Appendix I-F
Calculated Risks for Reference Segment

The analyses in Section 5.2 are based on comparisons to upstream levels of risk in Columbia River Segment 1. The risks in Segment 1 are assumed to be relatively unaffected by past Hanford operations, but may have a component of risk from non-natural upstream inputs. For the readers interested in the "background" risks of the Columbia River, the risks estimated for each of the individual exposure scenarios evaluated in Segment 1 are presented here.

Table F.1 provides the values of the risks calculated using the deterministic input values. Table F.2 provides the median values of risks calculated using the input distributions of concentration from Section 3 and exposure parameters from Section 5.2.

The effects of not having a measurement for a given contaminant are evident in each table. For example, the radionuclide neptunium-237 has not been observed in Segment 1. Therefore, all risk estimates for Np-237 in Tables F.1 and F.2 are zero. Similarly, iodine-129 has only been measured in surface water; measurements of iodine-129 in sediments and seeps in Segment 1 are all below the limits of detection. Therefore, only the surface water medium has a non-zero component in each of the scenario results. For some scenarios, an entire column of results is blank, such as seep water for the Avid Recreational Visitor scenario. This results from the scenario definition. In this case, the Avid Recreational Visitor is not defined to consume seep water, so the contribution is zero.

Note that chromium has two entries, one for chromium as a carcinogen and one for chromium as a non-carcinogenic toxic chemical.

The data presented here are summarized from the output files of the HUMAN computer code provided on disk (referred to in Appendix I-E). All of the results are also provided in the disk files DET-DTL.EXE and STOC-DTL.EXE. These files contain similar information for all river segments. Because the printed output would consume over 80 pages, it is only provided on disk.

Table F.1. Calculated Risks for Reference Segment Deterministic Results

		Agricultural Resident			Avid Recreational Visitor			Casual Recreational Visitor		
Analyte	Type	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep
External	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C14	RAD	0.00E+00	0.00E+00	1.54E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.96E-09
Cs137	RAD	9.47E-07	1.06E-05	0.00E+00	5.20E-05	1.66E-06	0.00E+00	5.20E-05	1.70E-07	0.00E+00
Co60	RAD	7.64E-07	1.58E-08	0.00E+00	6.94E-06	1.34E-07	0.00E+00	6.93E-06	1.49E-10	0.00E+00
Eu152	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu154	RAD	7.47E-07	0.00E+00	0.00E+00	1.77E-06	0.00E+00	0.00E+00	1.75E-06	0.00E+00	0.00E+00
I129	RAD	6.33E-10	0.00E+00	0.00E+00	1.32E-09	0.00E+00	0.00E+00	1.32E-09	0.00E+00	0.00E+00
Np237	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	RAD	1.57E-06	3.15E-06	0.00E+00	4.11E-06	5.58E-07	0.00E+00	4.11E-06	4.35E-08	0.00E+00
Tc99	RAD	1.03E-07	0.00E+00	1.78E-07	1.58E-07	0.00E+00	0.00E+00	1.58E-07	0.00E+00	3.41E-09
H3	RAD	5.72E-07	0.00E+00	1.68E-05	5.87E-07	0.00E+00	0.00E+00	5.87E-07	0.00E+00	3.23E-07
U234	RAD	1.79E-05	9.26E-06	4.07E-06	2.27E-05	3.03E-06	0.00E+00	2.27E-05	1.36E-07	7.81E-08
U238	RAD	1.26E-05	1.15E-05	3.15E-06	1.60E-05	3.74E-06	0.00E+00	1.60E-05	1.68E-07	6.05E-08
Benzene	CAR	3.97E-07	8.71E-12	0.00E+00	2.28E-07	8.75E-12	0.00E+00	2.32E-07	8.71E-12	0.00E+00
Chromium	CAR	2.37E-03	1.74E-02	2.18E-02	1.51E-02	4.21E-03	0.00E+00	1.51E-02	4.12E-03	1.85E-02
Ammonia	NON	3.95E-02	0.00E+00	0.00E+00	3.25E-03	0.00E+00	0.00E+00	1.57E-03	0.00E+00	0.00E+00
Chromium	NON	1.13E-02	8.27E-02	8.81E-02	7.21E-02	2.00E-02	0.00E+00	7.21E-02	1.96E-02	8.81E-02
Copper	NON	3.18E-02	5.44E-01	3.13E-02	2.04E-01	3.01E+00	0.00E+00	2.04E-01	2.41E-02	2.65E-02
Cyanide	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kerosene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	NON	2.45E-02	6.16E-01	3.06E-02	2.23E-01	8.13E-02	0.00E+00	2.23E-01	7.39E-02	3.06E-02
Mercury	NON	3.92E-03	2.92E-01	0.00E+00	1.10E-01	1.26E+00	0.00E+00	1.10E-01	4.69E-03	0.00E+00
Nickel	NON	1.84E-03	5.64E-02	1.21E-02	6.79E-03	3.88E-03	0.00E+00	6.79E-03	3.73E-03	1.21E-02
Nitrate	NON	9.95E-03	0.00E+00	1.44E-01	9.94E-03	0.00E+00	0.00E+00	9.95E-03	0.00E+00	1.22E-01
Nitrite	NON	2.45E-03	0.00E+00	0.00E+00	2.45E-03	0.00E+00	0.00E+00	2.45E-03	0.00E+00	0.00E+00
Phosphate	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfate	NON	2.93E-03	0.00E+00	9.27E-03	2.93E-03	0.00E+00	0.00E+00	2.93E-03	0.00E+00	7.86E-03
Xylene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	NON	1.14E-03	1.24E-01	3.44E-03	3.20E-02	4.39E-03	0.00E+00	3.20E-02	3.80E-03	3.10E-03

Table F.1. (contd)

		Fish Hatchery Worker			HSRAM Industrial Worker			HSRAM Resident Scenario		
Analyte	Type	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep
External	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C14	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-07
Cs137	RAD	3.29E-07	0.00E+00	0.00E+00	2.17E-07	0.00E+00	0.00E+00	5.20E-05	4.92E-07	0.00E+00
Co60	RAD	2.96E-07	0.00E+00	0.00E+00	1.78E-07	0.00E+00	0.00E+00	6.93E-06	7.76E-09	0.00E+00
Eu152	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu154	RAD	3.02E-07	0.00E+00	0.00E+00	1.75E-07	0.00E+00	0.00E+00	1.75E-06	0.00E+00	0.00E+00
I129	RAD	2.17E-10	0.00E+00	0.00E+00	1.45E-10	0.00E+00	0.00E+00	1.32E-09	0.00E+00	0.00E+00
Np237	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	RAD	5.38E-07	0.00E+00	0.00E+00	3.58E-07	0.00E+00	0.00E+00	4.11E-06	5.48E-07	0.00E+00
Tc99	RAD	3.51E-08	0.00E+00	0.00E+00	2.34E-08	0.00E+00	0.00E+00	1.58E-07	0.00E+00	1.78E-07
H3	RAD	1.96E-07	0.00E+00	0.00E+00	1.31E-07	0.00E+00	0.00E+00	5.87E-07	0.00E+00	1.68E-05
U234	RAD	6.13E-06	0.00E+00	0.00E+00	4.09E-06	0.00E+00	0.00E+00	2.27E-05	1.65E-06	4.07E-06
U238	RAD	4.31E-06	0.00E+00	0.00E+00	2.87E-06	0.00E+00	0.00E+00	1.60E-05	2.04E-06	3.15E-06
Benzene	CAR	1.42E-07	0.00E+00	0.00E+00	8.58E-08	0.00E+00	0.00E+00	2.32E-07	8.73E-12	0.00E+00
Chromium	CAR	8.14E-04	0.00E+00	0.00E+00	5.42E-04	0.00E+00	0.00E+00	1.51E-02	1.34E-02	1.85E-02
Ammonia	NON	6.30E-03	0.00E+00	0.00E+00	4.20E-03	0.00E+00	0.00E+00	1.59E-03	0.00E+00	0.00E+00
Chromium	NON	3.86E-03	0.00E+00	0.00E+00	2.57E-03	0.00E+00	0.00E+00	7.21E-02	6.37E-02	8.81E-02
Copper	NON	1.10E-02	0.00E+00	0.00E+00	7.29E-03	0.00E+00	0.00E+00	2.04E-01	5.41E-01	2.66E-02
Cyanide	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kerosene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	NON	8.38E-03	0.00E+00	0.00E+00	5.59E-03	0.00E+00	0.00E+00	2.23E-01	3.20E-01	3.06E-02
Mercury	NON	1.35E-03	0.00E+00	0.00E+00	8.97E-04	0.00E+00	0.00E+00	1.10E-01	7.34E-02	0.00E+00
Nickel	NON	6.29E-04	0.00E+00	0.00E+00	4.19E-04	0.00E+00	0.00E+00	6.79E-03	5.53E-02	1.21E-02
Nitrate	NON	3.42E-03	0.00E+00	0.00E+00	2.28E-03	0.00E+00	0.00E+00	9.95E-03	0.00E+00	1.22E-01
Nitrite	NON	8.42E-04	0.00E+00	0.00E+00	5.61E-04	0.00E+00	0.00E+00	2.45E-03	0.00E+00	0.00E+00
Phosphate	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfate	NON	1.01E-03	0.00E+00	0.00E+00	6.71E-04	0.00E+00	0.00E+00	2.93E-03	0.00E+00	7.87E-03
Xylene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	NON	3.92E-04	0.00E+00	0.00E+00	2.61E-04	0.00E+00	0.00E+00	3.20E-02	1.24E-01	3.11E-03

Table F.1. (contd)

		Native American Gatherer			Native Hunter/Fisher			Native American Subsistence		
Analyte	Type	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep
External	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C14	RAD	0.00E+00	0.00E+00	5.40E-07	0.00E+00	0.00E+00	2.22E-07	0.00E+00	0.00E+00	6.07E-07
Cs137	RAD	3.32E-06	6.35E-06	0.00E+00	1.20E-03	9.15E-06	0.00E+00	1.20E-03	1.86E-05	0.00E+00
Co60	RAD	2.73E-06	1.00E-07	0.00E+00	1.47E-04	8.18E-07	0.00E+00	1.47E-04	7.30E-07	0.00E+00
Eu152	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu154	RAD	2.68E-06	0.00E+00	0.00E+00	2.63E-05	0.00E+00	0.00E+00	2.61E-05	0.00E+00	0.00E+00
I129	RAD	2.22E-09	0.00E+00	0.00E+00	1.82E-08	0.00E+00	0.00E+00	1.82E-08	0.00E+00	0.00E+00
Np237	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	RAD	5.49E-06	6.92E-06	0.00E+00	6.48E-05	3.14E-06	0.00E+00	6.48E-05	1.07E-05	0.00E+00
Tc99	RAD	3.59E-07	0.00E+00	6.22E-07	1.65E-06	0.00E+00	2.56E-07	1.65E-06	0.00E+00	6.74E-07
H3	RAD	2.00E-06	0.00E+00	5.89E-05	2.36E-06	0.00E+00	2.42E-05	2.36E-06	0.00E+00	6.62E-05
U234	RAD	6.27E-05	2.20E-05	1.43E-05	1.76E-04	1.81E-05	5.86E-06	1.76E-04	3.93E-05	3.14E-05
U238	RAD	4.40E-05	2.73E-05	1.10E-05	1.23E-04	2.23E-05	4.54E-06	1.23E-04	4.86E-05	2.43E-05
Benzene	CAR	1.44E-06	2.35E-11	0.00E+00	1.53E-06	2.22E-11	0.00E+00	1.44E-06	2.35E-11	0.00E+00
Chromium	CAR	8.30E-03	1.27E-01	6.99E-02	3.06E-01	1.01E-02	6.69E-02	3.06E-01	1.30E-01	7.85E-02
Ammonia	NON	9.39E-02	0.00E+00	0.00E+00	4.18E-02	0.00E+00	0.00E+00	9.39E-02	0.00E+00	0.00E+00
Chromium	NON	3.94E-02	6.06E-01	3.08E-01	1.46E+00	4.79E-02	3.08E-01	1.46E+00	6.17E-01	3.47E-01
Copper	NON	1.12E-01	6.58E+00	1.00E-01	4.12E+00	1.82E+01	9.58E-02	4.12E+00	2.05E+01	1.04E-01
Cyanide	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kerosene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	NON	8.57E-02	3.33E+00	1.07E-01	4.71E+00	2.09E-01	1.07E-01	4.71E+00	3.52E+00	1.51E-01
Mercury	NON	1.38E-02	9.16E-01	0.00E+00	2.48E+00	7.64E+00	0.00E+00	2.48E+00	6.88E+00	0.00E+00
Nickel	NON	6.43E-03	6.60E-01	4.23E-02	1.22E-01	9.74E-03	4.22E-02	1.22E-01	6.61E-01	4.76E-02
Nitrate	NON	3.49E-02	0.00E+00	4.61E-01	3.51E-02	0.00E+00	4.41E-01	3.49E-02	0.00E+00	5.17E-01
Nitrite	NON	8.59E-03	0.00E+00	0.00E+00	8.63E-03	0.00E+00	0.00E+00	8.59E-03	0.00E+00	0.00E+00
Phosphate	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfate	NON	1.03E-02	0.00E+00	2.97E-02	1.03E-02	0.00E+00	2.84E-02	1.03E-02	0.00E+00	3.33E-02
Xylene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	NON	4.01E-03	1.52E+00	1.14E-02	7.24E-01	1.26E-02	1.11E-02	7.24E-01	1.53E+00	1.28E-02

Table F.1. (contd)

		Native Upland Hunter			Ranger		
Analyte	Type	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep
External	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C14	RAD	0.00E+00	0.00E+00	2.22E-07	0.00E+00	0.00E+00	0.00E+00
Cs137	RAD	0.00E+00	5.75E-06	0.00E+00	8.07E-09	1.84E-08	0.00E+00
Co60	RAD	0.00E+00	1.31E-07	0.00E+00	5.22E-08	2.90E-10	0.00E+00
Eu152	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu154	RAD	0.00E+00	0.00E+00	0.00E+00	7.16E-08	0.00E+00	0.00E+00
I129	RAD	0.00E+00	0.00E+00	0.00E+00	1.39E-14	0.00E+00	0.00E+00
Np237	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	RAD	0.00E+00	1.61E-06	0.00E+00	1.09E-12	1.24E-09	0.00E+00
Tc99	RAD	0.00E+00	0.00E+00	2.56E-07	1.47E-12	0.00E+00	0.00E+00
H3	RAD	0.00E+00	0.00E+00	2.42E-05	0.00E+00	0.00E+00	0.00E+00
U234	RAD	0.00E+00	5.96E-06	5.86E-06	7.56E-12	1.62E-07	0.00E+00
U238	RAD	0.00E+00	7.38E-06	4.54E-06	2.84E-12	2.01E-07	0.00E+00
Benzene	CAR	0.00E+00	2.05E-11	0.00E+00	3.05E-08	1.54E-12	0.00E+00
Chromium	CAR	0.00E+00	1.14E-02	6.49E-02	2.43E-06	6.60E-04	0.00E+00
Ammonia	NON	0.00E+00	0.00E+00	0.00E+00	1.30E-03	0.00E+00	0.00E+00
Chromium	NON	0.00E+00	5.41E-02	3.08E-01	0.00E+00	3.11E-03	0.00E+00
Copper	NON	0.00E+00	2.90E+00	9.31E-02	3.27E-05	3.91E-03	0.00E+00
Cyanide	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kerosene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	NON	0.00E+00	2.96E-01	1.07E-01	1.01E-07	1.12E-02	0.00E+00
Mercury	NON	0.00E+00	1.29E+00	0.00E+00	4.02E-06	1.69E-04	0.00E+00
Nickel	NON	0.00E+00	9.40E-03	4.22E-02	5.66E-08	6.05E-04	0.00E+00
Nitrate	NON	0.00E+00	0.00E+00	4.28E-01	1.02E-05	0.00E+00	0.00E+00
Nitrite	NON	0.00E+00	0.00E+00	0.00E+00	2.51E-06	0.00E+00	0.00E+00
Phosphate	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfate	NON	0.00E+00	0.00E+00	2.76E-02	3.01E-06	0.00E+00	0.00E+00
Xylene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	NON	0.00E+00	9.58E-03	1.09E-02	7.04E-07	6.19E-04	0.00E+00

Table F.2. Calculated Risks for Reference Segment Stochastic Median Results

		Agricultural Resident			Avid Recreational Visitor			Casual Recreational Visitor		
Analyte	Type	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep
External	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C14	RAD	0.00E+00	0.00E+00	4.49E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-10
Cs137	RAD	1.23E-08	5.60E-07	0.00E+00	9.68E-09	2.59E-07	0.00E+00	5.96E-09	4.90E-08	0.00E+00
Co60	RAD	2.50E-10	1.50E-09	0.00E+00	2.29E-10	4.29E-09	0.00E+00	1.14E-10	2.52E-11	0.00E+00
Eu152	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu154	RAD	2.65E-10	0.00E+00	0.00E+00	2.45E-10	0.00E+00	0.00E+00	1.30E-10	0.00E+00	0.00E+00
I129	RAD	1.93E-13	0.00E+00	0.00E+00	1.55E-13	0.00E+00	0.00E+00	8.59E-14	0.00E+00	0.00E+00
Np237	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	RAD	4.39E-07	3.94E-07	0.00E+00	3.37E-07	1.41E-07	0.00E+00	1.91E-07	1.58E-08	0.00E+00
Tc99	RAD	7.74E-10	0.00E+00	3.96E-08	6.91E-10	0.00E+00	0.00E+00	3.77E-10	0.00E+00	5.05E-10
H3	RAD	1.82E-08	0.00E+00	1.28E-06	1.49E-08	0.00E+00	0.00E+00	8.38E-09	0.00E+00	1.53E-08
U234	RAD	7.18E-07	4.14E-06	1.14E-06	6.14E-07	2.43E-06	0.00E+00	3.30E-07	1.09E-07	1.40E-08
U238	RAD	4.67E-07	3.39E-06	8.81E-07	4.01E-07	1.93E-06	0.00E+00	2.07E-07	1.26E-07	1.08E-08
Benzene	CAR	1.09E-08	1.60E-12	0.00E+00	5.79E-09	1.26E-12	0.00E+00	4.35E-09	6.19E-13	0.00E+00
Chromium	CAR	2.42E-03	8.03E-03	7.79E-03	1.97E-03	9.23E-04	0.00E+00	1.13E-03	5.27E-04	2.85E-03
Ammonia	NON	3.91E-04	0.00E+00	0.00E+00	1.63E-04	0.00E+00	0.00E+00	8.59E-05	0.00E+00	0.00E+00
Chromium	NON	9.18E-05	2.79E-04	2.32E-04	8.14E-05	3.16E-05	0.00E+00	4.09E-05	1.90E-05	1.07E-04
Copper	NON	1.21E-02	3.10E-01	8.98E-03	1.07E-02	5.30E-01	0.00E+00	6.07E-03	1.90E-03	2.87E-03
Cyanide	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kerosene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	NON	1.69E-02	7.49E-02	3.57E-03	1.50E-02	8.31E-03	0.00E+00	8.17E-03	5.03E-03	1.62E-03
Mercury	NON	3.09E-05	8.74E-05	0.00E+00	2.68E-05	3.55E-04	0.00E+00	1.46E-05	2.62E-06	0.00E+00
Nickel	NON	1.97E-05	1.35E-03	1.37E-05	1.48E-05	1.29E-05	0.00E+00	9.09E-06	6.28E-06	6.31E-06
Nitrate	NON	5.90E-04	0.00E+00	3.20E-02	4.98E-04	0.00E+00	0.00E+00	2.76E-04	0.00E+00	1.02E-02
Nitrite	NON	2.46E-04	0.00E+00	0.00E+00	2.02E-04	0.00E+00	0.00E+00	1.10E-04	0.00E+00	0.00E+00
Phosphate	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfate	NON	5.62E-04	0.00E+00	2.38E-03	4.74E-04	0.00E+00	0.00E+00	2.55E-04	0.00E+00	7.45E-04
Xylene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	NON	2.88E-03	6.02E-02	1.26E-04	2.45E-03	9.10E-04	0.00E+00	1.23E-03	3.76E-04	5.06E-05

Table F.2. (contd)

Analyte	Type	Fish Hatchery Worker			HSRAM Industrial Worker			HSRAM Resident Scenario		
		Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep
External	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C14	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.42E-08
Cs137	RAD	8.40E-11	0.00E+00	0.00E+00	8.40E-11	0.00E+00	0.00E+00	1.12E-08	1.18E-07	0.00E+00
Co60	RAD	1.37E-11	0.00E+00	0.00E+00	1.37E-11	0.00E+00	0.00E+00	2.55E-10	8.14E-10	0.00E+00
Eu152	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu154	RAD	3.48E-11	0.00E+00	0.00E+00	3.48E-11	0.00E+00	0.00E+00	3.22E-10	0.00E+00	0.00E+00
I129	RAD	1.29E-14	0.00E+00	0.00E+00	1.29E-14	0.00E+00	0.00E+00	1.82E-13	0.00E+00	0.00E+00
Np237	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	RAD	2.92E-08	0.00E+00	0.00E+00	2.92E-08	0.00E+00	0.00E+00	3.74E-07	1.31E-07	0.00E+00
Tc99	RAD	1.07E-10	0.00E+00	0.00E+00	1.07E-10	0.00E+00	0.00E+00	7.82E-10	0.00E+00	4.27E-08
H3	RAD	6.30E-09	0.00E+00	0.00E+00	6.30E-09	0.00E+00	0.00E+00	1.76E-08	0.00E+00	1.29E-06
U234	RAD	1.70E-07	0.00E+00	0.00E+00	1.70E-07	0.00E+00	0.00E+00	7.33E-07	1.44E-06	1.06E-06
U238	RAD	1.14E-07	0.00E+00	0.00E+00	1.14E-07	0.00E+00	0.00E+00	4.77E-07	1.20E-06	8.37E-07
Benzene	CAR	3.82E-09	0.00E+00	0.00E+00	5.84E-09	0.00E+00	0.00E+00	9.15E-09	1.62E-12	0.00E+00
Chromium	CAR	9.91E-05	0.00E+00	0.00E+00	1.00E-04	0.00E+00	0.00E+00	2.60E-03	4.81E-03	5.91E-03
Ammonia	NON	1.05E-04	0.00E+00	0.00E+00	1.07E-04	0.00E+00	0.00E+00	1.85E-04	0.00E+00	0.00E+00
Chromium	NON	3.68E-06	0.00E+00	0.00E+00	3.68E-06	0.00E+00	0.00E+00	9.09E-05	1.88E-04	2.22E-04
Copper	NON	7.56E-04	0.00E+00	0.00E+00	7.68E-04	0.00E+00	0.00E+00	1.18E-02	1.89E-01	6.14E-03
Cyanide	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kerosene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	NON	7.24E-04	0.00E+00	0.00E+00	7.24E-04	0.00E+00	0.00E+00	1.73E-02	4.44E-02	3.79E-03
Mercury	NON	3.38E-07	0.00E+00	0.00E+00	3.41E-07	0.00E+00	0.00E+00	2.97E-05	4.09E-05	0.00E+00
Nickel	NON	1.51E-06	0.00E+00	0.00E+00	1.51E-06	0.00E+00	0.00E+00	1.81E-05	7.09E-04	1.23E-05
Nitrate	NON	2.32E-04	0.00E+00	0.00E+00	2.35E-04	0.00E+00	0.00E+00	5.79E-04	0.00E+00	2.14E-02
Nitrite	NON	8.60E-05	0.00E+00	0.00E+00	8.79E-05	0.00E+00	0.00E+00	2.44E-04	0.00E+00	0.00E+00
Phosphate	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfate	NON	2.21E-04	0.00E+00	0.00E+00	2.24E-04	0.00E+00	0.00E+00	5.63E-04	0.00E+00	1.76E-03
Xylene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	NON	3.32E-05	0.00E+00	0.00E+00	3.33E-05	0.00E+00	0.00E+00	2.93E-03	3.60E-02	1.05E-04

Table F.2. (contd)

		Native American Gatherer			Native Hunter/Fisher			Native American Subsistence		
Analyte	Type	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep
External	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C14	RAD	0.00E+00	0.00E+00	1.10E-07	0.00E+00	0.00E+00	7.20E-08	0.00E+00	0.00E+00	1.41E-07
Cs137	RAD	6.12E-10	4.29E-07	0.00E+00	7.91E-08	8.53E-07	0.00E+00	8.31E-08	1.53E-06	0.00E+00
Co60	RAD	7.65E-11	2.67E-09	0.00E+00	1.72E-09	1.76E-08	0.00E+00	1.53E-09	1.61E-08	0.00E+00
Eu152	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu154	RAD	1.85E-10	0.00E+00	0.00E+00	1.36E-09	0.00E+00	0.00E+00	1.37E-09	0.00E+00	0.00E+00
I129	RAD	9.19E-14	0.00E+00	0.00E+00	9.38E-13	0.00E+00	0.00E+00	8.07E-13	0.00E+00	0.00E+00
Np237	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr90	RAD	1.84E-07	4.76E-07	0.00E+00	1.90E-06	3.92E-07	0.00E+00	2.20E-06	1.17E-06	0.00E+00
Tc99	RAD	6.88E-10	0.00E+00	9.39E-08	3.45E-09	0.00E+00	6.49E-08	3.43E-09	0.00E+00	1.14E-07
H3	RAD	4.09E-08	0.00E+00	2.92E-06	4.46E-08	0.00E+00	2.02E-06	4.17E-08	0.00E+00	3.67E-06
U234	RAD	9.70E-07	6.06E-06	2.63E-06	2.24E-06	6.75E-06	1.72E-06	2.32E-06	9.60E-06	7.73E-06
U238	RAD	6.44E-07	5.72E-06	1.93E-06	1.65E-06	7.51E-06	1.32E-06	1.60E-06	1.37E-05	6.33E-06
Benzene	CAR	2.62E-08	9.00E-12	0.00E+00	3.31E-08	8.18E-12	0.00E+00	2.44E-08	9.38E-12	0.00E+00
Chromium	CAR	5.39E-04	1.29E-02	1.55E-02	1.36E-02	2.02E-03	1.59E-02	1.44E-02	1.38E-02	2.12E-02
Ammonia	NON	6.81E-04	0.00E+00	0.00E+00	4.94E-04	0.00E+00	0.00E+00	4.87E-04	0.00E+00	0.00E+00
Chromium	NON	2.12E-05	5.07E-04	5.00E-04	5.83E-04	7.16E-05	5.09E-04	5.60E-04	5.31E-04	9.84E-03
Copper	NON	4.35E-03	6.16E-01	1.73E-02	6.84E-02	2.06E+00	1.65E-02	7.22E-02	1.95E+00	1.89E-02
Cyanide	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kerosene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead	NON	4.30E-03	1.28E-01	8.90E-03	1.06E-01	1.81E-02	8.73E-03	1.04E-01	1.42E-01	1.59E-02
Mercury	NON	2.16E-06	1.39E-04	0.00E+00	2.13E-04	1.38E-03	0.00E+00	2.07E-04	9.86E-04	0.00E+00
Nickel	NON	9.29E-06	2.48E-03	3.03E-05	8.85E-05	3.33E-05	3.08E-05	9.30E-05	2.58E-03	3.52E-04
Nitrate	NON	1.38E-03	0.00E+00	6.07E-02	1.44E-03	0.00E+00	5.66E-02	1.35E-03	0.00E+00	7.04E-02
Nitrite	NON	5.78E-04	0.00E+00	0.00E+00	5.54E-04	0.00E+00	0.00E+00	6.09E-04	0.00E+00	0.00E+00
Phosphate	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfate	NON	1.28E-03	0.00E+00	4.33E-03	1.32E-03	0.00E+00	4.43E-03	1.25E-03	0.00E+00	5.73E-03
Xylene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	NON	2.01E-04	1.30E-01	2.66E-04	1.67E-02	2.42E-03	2.57E-04	1.81E-02	1.20E-01	3.20E-04

Table F.2. (contd)

		Native Upland Hunter			Ranger		
Analyte	Type	Surf.Wat.	Sediment	Seep	Surf.Wat.	Sediment	Seep
External		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C14	RAD	0.00E+00	0.00E+00	7.49E-08	0.00E+00	0.00E+00	0.00E+00
	RAD	0.00E+00	5.81E-07	0.00E+00	3.28E-12	2.24E-09	0.00E+00
Co60		0.00E+00	2.93E-09	0.00E+00	3.32E-12	1.01E-11	0.00E+00
Eu152	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RAD	0.00E+00	0.00E+00	0.00E+00	1.29E-11	0.00E+00	0.00E+00
I129		0.00E+00	0.00E+00	0.00E+00	1.16E-18	0.00E+00	0.00E+00
Np237	RAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RAD	0.00E+00	2.41E-07	0.00E+00	8.74E-14	1.58E-10	0.00E+00
Tc99		0.00E+00	0.00E+00	6.51E-08	6.21E-15	0.00E+00	0.00E+00
H3	RAD	0.00E+00	0.00E+00	2.09E-06	0.00E+00	0.00E+00	0.00E+00
	RAD	0.00E+00	2.18E-06	1.67E-06	3.06E-13	2.07E-08	0.00E+00
U238		0.00E+00	2.42E-06	1.34E-06	1.04E-13	2.03E-08	0.00E+00
Benzene	CAR	0.00E+00	2.19E-12	0.00E+00	1.43E-09	5.08E-13	0.00E+00
	CAR	0.00E+00	2.06E-03	1.42E-02	4.04E-07	1.21E-04	0.00E+00
Ammonia		0.00E+00	0.00E+00	0.00E+00	3.34E-06	0.00E+00	0.00E+00
Chromium	NON	0.00E+00	7.92E-05	5.26E-04	0.00E+00	4.46E-06	0.00E+00
	NON	0.00E+00	2.36E-01	1.56E-02	3.24E-06	5.56E-04	0.00E+00
Cyanide		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead		0.00E+00	2.45E-02	8.47E-03	1.49E-08	1.04E-03	0.00E+00
Mercury	NON	0.00E+00	1.77E-04	0.00E+00	1.77E-09	5.80E-08	0.00E+00
	NON	0.00E+00	2.80E-05	2.96E-05	2.26E-10	1.55E-06	0.00E+00
Nitrate		0.00E+00	0.00E+00	5.38E-02	1.08E-06	0.00E+00	0.00E+00
Nitrite	NON	0.00E+00	0.00E+00	0.00E+00	4.33E-07	0.00E+00	0.00E+00
	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sulfate		0.00E+00	0.00E+00	3.66E-03	8.76E-07	0.00E+00	0.00E+00
Xylene	NON	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NON	0.00E+00	1.46E-03	2.53E-04	8.86E-08	1.05E-04	0.00E+00