-03	2.93E-06	3.62E-03
Cobalt-60	4.58E+00	2.86E-04	6.06E-07	2.87E-04	2.18E-05	5.62E-07	2.23E-05
Strontium-90	1.36E+03	2.46E-02		2.46E-02	4.92E-03		4.92E-03
Tritium	1.08E+06	3.45E-04		3.45E-04	3.45E-04		3.45E-04
Total		2.67E-02	3.87E-06	2.67E-02	8.90E-03	3.49E-06	8.90E-03
Lower WOC							
Carbon-14	5.26E+04	5.00E-01		5.00E-01	6.25E-01		6.25E-01
Cesium-137	4.88E+01	6.63E-04	1.46E-06	6.65E-04	1.62E-03	1.31E-06	1.62E-03
Cobalt-60	8.08E+01	5.05E-03	1.07E-05	5.06E-03	3.84E-04	9.92E-06	3.94E-04
Plutonium-238	2.00E-01	5.86E-06	7.89E-12	5.86E-06	2.35E-07	1.28E-12	2.35E-07
Strontium-90	1.62E+04	2.93E-01		2.93E-01	5.86E-02		5.86E-02
Thorium-228	1.30E+00	1.14E-03	1.07E-07	1.14E-03	6.85E-05	9.79E-08	6.86E-05
Thorium-230	2.20E-01	2.75E-05	8.68E-12	2.75E-05	1.65E-06	1.41E-12	1.65E-06
Tritium	1.29E+06	4.13E-04		4.13E-04	4.13E-04		4.13E-04
Uranium-234	1.59E+00	4.04E-05	6.27E-11	4.04E-05	4.04E-06	1.02E-11	4.04E-06
Uranium-238	6.50E-01	1.76E-05	4.37E-10	1.76E-05	1.77E-06	1.72E-10	1.77E-06
Total		8.00E-01	1.23E-05	8.00E-01	6.86E-01	1.13E-05	6.86E-01
MB-15							
Cesium-137	2.70E+01	3.67E-04	8.07E-07	3.68E-04	8.96E-04	7.26E-07	8.96E-04
Cobalt-60	4.90E+02	3.06E-02	6.49E-05	3.07E-02	2.33E-03	6.02E-05	2.39E-03
Strontium-90	2.72E+01	4.92E-04		4.92E-04	9.84E-05		9.84E-05
Tritium	7.68E+04	2.46E-05		2.46E-05	2.46E-05		2.46E-05
Total		3.15E-02	6.57E-05	3.16E-02	3.35E-03	6.09E-05	3.41E-03
MV Drive							
Strontium-90	1.80E+01	3.26E-04		3.26E-04	6.51E-05		6.51E-05
Tritium	2.00E+03	6.40E-07		6.40E-07	6.40E-07		6.40E-07
Total		3.26E-04	0.00E+00	3.26E-04	6.57E-05	0.00E+00	6.57E-05
Pit 4 South							
Cesium-137	5.66E+00	7.69E-05	1.69E-07	7.71E-05	1.88E-04	1.52E-07	1.88E-04
Cobalt-60	1.80E+02	1.13E-02	2.38E-05	1.13E-02	8.56E-04	2.21E-05	8.78E-04

Table 9.8 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Large invertebrates Internal	External	Total	Large fish Internal	External	Total
Strontium-90	3.43E+03	6.20E-02		6.20E-02	1.24E-02		1.24E-02
Tritium	3.00E+04	9.59E-06		9.59E-06	9.59E-06		9.59E-06
Total		7.34E-02	2.40E-05	7.34E-02	1.35E-02	2.23E-05	1.35E-02
SWSA 5 Seep A							
Americium-241	1.37E+00	4.04E-04	2.31E-09	4.04E-04	1.21E-05	1.45E-09	1.21E-05
Calcium-45	4.60E+01	7.55E-06		7.55E-06	7.55E-06		7.55E-06
Carbon-14	4.73E+04	4.50E-01		4.50E-01	5.62E-01		5.62E-01
Cesium-137	5.66E+00	7.69E-05	1.69E-07	7.71E-05	1.88E-04	1.52E-07	1.88E-04
Curium-244	3.20E+00	9.90E-04	1.26E-10	9.90E-04	2.97E-05	2.05E-11	2.97E-05
Plutonium-238	3.70E-01	1.08E-05	1.46E-11	1.08E-05	4.34E-07	2.37E-12	4.34E-07
Potassium-40	1.33E+02		1.10E-06	1.10E-06		9.73E-07	9.73E-07
Radium-226	1.48E-01	5.90E-05	1.38E-08	5.90E-05	9.88E-06	1.27E-08	9.90E-06
Radium-228	1.34E+01	3.64E-06		3.64E-06	6.07E-07		6.07E-07
Strontium-90	3.43E+03	6.20E-02		6.20E-02	1.24E-02		1.24E-02
Technetium-99	1.15E+02	3.10E-06		3.10E-06	1.24E-05		1.24E-05
Thorium-228	3.32E-01	2.91E-04	2.73E-08	2.91E-04	1.75E-05	2.50E-08	1.75E-05
Thorium-230	7.39E-01	9.23E-05	2.91E-11	9.23E-05	5.54E-06	4.73E-12	5.54E-06
Thorium-232	5.03E+00	6.05E-04	2.58E-07	6.05E-04	3.70E-05	2.34E-07	3.72E-05
Thorium-234	5.99E+02	1.30E-03	1.11E-07	1.30E-03	3.34E-04	1.79E-08	3.34E-04
Tin-119	1.90E+01						
Tin-119m	1.90E+01	2.56E-04	4.68E-09	2.56E-04	2.68E-04	6.68E-10	2.68E-04
Tritium	3.00E+04	9.59E-06		9.59E-06	9.59E-06		9.59E-06
Uranium-233/234	2.03E-01	5.22E-06	4.00E-12	5.22E-06	5.22E-07	6.49E-13	5.22E-07
Uranium-238	1.70E-01	4.61E-06	1.14E-10	4.62E-06	4.62E-07	4.50E-11	4.62E-07
Total		5.16E-01	1.68E-06	5.16E-01	5.75E-01	1.42E-06	5.75E-01
SWSA 5 Seep B West							
Calcium-45	1.50E+04	2.46E-03		2.46E-03	2.46E-03		2.46E-03
Carbon-14	5.66E+05	5.38E+00		5.38E+00	6.73E+00		6.73E+00
Strontium-90	7.10E+03	1.28E-01		1.28E-01	2.57E-02		2.57E-02
Technetium-99	1.58E+03	4.25E-05		4.25E-05	1.70E-04		1.70E-04
Thorium-228	2.90E-01	2.54E-04	2.38E-08	2.54E-04	1.53E-05	2.18E-08	1.53E-05
Tritium	1.12E+07	3.58E-03		3.58E-03	3.58E-03		3.58E-03
Uranium-233/234	5.28E+02	1.36E-02	1.04E-08	1.36E-02	1.36E-03	1.69E-09	1.36E-03
Uranium-238	1.82E+00	4.94E-05	1.22E-09	4.94E-05	4.95E-06	4.82E-10	4.95E-06
Total		5.53E+00	3.55E-08	5.53E+00	6.76E+00	2.40E-08	6.76E+00
SWSA 5 Seep B East							
Strontium-90	1.14E+03	2.06E-02		2.06E-02	4.12E-03		4.12E-03
Tritium	2.62E+06	8.38E-04		8.38E-04	8.38E-04		8.38E-04
Total		2.15E-02	0.00E+00	2.15E-02	4.96E-03	0.00E+00	4.96E-03
SWSA 5 Seep C							
Americium-241	2.08E+00	6.13E-04	3.51E-09	6.13E-04	1.84E-05	2.20E-09	1.84E-05

Table 9.8 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Large invertebrates Internal	External	Total	Large fish Internal	External	Total
Calcium-45	7.11E+03	1.17E-03		1.17E-03	1.17E-03		1.17E-03
Carbon-14	2.49E+06	2.37E+01		2.37E+01	2.96E+01		2.96E+01
Cesium-137	2.20E+00	2.99E-05	6.58E-08	3.00E-05	7.30E-05	5.92E-08	7.30E-05
Curium-243	1.51E+01	4.78E-03	1.07E-07	4.78E-03	1.44E-04	9.49E-08	1.44E-04
Plutonium-238	4.50E-01	1.32E-05	1.77E-11	1.32E-05	5.28E-07	2.88E-12	5.28E-07
Potassium-40	1.50E+02		1.24E-06	1.24E-06		1.10E-06	1.10E-06
Strontium-90	1.19E+05	2.15E+00		2.15E+00	4.30E-01		4.30E-01
Technetium-99	1.64E+03	4.41E-05		4.41E-05	1.77E-04		1.77E-04
Thorium-228	6.80E-01	5.95E-04	5.59E-08	5.95E-04	3.59E-05	5.12E-08	3.59E-05
Thorium-230	8.00E-02	9.99E-06	3.16E-12	9.99E-06	6.00E-07	5.12E-13	6.00E-07
Thorium-232	3.25E-02	3.91E-06	1.67E-09	3.91E-06	2.39E-07	1.51E-09	2.40E-07
Tritium	3.52E+06	1.13E-03		1.13E-03	1.13E-03		1.13E-03
Uranium-233/234	7.90E-01	2.03E-05	1.56E-11	2.03E-05	2.03E-06	2.53E-12	2.03E-06
Uranium-234	3.00E-02	7.63E-07	1.18E-12	7.63E-07	7.63E-08	1.92E-13	7.63E-08
Uranium-235	1.00E-02	2.46E-07	9.51E-11	2.46E-07	2.48E-08	7.90E-11	2.48E-08
Uranium-238	3.82E-01	1.04E-05	2.57E-10	1.04E-05	1.04E-06	1.01E-10	1.04E-06
Total		2.58E+01	1.47E-06	2.58E+01	3.00E+01	1.31E-06	3.00E+01
SWSA 5 Trib 1							
Americium-241	1.20E-01	3.54E-05	2.03E-10	3.54E-05	1.06E-06	1.27E-10	1.06E-06
Carbon-14	4.42E+03	4.20E-02		4.20E-02	5.25E-02		5.25E-02
Cesium-137	1.54E+01	2.09E-04	4.60E-07	2.10E-04	5.11E-04	4.14E-07	5.11E-04
Cobalt-60	1.27E+02	7.94E-03	1.68E-05	7.96E-03	6.04E-04	1.56E-05	6.19E-04
Curium-244	1.86E+00	5.76E-04	7.34E-11	5.76E-04	1.73E-05	1.19E-11	1.73E-05
Lead-212	2.12E+01	9.80E-04	1.74E-06	9.82E-04	2.98E-03	1.60E-06	2.98E-03
Plutonium-238	9.31E-01	2.73E-05	3.67E-11	2.73E-05	1.09E-06	5.95E-12	1.09E-06
Potassium-40	1.31E+02		1.08E-06	1.08E-06		9.59E-07	9.59E-07
Radium-226	2.77E-01	1.10E-04	2.57E-08	1.10E-04	1.85E-05	2.39E-08	1.85E-05
Radium-228	5.66E+01	1.54E-05		1.54E-05	2.56E-06		2.56E-06
Ruthenium-103	2.60E+01	3.31E-05	6.43E-07	3.38E-05	1.69E-06	5.85E-07	2.27E-06
Strontium-90	1.77E+02	3.20E-03		3.20E-03	6.40E-04		6.40E-04
Technetium-99	2.21E+01	5.95E-07		5.95E-07	2.38E-06		2.38E-06
Thorium-228	5.26E-01	4.60E-04	4.32E-08	4.60E-04	2.77E-05	3.96E-08	2.78E-05
Thorium-232	2.76E-01	3.32E-05	1.41E-08	3.32E-05	2.03E-06	1.29E-08	2.04E-06
Thorium-234	1.60E+03	3.54E-03	2.98E-07	3.54E-03	9.52E-04	4.80E-08	9.52E-04
Tin-119	5.50E+01						
Tin-119m	5.50E+01	7.42E-04	1.35E-08	7.42E-04	7.77E-04	1.93E-09	7.77E-04
Tritium	1.36E+05	4.35E-05		4.35E-05	4.35E-05		4.35E-05
Uranium-232	1.36E+01	3.86E-04	5.36E-10	3.86E-04	3.86E-05	8.70E-11	3.86E-05
Uranium-233/234	2.99E+02	7.69E-03	5.90E-09	7.69E-03	7.69E-04	9.56E-10	7.69E-04
Uranium-235	1.49E+01	3.66E-04	1.42E-07	3.67E-04	3.69E-05	1.18E-07	3.70E-05
Uranium-235/236	3.20E+00	7.58E-05	2.64E-08	7.59E-05	7.61E-06	2.34E-08	7.64E-06
Uranium-238	1.10E+03	2.99E-02	7.39E-07	2.99E-02	2.99E-03	2.91E-07	2.99E-03
Total		9.83E-02	2.20E-05	9.84E-02	6.29E-02	1.97E-05	6.30E-02

Table 9.8 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Large invertebrates Internal	External	Total	Large fish Internal	External	Total
SWSA 5 WOC							
Americium-241	3.90E-01	1.15E-04	6.59E-10	1.15E-04	3.46E-06	4.12E-10	3.46E-06
Carbon-14	5.90E+03	5.61E-02		5.61E-02	7.01E-02		7.01E-02
Cesium-137	3.16E+04	4.29E-01	9.45E-04	4.30E-01	1.05E+00	8.50E-04	1.05E+00
Cobalt-60	1.54E+02	9.63E-03	2.04E-05	9.65E-03	7.32E-04	1.89E-05	7.51E-04
Curium-244	1.62E+01	5.01E-03	6.39E-10	5.01E-03	1.50E-04	1.04E-10	1.50E-04
Plutonium-238	7.00E-01	2.05E-05	2.76E-11	2.05E-05	8.21E-07	4.48E-12	8.21E-07
Potassium-40	6.22E+01		5.13E-07	5.13E-07		4.55E-07	4.55E-07
Radium-228	2.70E+01	7.34E-06		7.34E-06	1.22E-06		1.22E-06
Strontium-90	2.57E+02	4.65E-03		4.65E-03	9.30E-04		9.30E-04
Technetium-99	3.95E+01	1.06E-06		1.06E-06	4.25E-06		4.25E-06
Thorium-228	8.92E-01	7.81E-04	7.33E-08	7.81E-04	4.70E-05	6.72E-08	4.71E-05
Thorium-230	5.10E-01	6.37E-05	2.01E-11	6.37E-05	3.82E-06	3.26E-12	3.82E-06
Tritium	3.10E+04	9.91E-06		9.91E-06	9.91E-06		9.91E-06
Uranium-232	3.70E+00	1.05E-04	1.46E-10	1.05E-04	1.05E-05	2.37E-11	1.05E-05
Uranium-233/234	9.32E+01	2.40E-03	1.84E-09	2.40E-03	2.40E-04	2.98E-10	2.40E-04
Uranium-235/236	3.80E-01	9.01E-06	3.13E-09	9.01E-06	9.04E-07	2.78E-09	9.07E-07
Uranium-238	8.90E-01	2.42E-05	5.98E-10	2.42E-05	2.42E-06	2.36E-10	2.42E-06
Total		5.08E-01	9.66E-04	5.09E-01	1.12E+00	8.70E-04	1.12E+00
SWSA 4 Main							
Carbon-14	2.64E+04	2.51E-01		2.51E-01	3.14E-01		3.14E-01
Cesium-137	2.85E+02	3.87E-03	8.52E-06	3.88E-03	9.45E-03	7.67E-06	9.46E-03
Lead-214	5.95E+03	2.75E-01	5.52E-04	2.75E-01	8.36E-01	5.12E-04	8.36E-01
Plutonium-238	1.60E-01	4.69E-06	6.31E-12	4.69E-06	1.88E-07	1.02E-12	1.88E-07
Strontium-90	1.24E+04	2.24E-01		2.24E-01	4.49E-02		4.49E-02
Thorium-228	3.21E+00	2.81E-03	2.64E-07	2.81E-03	1.69E-04	2.42E-07	1.69E-04
Thorium-230	2.77E-01	3.46E-05	1.09E-11	3.46E-05	2.08E-06	1.77E-12	2.08E-06
Thorium-232	4.00E-02	4.81E-06	2.05E-09	4.81E-06	2.94E-07	1.86E-09	2.96E-07
Tritium	1.09E+07	3.49E-03		3.49E-03	3.49E-03		3.49E-03
Uranium-232	3.08E+00	8.73E-05	1.21E-10	8.73E-05	8.73E-06	1.97E-11	8.73E-06
Uranium-234	1.60E+02	4.07E-03	6.31E-09	4.07E-03	4.07E-04	1.02E-09	4.07E-04
Uranium-235	5.16E+00	1.27E-04	4.91E-08	1.27E-04	1.28E-05	4.08E-08	1.28E-05
Uranium-238	8.23E+01	2.23E-03	5.53E-08	2.23E-03	2.24E-04	2.18E-08	2.24E-04
Total		7.66E-01	5.61E-04	7.67E-01	1.21E+00	5.20E-04	1.21E+00
SWSA 5 N WOC							
Carbon-14	2.74E+02	2.60E-03		2.60E-03	3.26E-03		3.26E-03
Cesium-137	1.08E+01	1.47E-04	3.23E-07	1.47E-04	3.58E-04	2.91E-07	3.58E-04
Potassium-40	8.12E+01		6.70E-07	6.70E-07		5.94E-07	5.94E-07
Strontium-90	8.37E+01	1.51E-03		1.51E-03	3.03E-04		3.03E-04
Thorium-232	2.91E+01	3.50E-03	1.49E-06	3.50E-03	2.14E-04	1.36E-06	2.15E-04
Tritium	7.59E+03	2.43E-06		2.43E-06	2.43E-06		2.43E-06
Uranium-238	9.21E-01	2.50E-05	6.19E-10	2.50E-05	2.50E-06	2.44E-10	2.50E-06
Total		7.79E-03	2.48E-06	7.79E-03	4.14E-03	2.24E-06	4.14E-03

Table 9.8 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Large invertebrates Internal	External	Total	Large fish Internal	External	Total
SWSA 6 East							
Americium-241	1.00E+00	2.95E-04	1.69E-09	2.95E-04	8.87E-06	1.06E-09	8.87E-06
Cesium-137	1.62E+01	2.20E-04	4.84E-07	2.21E-04	5.37E-04	4.36E-07	5.38E-04
Cobalt-60	5.50E+02	3.44E-02	7.28E-05	3.45E-02	2.61E-03	6.75E-05	2.68E-03
Plutonium-238	1.00E+00	2.93E-05	3.94E-11	2.93E-05	1.17E-06	6.40E-12	1.17E-06
Strontium-90	5.00E+00	9.04E-05		9.04E-05	1.81E-05		1.81E-05
Thorium-228	1.00E+00	8.75E-04	8.22E-08	8.75E-04	5.27E-05	7.53E-08	5.28E-05
Thorium-230	1.00E+00	1.25E-04	3.94E-11	1.25E-04	7.50E-06	6.40E-12	7.50E-06
Thorium-232	1.00E+00	1.20E-04	5.13E-08	1.20E-04	7.35E-06	4.66E-08	7.40E-06
Tritium	1.90E+05	6.08E-05		6.08E-05	6.08E-05		6.08E-05
Uranium-234	1.00E+00	2.54E-05	3.94E-11	2.54E-05	2.54E-06	6.40E-12	2.54E-06
Uranium-235/236	1.00E+00	2.37E-05	8.25E-09	2.37E-05	2.38E-06	7.32E-09	2.39E-06
Uranium-238	1.00E+00	2.71E-05	6.72E-10	2.71E-05	2.72E-06	2.65E-10	2.72E-06
Total		3.63E-02	7.34E-05	3.63E-02	3.32E-03	6.81E-05	3.38E-03
W6MS3							
Americium-241	1.23E+00	3.63E-04	2.08E-09	3.63E-04	1.09E-05	1.30E-09	1.09E-05
Cesium-137	1.44E+01	1.96E-04	4.31E-07	1.96E-04	4.78E-04	3.87E-07	4.78E-04
Cobalt-60	1.71E+00	1.07E-04	2.26E-07	1.07E-04	8.13E-06	2.10E-07	8.34E-06
Curium-242	7.88E+00	2.57E-03	3.11E-10	2.57E-03	7.70E-05	5.04E-11	7.70E-05
Curium-244	1.35E+02	4.18E-02	5.32E-09	4.18E-02	1.25E-03	8.63E-10	1.25E-03
Europium-152	2.78E+01	1.12E-05	1.69E-06	1.28E-05	1.71E-05	1.57E-06	1.87E-05
Europium-154	5.74E+00	4.66E-06	3.76E-07	5.03E-06	5.99E-06	3.50E-07	6.34E-06
Europium-155	1.15E+01	1.95E-06	3.70E-08	1.99E-06	2.12E-06	3.37E-08	2.15E-06
Europium-156	2.89E+02						
Plutonium-238	1.47E+00	4.31E-05	5.80E-11	4.31E-05	1.72E-06	9.40E-12	1.72E-06
Potassium-40	2.52E+02		2.08E-06	2.08E-06		1.84E-06	1.84E-06
Radium-224	2.10E+01	9.21E-03	1.72E-06	9.21E-03	1.54E-03	1.58E-06	1.54E-03
Radium-226	1.00E+00	3.99E-04	9.29E-08	3.99E-04	6.68E-05	8.61E-08	6.69E-05
Radium-228	2.18E+01	5.93E-06		5.93E-06	9.88E-07		9.88E-07
Strontium-90	4.70E+02	8.50E-03		8.50E-03	1.70E-03		1.70E-03
Thorium-228	1.19E+00	1.04E-03	9.78E-08	1.04E-03	6.27E-05	8.96E-08	6.28E-05
Thorium-230	1.13E+00	1.41E-04	4.46E-11	1.41E-04	8.47E-06	7.23E-12	8.47E-06
Thorium-232	1.02E+00	1.23E-04	5.23E-08	1.23E-04	7.50E-06	4.75E-08	7.55E-06
Thorium-234	2.66E+02	7.88E-03	4.73E-08	7.88E-03	7.42E-03	7.66E-09	7.42E-03
Tritium	2.31E+07	7.39E-03		7.39E-03	7.39E-03		7.39E-03
Uranium-234	1.11E+00	2.82E-05	4.38E-11	2.82E-05	2.82E-06	7.10E-12	2.82E-06
Uranium-235/236	1.00E+00	2.37E-05	8.25E-09	2.37E-05	2.38E-06	7.32E-09	2.39E-06
Uranium-238	1.00E+00	2.71E-05	6.72E-10	2.71E-05	2.72E-06	2.65E-10	2.72E-06
Total		7.98E-02	6.87E-06	7.98E-02	2.01E-02	6.22E-06	2.01E-02
W6MS1							
Americium-241	1.00E+00	2.95E-04	1.69E-09	2.95E-04	8.87E-06	1.06E-09	8.87E-06
Cesium-137	6.15E+00	8.36E-05	1.84E-07	8.38E-05	2.04E-04	1.65E-07	2.04E-04

Table 9.8 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Large invertebrates Internal	External	Total	Large fish Internal	External	Total
Cobalt-60	1.35E+00	8.44E-05	1.79E-07	8.46E-05	6.42E-06	1.66E-07	6.58E-06
Europium-154	3.42E+00	2.77E-06	2.24E-07	3.00E-06	3.57E-06	2.08E-07	3.78E-06
Plutonium-238	1.00E+00	2.93E-05	3.94E-11	2.93E-05	1.17E-06	6.40E-12	1.17E-06
Radium-224	1.83E+01	8.02E-03	1.50E-06	8.03E-03	1.34E-03	1.38E-06	1.34E-03
Radium-226	1.00E+00	3.99E-04	9.29E-08	3.99E-04	6.68E-05	8.61E-08	6.69E-05
Radium-228	3.00E+00	8.15E-07		8.15E-07	1.36E-07		1.36E-07
Strontium-90	7.09E+00	1.28E-04		1.28E-04	2.56E-05		2.56E-05
Thorium-228	1.00E+00	8.75E-04	8.22E-08	8.75E-04	5.27E-05	7.53E-08	5.28E-05
Thorium-230	1.00E+00	1.25E-04	3.94E-11	1.25E-04	7.50E-06	6.40E-12	7.50E-06
Thorium-232	1.00E+00	1.20E-04	5.13E-08	1.20E-04	7.35E-06	4.66E-08	7.40E-06
Tritium	2.07E+06	6.62E-04		6.62E-04	6.62E-04		6.62E-04
Uranium-234	1.00E+00	2.54E-05	3.94E-11	2.54E-05	2.54E-06	6.40E-12	2.54E-06
Uranium-235/236	1.00E+00	2.37E-05	8.25E-09	2.37E-05	2.38E-06	7.32E-09	2.39E-06
Uranium-238	1.00E+00	2.71E-05	6.72E-10	2.71E-05	2.72E-06	2.65E-10	2.72E-06
Total		1.09E-02	2.33E-06	1.09E-02	2.40E-03	2.13E-06	2.40E-03
WAG 7 WOC							
Cesium-137	3.38E+02	4.59E-03	1.01E-05	4.60E-03	1.12E-02	9.09E-06	1.12E-02
Strontium-90	1.15E+03	2.08E-02		2.08E-02	4.16E-03		4.16E-03
Tritium	3.00E+03	9.59E-07		9.59E-07	9.59E-07		9.59E-07
Total		2.54E-02	1.01E-05	2.54E-02	1.54E-02	9.09E-06	1.54E-02
West Seep							
Americium-241	1.09E+01	3.21E-03	1.84E-08	3.21E-03	9.66E-05	1.15E-08	9.66E-05
Cesium-137	1.40E+01	1.90E-04	4.19E-07	1.91E-04	4.64E-04	3.77E-07	4.65E-04
Cobalt-60	5.99E+02	3.74E-02	7.93E-05	3.75E-02	2.85E-03	7.35E-05	2.92E-03
Curium-243	5.06E+01	1.60E-02	3.59E-07	1.60E-02	4.81E-04	3.18E-07	4.82E-04
Plutonium-238	9.60E-01	2.81E-05	3.79E-11	2.81E-05	1.13E-06	6.14E-12	1.13E-06
Radium-226	1.00E+00	3.99E-04	9.29E-08	3.99E-04	6.68E-05	8.61E-08	6.69E-05
Radium-228	3.00E+00	8.15E-07		8.15E-07	1.36E-07		1.36E-07
Strontium-90	8.76E+02	1.58E-02		1.58E-02	3.17E-03		3.17E-03
Thorium-228	1.00E+00	8.75E-04	8.22E-08	8.75E-04	5.27E-05	7.53E-08	5.28E-05
Thorium-230	1.00E+00	1.25E-04	3.94E-11	1.25E-04	7.50E-06	6.40E-12	7.50E-06
Thorium-232	1.00E+00	1.20E-04	5.13E-08	1.20E-04	7.35E-06	4.66E-08	7.40E-06
Tritium	1.36E+05	4.35E-05		4.35E-05	4.35E-05		4.35E-05
Uranium-232	7.15E+01	2.03E-03	2.82E-09	2.03E-03	2.03E-04	4.57E-10	2.03E-04
Uranium-234	7.65E+02	1.95E-02	3.02E-08	1.95E-02	1.95E-03	4.89E-09	1.95E-03
Uranium-235	6.22E+00	1.53E-04	5.91E-08	1.53E-04	1.54E-05	4.91E-08	1.54E-05
Uranium-235/236	1.00E+00	2.37E-05	8.25E-09	2.37E-05	2.38E-06	7.32E-09	2.39E-06
Uranium-238	3.33E+01	9.04E-04	2.24E-08	9.04E-04	9.05E-05	8.82E-09	9.05E-05
Total		9.69E-02	8.04E-05	9.69E-02	9.49E-03	7.45E-05	9.57E-03
SWSA 5 Drainage D-2							
Americium-241	9.74E+00	2.87E-03	1.64E-08	2.87E-03	8.63E-05	1.03E-08	8.64E-05
Carbon-14	1.48E+03	1.41E-02		1.41E-02	1.76E-02		1.76E-02

Table 9.8 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/L)	Large invertebrates Internal	External	Total	Large fish Internal	External	Total
Cesium-137	7.00E-01	9.51E-06	2.09E-08	9.53E-06	2.32E-05	1.88E-08	2.32E-05
Plutonium-238	1.77E+01	5.19E-04	6.98E-10	5.19E-04	2.08E-05	1.13E-10	2.08E-05
Radium-226	1.30E-01	5.18E-05	1.21E-08	5.18E-05	8.68E-06	1.12E-08	8.69E-06
Radium-228	1.52E+03	4.13E-04		4.13E-04	6.89E-05		6.89E-05
Strontium-90	1.98E+03	3.58E-02		3.58E-02	7.16E-03		7.16E-03
Technetium-99	5.90E+01	1.59E-06		1.59E-06	6.35E-06		6.35E-06
Thorium-228	6.97E-01	6.10E-04	5.73E-08	6.10E-04	3.67E-05	5.25E-08	3.68E-05
Thorium-230	1.09E+00	1.36E-04	4.30E-11	1.36E-04	8.17E-06	6.97E-12	8.17E-06
Thorium-232	1.73E-01	2.08E-05	8.87E-09	2.08E-05	1.27E-06	8.06E-09	1.28E-06
Tritium	8.47E+06	2.71E-03		2.71E-03	2.71E-03		2.71E-03
Uranium-232	1.41E-01	4.00E-06	5.56E-12	4.00E-06	4.00E-07	9.02E-13	4.00E-07
Uranium-233/234	4.13E+00	1.06E-04	8.14E-11	1.06E-04	1.06E-05	1.32E-11	1.06E-05
Uranium-238	6.65E-01	1.81E-05	4.47E-10	1.81E-05	1.81E-06	1.76E-10	1.81E-06
Total		5.73E-02	1.17E-07	5.73E-02	2.77E-02	1.01E-07	2.77E-02
WOC							
Cesium-137	9.27E+01	1.26E-03	2.77E-06	1.26E-03	3.07E-03	2.49E-06	3.08E-03
Cobalt-60	2.27E+00	1.42E-04	3.01E-07	1.42E-04	1.08E-05	2.79E-07	1.11E-05
Strontium-90	1.54E+02	2.79E-03		2.79E-03	5.57E-04		5.57E-04
Tritium	0.00E+00						
Total		4.19E-03	3.07E-06	4.19E-03	3.64E-03	2.77E-06	3.65E-03
WOCE							
Cesium-137	6.10E+01	8.29E-04	1.82E-06	8.31E-04	2.02E-03	1.64E-06	2.02E-03
Cobalt-60	4.66E+00	2.91E-04	6.17E-07	2.92E-04	2.22E-05	5.72E-07	2.27E-05
Strontium-90	4.27E+01	7.72E-04		7.72E-04	1.54E-04		1.54E-04
Tritium	6.38E+04	2.04E-05		2.04E-05	2.04E-05		2.04E-05
Total		1.91E-03	2.44E-06	1.92E-03	2.22E-03	2.21E-06	2.22E-03

[a] Dose from each radionuclide includes all short-lived daughter products

[b] Representative concentration is the minimum of the UCL95 and the maximum detect.

Table 9.9 Estimated radiation doses (mrad/d) to aquatic organisms exposed to radionuclides in sediment at WOC

Radionuclide[a]	Soil Activity[b] (pCi/g)	Large invertebrates	Large fish
Intermediate Pond			
Cobalt-60	3.20E+01	2.12E+00	9.83E-01
Cesium-137	3.44E+03	5.15E+01	2.32E+01
Total		5.36E+01	2.41E+01
Lower WOC			
Cobalt-60	5.50E+02	3.64E+01	1.69E+01
Cesium-137	5.41E+03	8.09E+01	3.64E+01
Total		1.17E+02	5.33E+01
Pit 4 South			
Cobalt-60	1.89E+02	1.25E+01	5.81E+00
Total		1.25E+01	5.81E+00
SWSA 5 Seep A			
Actinium-228	1.50E+00	3.85E-02	1.75E-02
Bismuth-214	9.10E-01	3.62E-02	1.68E-02
Carbon-14	4.50E-01		
Cesium-137	3.90E-01	5.83E-03	2.62E-03
Iodine-129	1.30E+00	7.71E-04	1.82E-04
Lead-210	2.70E+00	1.33E-04	1.08E-05
Lead-212	1.40E+00	5.74E-02	2.64E-02
Lead-214	1.00E+00	4.64E-02	2.15E-02
Potassium-40	1.30E+01	5.36E-02	2.38E-02
Radium-226	8.80E-01	4.09E-02	1.90E-02
Radium-228	1.50E+00		
Strontium-90	1.00E+00		
Thorium-228	1.20E+00	4.93E-02	2.26E-02
Thorium-232	1.50E+00	3.85E-02	1.75E-02
Thallium-208	1.10E+00	9.82E-02	4.55E-02
Thorium-234	1.80E+00	7.93E-03	3.62E-03
Tin-126	1.90E-01		
Tritium	1.14E+01		
Total		4.74E-01	2.17E-01
	0.00E+00		
SWSA 5 Seep C			
Cobalt-60	1.34E+03	8.88E+01	4.12E+01
Cesium-137	5.93E+02	8.87E+00	3.99E+00
Total		9.76E+01	4.51E+01
SWSA 5 Trib 1			
Americium-241	5.55E+02	4.69E-01	1.47E-01
Actinium-228	1.40E+00	3.59E-02	1.63E-02
Bismuth-212	1.50E+00	7.38E-03	3.27E-03
Bismuth-214	8.60E-01	3.42E-02	1.59E-02

Table 9.9 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Large invertebrates	Large fish
Curium-244	1.00E+03	1.97E-02	1.60E-03
Carbon-14	5.94E+01		
Cobalt-60	3.90E+03	2.58E+02	1.20E+02
Cesium-137	1.28E+04	1.91E+02	8.61E+01
Curium-242	3.50E-01	6.91E-06	5.60E-07
Europium-152	9.61E+02	2.93E+01	1.36E+01
Europium-154	5.79E+02	1.90E+01	8.82E+00
Europium-155	1.50E-01	2.42E-04	1.10E-04
Lead-212	8.14E-01	3.34E-02	1.53E-02
Lead-214	9.30E-01	4.32E-02	2.00E-02
Plutonium-238	1.11E+02	2.19E-03	1.78E-04
Plutonium-239/40	1.11E+02		
Potassium-40	2.40E+01	9.90E-02	4.39E-02
Radium-223	3.70E-01		
Radium-224	1.60E+00	6.57E-02	3.01E-02
Radium-226	4.89E+01	2.27E+00	1.05E+00
Radium-228	1.16E+02		
Radon-219	4.70E-01	7.68E-04	2.98E-04
Strontium-90	9.59E+04		
Technetium-99	2.80E+00		
Thorium-228	2.94E+02	1.21E+01	5.54E+00
Thorium-230	4.30E+01	8.49E-04	6.88E-05
Thorium-231	5.30E-01	3.34E-04	7.72E-05
Thorium-232	3.51E+00	9.00E-02	4.09E-02
Thorium-234	1.10E+01	1.24E-02	5.40E-03
Tin-126	2.80E-01		
Tritium	8.30E+02		
Uranium-232	3.21E+02	6.33E-03	5.14E-04
Uranium-233	4.13E+03	4.07E-02	3.30E-03
Uranium-233/234	9.06E+00	8.94E-05	7.25E-06
Uranium-235	3.61E-01	1.49E-03	6.61E-04
Uranium-235/236	1.47E+01	6.18E-02	2.70E-02
Uranium-238	1.17E+02	3.93E-02	7.75E-03
Total		5.13E+02	2.35E+02
SWSA 5 WOC			
Americium-241	9.58E+02	8.09E-01	2.53E-01
Curium-244	2.77E+04	5.47E-01	4.43E-02
Carbon-14	8.08E+03		
Cobalt-60	4.00E+04	2.65E+03	1.23E+03
Cesium-137	1.33E+07	1.99E+05	8.95E+04
Plutonium-238	1.24E+03	2.45E-02	1.98E-03
Plutonium-239/40	6.39E+02		
Radium-226	3.00E+03	1.39E+02	6.46E+01
Radium-228	3.90E+03		
Strontium-90	7.40E+05		

Table 9.9 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Large invertebrates	Large fish
Thorium-228	1.74E+02	7.15E+00	3.28E+00
Thorium-230	3.09E+02	6.10E-03	4.94E-04
Thorium-232	5.28E+01	1.35E+00	6.15E-01
Tritium	2.97E+01		
Uranium-232	3.76E+01	7.42E-04	6.02E-05
Uranium-233	1.58E+03	1.56E-02	1.26E-03
Uranium-238	1.53E+01	5.15E-03	1.01E-03
Total		2.02E+05	9.08E+04
SWSA 4 Main			
Cobalt-60	1.34E+03	8.88E+01	4.12E+01
Cesium-137	6.88E+02	1.03E+01	4.63E+00
Total		9.90E+01	4.58E+01
SWSA 5 Drainage D-2			
Americium-241	6.20E-01	5.24E-04	1.64E-04
Actinium-228	2.30E+00	5.90E-02	2.68E-02
Bismuth-212	1.70E+00	8.36E-03	3.71E-03
Bismuth-214	1.20E+00	4.78E-02	2.22E-02
Curium-244	5.52E+00	1.09E-04	8.83E-06
Calcium-45	9.20E+01		
Carbon-14	6.18E+01		
Cobalt-60	6.30E-01	4.17E-02	1.94E-02
Cesium-137	6.48E+00	9.69E-02	4.36E-02
Iodine-129	1.40E+01	8.31E-03	1.96E-03
Lead-212	1.70E+00	6.97E-02	3.20E-02
Lead-214	1.20E+00	5.57E-02	2.58E-02
Plutonium-238	3.13E+01	6.18E-04	5.01E-05
Plutonium-239/40	2.60E-01		
Potassium-40	1.18E+01	4.87E-02	2.16E-02
Radium-223	9.10E-01		
Radium-224	4.90E+00	2.01E-01	9.23E-02
Radium-226	2.73E+00	1.27E-01	5.88E-02
Radium-228	2.30E+00		
Radon-219	1.20E+00	1.96E-03	7.62E-04
Strontium-90	1.36E+03		
Technetium-99	1.10E+01		
Thorium-228	2.50E+00	1.03E-01	4.71E-02
Thorium-230	1.30E+00	2.57E-05	2.08E-06
Thorium-232	2.25E+00	5.77E-02	2.62E-02
Thallium-208	1.40E+00	1.25E-01	5.80E-02
Tritium	1.84E+03		
Uranium-233/234	1.60E+01	1.58E-04	1.28E-05
Uranium-235	4.10E-01	1.69E-03	7.50E-04
Uranium-238	2.40E+00	8.07E-04	1.59E-04
Total		1.06E+00	4.81E-01

Table 9.9 (continued)

Radionuclide[a]	Soil Activity[b] (pCi/g)	Large invertebrates	Large fish
WOC			
Americium-241	2.70E+00	2.28E-03	7.13E-04
Curium-244	4.80E+00	9.47E-05	7.68E-06
Cobalt-60	8.84E+02	5.85E+01	2.72E+01
Cesium-137	1.45E+03	2.17E+01	9.76E+00
Plutonium-238	8.10E-01	1.60E-05	1.30E-06
Plutonium-239/40	5.00E+00		
Strontium-90	1.80E+01		
Thorium-228	1.50E+00	6.17E-02	2.82E-02
Thorium-230	8.80E-01	1.74E-05	1.41E-06
Thorium-232	1.10E+00	2.82E-02	1.28E-02
Uranium-233/234	5.50E+00	5.43E-05	4.40E-06
Uranium-235	1.10E-01	4.54E-04	2.01E-04
Uranium-238	1.80E+00	6.05E-04	1.19E-04
Total		8.03E+01	3.70E+01
WOCE			
Cobalt-60	1.47E+03	9.74E+01	4.52E+01
Cesium-137	2.57E+03	3.84E+01	1.73E+01
Total		1.36E+02	6.24E+01

[a] Dose from each radionuclide includes all short-lived daughter products

[b] Representative concentration is the minimum of the UCL95 and the maximum detect.

Table 9.10. Summary of risk to terrestrial biota from exposure to radionuclides in White Oak Creek watershed soil.

			Risk Drivers[a]									
Subbasin	Receptor	HI: rads	^{241}Am	^{244}Cm	^{60}Co	^{137}Cs	^{238}Pu	$^{239/240}Pu$	^{90}Sr	^{234}Th	$^{233/234}U$	^{238}U
East Seep	shrew	148.0				147.9						
East Seep	turkey	144.1				114.8				14.2	13.5	
East Seep	mouse	122.2				122.1						
East Seep	fox	108.7				108.5						
East Seep	mink	92.6				92.6						
East Seep	hawk	60.5				60.3						
East Seep	deer	50.8				50						
East Seep	inverts	31.0				30.8						
East Seep	plants	8.6				4.2				2.1	2	
WestSeep	shrew	53.0			52.3							
WestSeep	mouse	53.0			52.3							
WestSeep	fox	41.2			41.1							
WestSeep	mink	39.3			39.2							
WestSeep	turkey	20.7			20.1							
WestSeep	deer	19.5			19.4							
WestSeep	inverts	10.3			10.2							
WestSeep	hawk	4.2			4.2							
WestSeep	plants	2.0			1.9							
IntermediatePond	shrew	40.2	4.8			1.3		32.3				
IntermediatePond	mouse	40.0	4.8			1.1		32.3				
IntermediatePond	turkey	4.7				1					2.5	0.7
IntermediatePond	plants	3.6	0.4					2.6				
IntermediatePond	inverts	2.3	0.6					1.2				
IntermediatePond	fox	1.0				1						
MB-15	shrew	30.6			30.5							
MB-15	mouse	30.6			30.5							
MB-15	fox	24.0			24							
MB-15	mink	22.9			22.9							

Table 9.10. (continued)

Subbasin	Receptor	HI: rads	Risk Drivers[a]									
			^{241}Am	^{244}Cm	^{60}Co	^{137}Cs	^{238}Pu	$^{239/240}Pu$	^{90}Sr	^{234}Th	$^{233/234}U$	^{238}U
MB-15	inverts	6.0			6							
MB-15	hawk	2.5			2.4							
MB-15	plants	1.1			1.1							
SWSA 4 Main	shrew	18.8				18.6						
SWSA 4 Main	turkey	15.9				14.4			1.4			
SWSA 4 Main	mouse	15.6				15.4						
SWSA 4 Main	fox	14.3				13.6						
SWSA 4 Main	mink	11.8				11.6						
SWSA 4 Main	hawk	8.0				7.6						
SWSA 4 Main	deer	7.6				6.3			1.3			
SWSA 4 Main	inverts	4.7				3.9						
LowerWOC	shrew	17.4	1					15.4				
LowerWOC	mouse	17.3	1					15.4				
LowerWOC	plants	1.4						1.2				
SWSA 5 Seep B West	shrew	8.0	1.1	5.7								
SWSA 5 Seep B West	mouse	8.0	1.1	5.7								
SWSA 5 Seep B West	turkey	2.3							1.4			
SWSA 5 Seep B West	deer	1.4							1.2			
SWSA 5 Seep B West	inverts	1.2							0.8			
WOC	shrew	4.2	0.4	0.5				2.8				
WOC	mouse	4.2	0.4	0.5				2.8				
HRE	turkey	4.0								1.6	1.6	
HFIR	turkey	3.7							3.3			
HFIR	deer	3.1							3			
HFIR	inverts	2.0							1.9			
HFIR	fox	1.4							1.4			
HFIR	hawk	1.0							0.9			
SWSA 5 Seep B East	shrew	2.6				2.5						
SWSA 5 Seep B East	mouse	2.3				2.2						
SWSA 5 Seep B East	fox	1.9				1.9						

Table 9.10. (continued)

Subbasin	Receptor	HI: rads	Risk Drivers[a]									
			^{241}Am	^{244}Cm	^{60}Co	^{137}Cs	^{238}Pu	$^{239/240}Pu$	^{90}Sr	^{234}Th	$^{233/234}U$	^{238}U
SWSA 5 Seep B East	turkey	1.7				1.7						
Seep B East	mink	1.7				1.7						
SWSA5Trib-1	shrew	2.2					1.3					
SWSA5Trib-1	mouse	2.1					1.3					
SWSA5Trib-1	turkey	1.1										
WCTrib1	shrew	2.0				1.8						
WCTrib1	mouse	1.7				1.5						
WCTrib1	turkey	1.6				1.4						
WCTrib1	fox	1.5				1.3						
WCTrib1	mink	1.3				1.1						
SWSA 5 SeepC	shrew	1.7		0.9								
SWSA 5 SeepC	mouse	1.7		0.9								
WAG 7 WOC	shrew	1.5				1.2						
WAG 7 WOC	mouse	1.3				1.0						
WAG 7 WOC	turkey	1.1				0.9						
SWSA 5 SeepA	shrew	1.0						0.6				
SWSA 5 SeepA	mouse	1.0						0.6				

[a] HI = Hazard Index for radionuclides, calculated as estimated dose rate divided by recommended dose limit.

Am - 241= Americium-241, Cm-244 = Curium-244, Co-60 = Cobalt-60, Cs-137 = Cesium-137, Pu-238= Plutonium-238, Pu-239/240 = Plutonium-239/240, Sr-90 = Strontium-90, Th-234 = Thorium-234, U-233/234 = Uranium-233/234, U-238 = Uranium-238

No risks were identified at the HFIR East, HF-2, SWSA 5 Drainage D-2, MVDrive, SWSA 5 WOC, SWSA 5 N WOC, Haw Ridge, W6MS3, W6MS1, SWSA 6 South, SWSA 6 East, Pit 4 South, or NHF subbasins.

Table 9.11. Summary of estimated risks to piscivorous wildlife from food chain exposures to radionuclides in White Oak Creek watershed surface water

Subbasin	HI[a]	Receptor	Risk Driver ^{137}Cs
SWSA5/WOC	12.7	Mink	12.0
	24.2	River otter	22.9
	23.3	Belted kingfisher	22.0
	24.2	Great blue heron	22.9
	23.3	Osprey	22.0

Note: No other subbasins resulted in risks to piscivorous wildlife.
[a] The Hazard Index (HI) is the overall dose rate from all radionuclides detected in the subbasin divided by the recommended dose rate limit of 100 mrad/d.

Table 9.12. Summary of estimated risks to aquatic biota from exposures to radionuclides in White Oak Creek watershed surface water and sediment

					SW Risk drivers[b]		SD Risk drivers[b]	
Subbasin	Overall HI[a]	Water HI[a]	Sediment HI[a]	Receptor	^{137}Cs	^{90}Sr	^{137}Cs	^{60}Co
SWSA5/ WOC	202.1	0.4	201.7	Aquatic invertebrate	0.4		199.0	2.6
	92.3	1.0	90.8	Large fish	1.0		89.5	1.2
Seep C	2.2	2.2	0.1	Aquatic invertebrate		2.2		
	0.4	0.4	0.0	Large fish		0.4		

Note: No other subbasins resulted in risks to aquatic organisms.
[a] The Overall Hazard Index (HI) is the combined dose rate from all radionuclides detected in surface water and sediment in the subbasin divided by the recommended dose rate limit of 1 rad/d. The water and sediment HIs represent exposures from single media only.
[b] Risk driving radionuclides are those that account for the largest fraction of the dose rate. The value entered is the dose rate from individual radionuclides divided by the recommended dose rate limit.

10. SUMMARY OF ECOLOGICAL RISKS WITHIN THE WHITE OAK CREEK WATERSHED

10.1 SOIL EXPOSURES

Ecological risks were evaluated for plants, soil invertebrates, and terrestrial wildlife exposed to radionuclide and nonradionuclide contaminants in surface soil within each subbasin in the watershed for which surface soil data were available. Nonradiological data were available from 22 subbasins; radiological data were available from 28 subbasins. Only one formal line of evidence, single chemical toxicity data, was available to evaluate potential risks for terrestrial flora and fauna.

Potential risks to terrestrial plants from nonradionuclide soil-related exposures were identified for 19 subbasins for plants, 10 for soil invertebrates, 20 for short-tailed shrews, 9 for white-footed mice, 10 for red fox, 3 for white-tailed deer, 6 for red-tailed hawks, 4 for wild turkeys, and 5 for mink (Tables 5.2, 6.2, and 7.17 through 7.23). The Intermediate Pond resulted in the highest risks for all receptors due to high soil mercury concentrations. Radionuclide exposures resulted in potential risks to terrestrial biota at 16 subbasins (Table 9.10). Radionuclide risks were highest in the East Seep subbasin with Cs-137 driving risks for all receptors.

Potential nonradionuclide risks to plants were identified in at least one subbasin from exposure to maximum concentrations of antimony, arsenic, barium, cadmium, chromium, cobalt, copper, mercury, molybdenum, nickel, selenium, silver, thallium, tin, and zinc (Table 6.2). Hazard quotients were generally low (<3.8) with the exception of mercury, nickel, silver, and zinc at the Intermediate Pond; chromium and zinc at HF-2; chromium, mercury, and zinc at Lower WOC/WOL; zinc, mercury, and silver at WOC; mercury at SWSA 5 Trib-1 and Seep B; nickel at SWSA 4 Main; chromium at HRE; and zinc and selenium at Seep A. Potential risks to plants from exposure to radionuclides were identified in 5 subbasins. Cesium-137 was the risk driver in East Seep soils. Plutonium-239/240 was the primary risk driver at the Intermediate Pond and Lower WOC/WOL subbasins, and Co-60 was the risk driver at MB-15 and West Seep.

Potential nonradionuclide risks to soil invertebrates were identified in at least one subbasin from exposure to maximum concentrations of chromium, copper, mercury, nickel, and zinc (Table 5.2). Hazard quotients were generally low (<4.5) with the exception of mercury at the Intermediate Pond, WOC, SWSA5 Trib-1, Seep B West, and SWSA5/WOC; chromium at HF-2 and HRE; and chromium and mercury at Lower WOC; and nickel at SWSA 4 Main. Potential risks to soil invertebrates from exposure to radionuclides in surface soil were identified in 7 subbasins. Cesium-137 was the risk driver in East Seep and SWSA 4 Main. Cobalt-60 was the primary risk driver at MB-15 and West Seep, and Plutonium-239/240 was the primary risk driver at the Intermediate Pond. Strontium-90 was the risk driver at the HFIR and Seep B West subbasins.

LOAELs for at least one wildlife receptor (short-tailed shrew, white-footed mouse, red fox, white-tailed deer, red-tailed hawk, wild turkey, or mink) were exceeded in at least one subbasin as a result of arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, selenium, thallium, zinc, and PCB-1260 (Tables 7.17 through 7.23). However, only mercury, molybdenum, nickel, selenium, and PCB-1260 for the shrew and mercury for the fox resulted in potential watershed-wide effects. Fewer than 20% of the individuals in populations within the watershed were likely to exceed LOAELs for all other receptor-contaminant combinations. The Intermediate Pond was the primary contributor to mercury exposures; the average mercury concentration there was an order of magnitude higher than in any other subbasin. The White Oak Creek, Lower White Oak

Creek/White Oak Lake, and Seep B West subbasins were also major contributors to high mercury exposures. The SWSA 5 Drainage D-2 was the primary contributor to PCB-1260 exposures, followed by the Intermediate Pond. Seep C subbasin was the most significant contributor to molybdenum exposures. Selenium exposures were highest in the Seep A, Pit 4 South, and SWSA 5 N/WOC subbasins. Nickel risks were driven by a single location (WAG 4 Seep 6) in SWSA 4 Main.

Potential risks from exposure to radionuclides in surface soil were identified for at least one wildlife receptor at 16 subbasins (Table 9.10). Shrews and mice generally received the highest dose rates. Cs-137 was the primary risk driver in East Seep, SWSA 4 Main, Seep B East, WAG 7 WOC, and WC Trib-1 soils. Plutonium-239/240 was the primary risk driver at the Intermediate Pond, Lower WOC/WOL, WOC, and Seep A. Cobalt-60 contributed the highest dose rate at MB-15 and West Seep. Curium-244 was the risk driver at Seep B West and Seep C and was a significant contributor at WOC. Strontium-90 was a risk driver at the HFIR subbasin and at Seep B West. Plutonium-238 was the primary risk driver at SWSA 5 Trib-1.

10.2 SURFACE WATER EXPOSURES

Ecological risks were evaluated for aquatic organisms and piscivorous wildlife exposed to nonradiological contaminants in unfiltered surface water within each subbasin in the watershed for which surface water data were available. Evaluations were restricted to unfiltered surface water samples from mainstem streams and large tributaries potentially providing suitable habitat for fish. Risks were estimated by subbasin by comparing the distribution of observed concentrations to different types of aquatic benchmarks. Chemicals were considered to present significant risks if at least 20% of the concentrations exceeded probably effects benchmarks. In addition, risks to terrestrial plants were evaluated based on exposure to surface water at identified seeps. Nonradiological data were available from 19 subbasins for the fish evaluation and 21 for the plant-seep evaluation. Potential risks from exposure to radionuclides were evaluated for aquatic organisms across all 25 subbasins for which surface water and sediment radionuclide data were available. Only one formal line of evidence, single chemical toxicity data, was available to evaluate potential risks for plants. For piscivorous wildlife, three lines of evidence (limited biological survey data, media toxicity data, and single chemical toxicity data) were available. For fish, biological survey data, biological indicators data, media toxicity data, and single chemical toxicity data were available.

Significant or potential risks were identified for aquatic organisms exposed to nonradionuclides in mainstem surface water in 14 subbasins (Tables 3.2 and 3.4). Thirteen inorganics, ammonia, BEHP, and PCBs potentially present significant risks to aquatic organisms in the watershed. Evaluation of the HIs suggests that the HF-2 and SWSA 6 East subbasins present the highest risks although only 5 and 3 inorganics, respectively, were identified as COECs. PCBs present significant risks in the Lower WOC/WOL and WOC subbasins. Mercury presents significant risks at SWSA 6 East, W6MS3, and W6MS1. Copper, aluminum, and iron potentially present significant risks at 10, 9, and 8 subbasins, respectively. However, use of unfiltered water samples may result in overestimates of risks for metals that are significantly associated with the particulate fraction as they may not be bioavailable.

Significant risks indicated by surface water chemical concentrations were corroborated by the biological data for four subbasins: Intermediate Pond, WOC, Lower WOC/WOL, and WOCE. The weight of evidence is strongest for the subbasins upstream of WOD. The fish community is less species rich relative to the community observed here in the 1950s, redbreast sunfish have

experienced reproductive failures, and the water has been lethal to Medaka embryos and larvae. The total number of macroinvertebrate species and the number of sensitive species are significantly lower than the upstream and pooled reference communities.

In Seep C, the biological data contradicts the chemical data. The water in the Seep C subbasin does not appear to pose a significant risk to fish. Although copper and nickel appear to present a significant risk and were identified as COECs, the water has not been toxic in the standard toxicity tests.

Potential risks to aquatic organisms exposed to radionuclides in surface water within the watershed were identified for only two subbasins: SWSA5/WOC and Seep C. The dose rate to large fish in the SWSA5/WOC subbasin marginally exceeded the recommended dose rate limit (HI = 1.1) as a result of high ^{137}Cs activity. This dose was associated with the 05.OHF station at the OHF Pond and does not represent a widespread problem. The dose rate for large insects at Seep C also marginally exceeded the dose limit (HI = 2.2) but was a result of ^{90}Sr, which contributed >99% of the dose. No aquatic receptors received doses above the dose rate limit in any of the other subbasins.

Potential risks were evaluated for 5 species of piscivorous wildlife: mink, river otter, belted kingfisher, great blue heron, and osprey. Evaluation of available single chemical toxicity data, toxicity test data, and field surveys suggest that the WOCW populations of mink, great blue heron, and osprey are not at risk. However, if present, individual river otter (listed as threatened by TWRA) may be at risk from exposure to mercury, primarily at the Lower WOC/WOL and WOC subbasins, and kingfisher populations may be at risk from exposure to mercury and selenium.

Risks from exposure of piscivorous wildlife to radionuclides are not anticipated in the White Oak Creek watershed. Exposure of piscivorous wildlife to radionuclides were modeled using available surface water data and measured fish body burden data. Potential risks were identified in only one subbasin: SWSA5/WOC. As noted above, the sample from this subbasin was associated with the OHF Pond and does not represent a widespread problem. Estimated exposures were below recommended dose rate limits for all receptors in all other subbasins.

Potential risks to plants assumed to be exposed to seep water in soil solution were identified for seeps in most subbasins from which data were available (Table 6.3). The primary risk drivers were aluminum and/or thallium in most seeps. The aluminum and thallium benchmarks appear to be conservative as both analytes exceeded benchmarks at numerous seeps across the whole watershed, and the aluminum benchmark is below background. There is low confidence in the arsenic benchmark as it was derived from limited data on root length reduction (Will and Suter 1995b). Other analytes marginally exceeding benchmarks at at least one station in the watershed included boron, chromium, cobalt, copper, fluoride, iron, lead, manganese, and nickel (HQs generally <5). Use of unfiltered water samples may result in overestimates of risks for metals that are significantly associated with the particulate fraction, which is largely unavailable to plants. Because of the uncertainty associated with the benchmarks and analyte bioavailability, it is unclear whether significant risks are present.

10.3 SEDIMENT EXPOSURES

Ecological risks were evaluated for benthic invertebrates exposed to nonradiological contaminants in sediment within each subbasin in the watershed for which sediment data were available. Nonradiological data were available from 21 subbasins. Potential risks from exposure

to radionuclides were evaluated for aquatic organisms across all 25 subbasins for which surface water and sediment radionuclide data were available. Two lines of evidence, biological survey data and single chemical toxicity data, were used in evaluating potential risks to benthic invertebrates.

Significant or potential risks were identified for benthic invertebrates exposed to nonradionuclides in sediment in 21 subbasins (Tables 4.2 and 4.3), based on the comparison of sediment concentration to benchmarks. Eleven inorganics and 15 organic analytes potentially present significant risks to aquatic organisms in the watershed. Evaluation of the average HIs suggests that the WOC Embayment and SWSA5 Trib 1 subbasins appeared to present the highest risks with 5 and 11 COECs, respectively. PCBs present significant risks in the WOC Embayment, SWSA 5 Trib 1, Lower WOC/WOL, WOC, SWSA5/WOC, Intermediate Pond, and HRE subbasins. Mercury presents significant risks at the WOC Embayment, SWSA5 Trib 1, WOC, SWSA5/WOC, and Intermediate Pond subbasins. Several polyaromatic hydrocarbons present significant risks at the WOC and Intermediate Pond subbasins. Manganese, silver, and zinc potentially present significant risks at 8, 7, and 5 subbasins, respectively.

Significant risks indicated by sediment chemical concentrations were not refuted by the community survey data in the Lower WOC/WOL subbasin. That is, eight sediment COECs were identified in this subbasin and the sediment community surveys were inconclusive. The relative importance of habitat and contamination could not be determined because a good reference was not available. However, the community survey suggests that sediment in subbasin WOC does not pose a significant risk to benthic invertebrates. Chironomid taxa richness was slightly lower than in the reference pools, but total taxonomic richness of the sediment community was similar to the reference sites. Hence, all of the eleven COECs appear to be credible contributors to toxicity, but the community does not appear to be degraded.

Potential risks to aquatic organisms exposed to radionuclides in sediment within the watershed were identified for just one subbasins: SWSA5/WOC. The dose rate to large invertebrates and fish in the SWSA5/WOC subbasin greatly exceeded the recommended dose rate limit (HI = 202 and 91) as a result of high Cs-137 activity. This dose was associated with the 05.OHF station at the OHF Pond and does not represent a widespread ecological problem. Sediment did not contribute significantly to the dose to large insects at Seep C (see surface water discussion). No aquatic receptors received doses above the dose rate limit in any of the other subbasins.

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