Appendix A

Additional Monitoring Results for 1995

This Appendix contains additional information on 1995 monitoring results, supplementing the data summarized in the main body of the report. More detailed information is available in the companion 1995 report by L. E. Bisping, *1995 Surface Environmental Surveillance Data* (PNNL-11140, Pacific Northwest National Laboratory, Richland, Washington).

Table A.1. Radionuclide Concentrations Measured in Columbia River Water at Priest Rapids Dam, 1995 Compared to Values from the Previous 5 Years

Radionuclide[b]		1995 No. of Samples	1995 Concentration,[a] pCi/L (10^{-6} µCi/L) Maximum	1995 Concentration,[a] pCi/L (10^{-6} µCi/L) Average	1990-1994 No. of Samples	1990-1994 Concentration,[a] pCi/L Maximum	1990-1994 Concentration,[a] pCi/L Average	Ambient Surface Water Quality Standard,[c] pCi/L
Composite System								
Alpha		12	0.800 ± 0.581	0.346 ± 0.158	59	1.67 ± 1.30	0.532 ± 0.114	15
Beta		12	3.36 ± 1.64	1.46 ± 0.42	59	5.17 ± 2.50	1.28 ± 0.42	50
^{3}H		12	39.7 ± 9.1	34.4 ± 1.8	59	114 ± 16	44.6 ± 2.9	20,000
^{90}Sr		12	0.114 ± 0.048	0.0801 ± 0.0116	58	0.178 ± 0.084	0.0860 ± 0.0074	8
^{99}Tc		12	0.260 ± 0.540	-0.0794 ± 0.0796	58	1.23 ± 2.79	-0.186 ± 0.334	900
^{234}U		12	0.248 ± 0.052	0.212 ± 0.015	58	0.444 ± 0.129	0.235 ± 0.014	--[d]
^{235}U		12	0.0293 ± 0.0160	0.00612 ± 0.00486	58	0.0316 ± 0.0393	0.00942 ± 0.00214	--
^{238}U		12	0.240 ± 0.054	0.179 ± 0.018	58	0.350 ± 0.111	0.185 ± 0.011	--
U-Total		12	0.490 ± 0.114	0.397 ± 0.028	58	0.826 ± 0.279	0.429 ± 0.025	--
Continuous System								
^{129}I	D	4	0.00000410 ± 0.00000070	0.00000360 ± 0.00000054	16	0.000129 ± 0.0000129	0.0000192 ± 0.0000161	--
$^{239,240}Pu$	P	4	0.0000549 ± 0.0000298	0.0000306 ± 0.0000184	19	0.0000969 ± 0.0000395	0.0000225 ± 0.0000104	--
	D	4	0.0000715 ± 0.0000817	0.0000269 ± 0.0000327	19	0.000627 ± 0.000207	0.0000677 ± 0.0000689	--

(a) Maximum values are ±2 total propagated analytical uncertainty. Averages are ±2 standard error of the calculated mean.
(b) Radionuclides measured using the continuous system show the particulate (P) and dissolved (D) fractions separately. Other radionuclides are based on unfiltered samples collected by the composite system (see Section 4.2, "Surface Water and Sediment Surveillance").
(c) Appendix C, Table C.1.
(d) Dashes indicate no concentration guides are available.

Table A.2. Radionuclide Concentrations Measured in Columbia River Water at the 300 Area Water Intake, 1995 Compared to Values from the Previous 5 Years

Radionuclide[b]	1995 No. of Samples	1995 Concentration,[a] pCi/L (10^{-6} µCi/mL) Maximum	1995 Concentration,[a] pCi/L (10^{-6} µCi/mL) Average	1990-1994 No. of Samples	1990-1994 Concentration,[a] pCi/L Maximum	1990-1994 Concentration,[a] pCi/L Average	Ambient Surface Water Quality Standard,[c] pCi/L
Composite System							
Alpha	4	1.49 ± 0.93	1.05 ± 0.30	20	1.44 ± 1.02	0.658 ± 0.188	15
Beta	4	3.63 ± 1.70	1.95 ± 1.42	20	10.3 ± 13.7	1.77 ± 0.94	50
^{3}H	4	197 ± 22	129 ± 52	20	214 ± 22	144 ± 17	20,000
^{90}Sr	4	0.417 ± 0.098	0.159 ± 0.172	20	1.37 ± 0.28	0.164 ± 0.132	8
^{99}Tc	4	0.196 ± 0.536	0.0635 ± 0.102	20	52.4 ± 7.0	2.91 ± 5.22	900
^{234}U	4	0.391 ± 0.098	0.349 ± 0.031	20	0.559 ± 0.095	0.337 ± 0.055	--[d]
^{235}U	4	0.0287 ± 0.0278	0.0168 ± 0.0098	20	0.034 ± 0.019	0.0127 ± 0.0047	--
^{238}U	4	0.374 ± 0.073	0.312 ± 0.056	20	0.478 ± 0.085	0.276 ± 0.046	--
U-Total	4	0.747 ± 0.213	0.678 ± 0.066	20	1.05 ± 0.19	0.626 ± 0.101	--

(a) Maximum values are ±2 total propagated analytical uncertainty. Averages are ±2 standard error of the calculated mean.
(b) Radionuclides are based on unfiltered samples collected by the composite system (see Section 4.2, "Surface Water and Sediment Surveillance").
(c) Appendix C, Table C.1.
(d) Dashes indicate no concentration guides are available.

Table A.3. Radionuclide Concentrations Measured in Columbia River Water at the Richland Pumphouse, 1995 Compared to Values from the Previous 5 Years

Radionuclide[b]		1995 No. of Samples	1995 Concentration,[a] pCi/L (10^{-6} µCi/mL) Maximum	1995 Concentration,[a] pCi/L (10^{-6} µCi/mL) Average	1990-1994 No. of Samples	1990-1994 Concentration,[a] pCi/L Maximum	1990-1994 Concentration,[a] pCi/L Average	Ambient Surface Water Quality Standard,[c] pCi/L
Composite System								
Alpha		12	1.47 ± 0.85	0.565 ± 0.216	79	3.38 ± 1.53	0.714 ± 0.165	15
Beta		12	3.40 ± 1.67	1.30 ± 0.62	79	9.18 ± 2.99	1.20 ± 0.43	50
^{3}H		12	114 ± 15	79.0 ± 14.9	59	211 ± 23	100 ± 8	20,000
^{90}Sr		12	0.126 ± 0.074	0.0847 ± 0.0103	77	0.175 ± 0.073	0.0876 ± 0.0073	8
^{99}Tc		12	0.296 ± 0.551	-0.0330 ± 0.0984	58	6.47 ± 2.70	0.165 ± 0.328	900
^{234}U		12	0.447 ± 0.081	0.282 ± 0.054	78	0.499 ± 0.134	0.262 ± 0.018	--[d]
^{235}U		12	0.048 ± 0.0220	0.00985 ± 0.00794	78	0.0386 ± 0.0245	0.00992 ± 0.00206	--
^{238}U		12	0.286 ± 0.060	0.207 ± 0.024	78	0.528 ± 0.136	0.212 ± 0.017	--
U-Total		12	0.781 ± 0.163	0.499 ± 0.080	78	1.05 ± 0.30	0.483 ± 0.035	--
Continuous System								
^{129}I	D	1	0.0000571 ± 0.0000047	0.0000571	16	0.000168 ± 0.000020	0.000108 ± 0.000018	--
$^{239,240}Pu$	P	1	0.0000564 ± 0.0000256	0.0000564	19	0.0000698 ± 0.0000285	0.0000172 ± 0.0000073	--
	D	1	0.0000240 ± 0.0000482	0.0000240	19	0.00215 ± 0.000376	0.000188 ± 0.000227	--

(a) Maximum values are ±2 total propagated analytical uncertainty. Averages are ±2 standard error of the calculated mean.
(b) Radionuclides measured using the continuous system show the particulate (P) and dissolved (D) fractions separately. Other radionuclides are based on unfiltered samples collected by the composite system (see Section 4.2, "Surface Water and Sediment Surveillance").
(c) Appendix C, Table C.1.
(d) Dashes indicate no concentration guides are available.

Table A.4. Radionuclide Concentrations Measured in Columbia River Water Along Cross Sections of the Hanford Reach, 1995

Transect/Radionuclide	No. of Samples	Concentration,[(a)] pCi/L Maximum	Minimum	Mean
Vernita Bridge				
^{3}H	16	39.2 ± 9.0	29.1 ± 8.3	33.6 ± 1.5
^{90}Sr	16	0.134 ± 0.060	0.0305 ± 0.103	0.0842 ± 0.0170
U-Total	16	0.581 ± 0.136	0.353 ± 0.091	0.432 ± 0.035
100-N Area				
^{3}H	10	70.0 ± 11.4	33.3 ± 8.6	38.7 ± 7.1
^{90}Sr	10	0.168 ± 0.115	0.0212 ± 0.0870	0.0882 ± 0.0341
^{99}Tc	10	0.156 ± 0.732	-0.482 ± 1.21	-0.209 ± 0.126
U-Total	10	0.484 ± 0.113	0.392 ± 0.101	0.433 ± 0.020
100-F Area				
^{3}H	10	37.9 ± 9.0	33.1 ± 8.7	36.0 ± 0.8
^{90}Sr	10	0.0907 ± 0.0584	0.0274 ± 0.0477	0.0707 ± 0.0120
U-Total	10	0.497 ± 0.140	0.358 ± 0.103	0.433 ± 0.024
Old Hanford Townsite				
^{3}H	10	190 ± 21.1	34.1 ± 8.7	52.9 ± 30.6
^{90}Sr	10	0.116 ± 0.055	0.0624 ± 0.0472	0.0886 ± 0.0084
^{99}Tc	10	-0.276 ± 1.16	-0.837 ± 1.27	-0.535 ± 0.129
U-Total	10	0.451 ± 0.110	0.344 ± 0.095	0.385 ± 0.019
300 Area				
^{3}H	10	128 ± 15.9	25.0 ± 8.0	48.6 ± 19.9
^{90}Sr	10	0.120 ± 0.102	0.0198 ± 0.0404	0.0844 ± 0.0180
U-Total	10	0.609 ± 0.153	0.380 ± 0.102	0.474 ± 0.051
Richland Pumphouse				
^{3}H	40	224 ± 23.3	25.6 ± 8.3	51.7 ± 12.7
^{90}Sr	40	0.476 ± 0.100	0.0305 ± 0.107	0.117 ± 0.035
U-Total	40	0.751 ± 0.170	0.297 ± 0.082	0.439 ± 0.033

(a) Maximum and minimum values are ±2 total propagated analytical uncertainty. Mean values are ±2 standard error of the mean.

Table A.5. Select Provisional U.S. Geological Survey Columbia River Water Quality Data, 1995[a]

Analysis	Units	Vernita Bridge (upstream) No. of Samples	Maximum	Median	Minimum	Richland Pumphouse (downstream) No. of Samples	Maximum	Median	Minimum	Washington Ambient Surface Water Quality Standard[b]
Temperature	°C	4	20.0	15.0	3.5	3	19.0	11.5	3.5	20 (maximum)
Dissolved oxygen	mg/L	4	13.2	11.2	9.1	3	12.6	12.2	9.2	8 (minimum)
Turbidity	NTU[c]	4	1.7	1.2	0.7	3	2.1	1.1	1.1	5 + background
pH	pH units	4	8.2	8.0	8.0	3	8.2	8.1	8.0	6.5 - 8.5
Fecal coliform	#/100 mL	4	8	2[d]	1	3	6	5[d]	3	100
Suspended solids, 105°C	mg/L	1	2	2	2	2	6	5	4	--[e]
Dissolved solids, 180°C	mg/L	4	85	79	71	3	87	84	81	--
Specific conductance	µS/cm[f]	4	148	137	132	3	152	140	137	--
Total hardness, as $CaCO_3$	mg/L	4	70	60	56	3	70	63	60	--
Phosphorus, total	mg/L	4	0.01	<0.01	<0.01	3	0.02	<0.01	<0.01	--
Chromium, dissolved	µg/L	0	NR[g]	NR	NR	3	<1	<1	<1	--
Dissolved organic carbon	mg/L	4	3.3	3.0	2.3	3	3.5	3.2	3.0	--
Iron, dissolved	µg/L	4	15	9	3	3	14	10	6	--
Ammonia, dissolved, as N	mg/L	4	0.02	0.02	<0.015	3	<0.015	<0.015	<0.015	--
Nitrogen, total Kjeldahl, as N	mg/L	4	0.4	0.4	0.2	3	0.4	0.4	0.3	--
Nitrite + Nitrate, dissolved, as N	mg/L	4	0.25	0.08	<0.05	3	0.27	<0.05	<0.05	--

(a) Provisional data from USGS National Stream Quality Accounting Network (NASQAN), subject to revision.
(b) See Appendix C, Table C.1.
(c) NTU = nephelometric turbidity units.
(d) Annual geometric mean.
(e) Dashes indicate no standard available.
(f) µ Siemens/cm.
(g) NR = not reported.

Table A.6. Radionuclide Concentrations in Columbia River and Riverbank Spring Sediment, 1995 Compared to Values from the Previous 5 Years

Location	Radionuclide	1995 Number of Samples	1995 Concentration, pCi/g Maximum[b]	1995 Concentration, pCi/g Median	1990-1994[a] Number of Samples	1990-1994[a] Concentration, pCi/g Maximum[b]	1990-1994[a] Concentration, pCi/g Median
River Sediment							
Priest Rapids Dam	^{60}Co	4	0.0100 ± 0.0126	-0.00111	20	0.0379 ± 0.0493	0.00290
	^{137}Cs	4	0.505 ± 0.061	0.434	20	1.02 ± 0.14	0.484
	^{155}Eu	4	0.101 ± 0.050	0.0513	20	0.107 ± 0.084	0.0454
	^{239,240}Pu	4	0.0106 ± 0.0022	0.00764	20	0.0175 ± 0.0032	0.00868
	^{90}Sr	4	0.0157 ± 0.0048	0.0124	20	0.0224 ± 0.0078	0.0132
	^{235}U	4	0.317 ± 0.167	0.137	20	0.137 ± 0.155	0.0372
	^{238}U	4	2.23 ± 0.71	1.43	20	1.71 ± 0.65	0.835
White Bluffs Slough	^{60}Co	1	0.114 ± 0.025	0.114	5	0.0977 ± 0.0258	0.0740
	^{137}Cs	1	0.693 ± 0.077	0.693	5	0.925 ± 0.103	0.733
	^{155}Eu	1	0.0498 ± 0.0371	0.0498	5	0.0646 ± 0.0820	0.0522
	^{239,240}Pu	1	0.00314 ± 0.00113	0.00314	5	0.00726 ± 0.00174	0.00402
	^{90}Sr	1	0.00517 ± 0.00303	0.00517	5	0.0133 ± 0.0045	0.00654
	^{235}U	1	0.155 ± 0.119	0.155	5	0.191 ± 0.044	0.0267
	^{238}U	1	1.66 ± 0.49	1.66	5	2.30 ± 0.26	0.828
100-F Slough	^{60}Co	1	0.0275 ± 0.0106	0.0275	5	0.0369 ± 0.024	0.0240
	^{137}Cs	1	0.486 ± 0.054	0.486	5	0.758 ± 0.082	0.149
	^{155}Eu	1	0.0162 ± 0.0276	0.0162	5	0.0636 ± 0.0477	0.0518
	^{239,240}Pu	1	0.00242 ± 0.00082	0.00242	5	0.00153 ± 0.00069	0.000907
	^{90}Sr	1	0.00220 ± 0.00515	0.00220	5	0.00468 ± 0.00328	0.00367
	^{235}U	1	0.00191 ± 0.00160	0.00191	5	0.0587 ± 0.0266	0.0352
	^{238}U	1	0.121 ± 0.016	0.121	5	1.40 ± 0.16	0.878
Hanford Slough	^{60}Co	1	0.315 ± 0.046	0.315	5	0.0850 ± 0.0219	0.0284
	^{137}Cs	1	0.572 ± 0.067	0.572	5	0.516 ± 0.060	0.105
	^{155}Eu	1	0.0781 ± 0.0382	0.0781	5	0.0848 ± 0.0793	0.0700
	^{239,240}Pu	1	0.00729 ± 0.00234	0.00729	5	0.00323 ± 0.00072	0.00174
	^{90}Sr	1	0.00590 ± 0.00331	0.00590	5	0.00806 ± 0.00352	0.00634
	^{235}U	1	0.235 ± 0.159	0.235	5	0.123 ± 0.033	0.0839
	^{238}U	1	2.38 ± 0.88	2.38	5	2.11 ± 0.23	0.942

Table A.6. Radionuclide Concentrations in Columbia River and Riverbank Spring Sediment, 1995 Compared to Values from the Previous 5 Years (contd)

		1995			1990-1994[a]		
		Number of	Concentration, pCi/g		Number of	Concentration, pCi/g	
Location	Radionuclide	Samples	Maximum[b]	Median	Samples	Maximum[b]	Median
Richland	^{60}Co	1	0.0650 ± 0.0223	0.0650	5	0.0754 ± 0.0243	0.0514
	^{137}Cs	1	0.342 ± 0.0420	0.342	5	0.406 ± 0.053	0.310
	^{155}Eu	1	0.0655 ± 0.0339	0.0655	5	0.0771 ± 0.0446	0.0501
	^{239,240}Pu	1	0.00231 ± 0.00077	0.00231	5	0.00304 ± 0.00071	0.00199
	^{90}Sr	1	0.00273 ± 0.00271	0.00273	5	0.00301 ± 0.00297	0.000826
	^{235}U	1	-0.112 ± 0.136	-0.112	5	0.136 ± 0.080	0.0794
	^{238}U	1	1.59 ± 0.56	1.59	5	2.33 ± 0.27	1.16
McNary Dam	^{60}Co	4	0.168 ± 0.032	0.0790	20	0.367 ± 0.061	0.129
	^{137}Cs	4	1.02 ± 0.11	0.454	20	1.19 ± 0.14	0.527
	^{155}Eu	4	0.0679 ± 0.0500	0.0484	20	0.154 ± 0.085	0.0784
	^{239,240}Pu	4	0.0143 ± 0.0026	0.0112	20	0.0144 ± 0.0018	0.00786
	^{90}Sr	4	0.0392 ± 0.0134	0.0257	20	0.0614 ± 0.0135	0.0266
	^{235}U	4	0.201 ± 0.159	0.182	20	0.119 ± 0.067	0.0379
	^{238}U	4	2.33 ± 0.71	1.98	20	1.98 ± 0.80	1.09
					1993-1994[a]		
Riverbank Spring Sediment							
100-B Spring	^{60}Co	1	0.0291 ± 0.0097	0.0291	0		
	^{137}Cs	1	0.0953 ± 0.0153	0.0953	0		
	^{155}Eu	1	0.0646 ± 0.0214	0.0646	0		
	^{90}Sr	1	0.00409 ± 0.00499	0.00409	0		
	^{235}U	1	-0.0166 ± 0.136	-0.0166	0		
	^{238}U	1	1.09 ± 0.50	1.09	0		
100-K Spring	^{60}Co	1	0.00734 ± 0.0205	0.00734	0		
	^{137}Cs	1	0.148 ± 0.047	0.148	0		
	^{155}Eu	1	0.131 ± 0.066	0.131	0		
	^{90}Sr	1	0.00125 ± 0.00465	0.00125	0		
	^{235}U	1	0.205 ± 0.135	0.205	0		
	^{238}U	1	1.53 ± 0.54	1.53	0		

Table A.6. Radionuclide Concentrations in Columbia River and Riverbank Spring Sediment, 1995 Compared to Values from the Previous 5 Years (contd)

		1995			1993-1994[a]		
		Number of	Concentration, pCi/g		Number of	Concentration, pCi/g	
Location	Radionuclide	Samples	Maximum[b]	Median	Samples	Maximum[b]	Median
100-F Spring	^{60}Co	1	0.00441 ± 0.0151	0.00441	0		
	^{137}Cs	1	0.190 ± 0.035	0.190	0		
	^{155}Eu	1	0.0370 ± 0.0354	0.0370	0		
	^{90}Sr	1	0.00427 ± 0.00442	0.00427	0		
	^{235}U	1	0.173 ± 0.134	0.173	0		
	^{238}U	1	1.19 ± 1.00	1.19	0		
Hanford Townsite Spring	^{60}Co	1	0.864 ± 0.0149	0.0864	2	0.0900 ± 0.0211	0.0632
	^{137}Cs	1	0.287 ± 0.032	0.287	2	0.250 ± 0.036	0.217
	^{155}Eu	1	0.0616 ± 0.0197	0.0616	2	0.0606 ± 0.0329	0.0558
	^{90}Sr	1	0.00863 ± 0.0111	0.00863	2	0.00682 ± 0.00470	0.00456
	^{235}U	1	0.234 ± 0.141	0.234	2	0.0232 ± 0.0068	0.0104
	^{238}U	1	1.88 ± 0.54	1.88	2	0.974 ± 0.286	0.716
300 Area Spring	^{60}Co	1	0.0155 ± 0.0076	0.0155	2	0.0139 ± 0.0113	0.00125
	^{137}Cs	1	0.0699 ± 0.0120	0.0699	2	0.0736 ± 0.0166	0.0648
	^{155}Eu	1	0.0446 ± 0.0223	0.0446	2	0.126 ± 0.139	0.0951
	^{90}Sr	1	0.00760 ± 0.00654	0.00760	2	0.0124 ± 0.0060	0.00945
	^{235}U	1	0.406 ± 0.165	0.406	2	0.124 ± 0.159	0.0714
	^{238}U	1	5.19 ± 1.09	5.19	2	4.24 ± 0.58	3.72

(a) 1995 river sediment values compared to values from 1990 through 1994; 1995 Riverbank spring sediment values compared to values from 1993 through 1994.
(b) Values are ±2 total propagated analytical uncertainty.

Table A.7. Median Metal Concentrations in Columbia River Sediment, 1995

Metal	Median Concentration, mg/kg dry weight			
	Priest Rapids Dam	Hanford Reach	McNary Dam	Riverbank Springs
Aluminum	12,000	8,100	20,000	7,900
Antimony	4.3	3.7	5.5	3.8
Arsenic	NR[a]	NR	NR	5.3
Barium	92	64	150	61
Beryllium	0.32	0.20	0.66	0.23
Cadmium	4.2	2.2	2.9	1.0
Calcium	5,100	4,800	5,800	5,900
Chromium	21	17	26	36
Cobalt	7.7	6.7	11	5.5
Copper	25	23	33	19
Iron	20,000	20,000	29,000	17,000
Lead	21	23	7.6	24
Magnesium	5,700	4,400	6,300	3,900
Manganese	290	230	590	254
Nickel	20	13	21	14
Potassium	1,500	1,200	2,500	890
Selenium	NR	NR	NR	0.17
Silver	0.93	0.92	1.4	0.80
Sodium	400	390	440	320
Thallium	NR	NR	NR	1.2
Tin	4.9	6.9	6.3	4.4
Vanadium	48	56	55	50
Zinc	420	350	270	160

(a) NR = not reported.

Table A.8. Radionuclide Concentrations Measured in Riverbank Spring Water, 1995 Compared to Values from the Previous 5 Years

Location/Radionuclide	1995 No. of Samples	1995 Concentration,[a] pCi/L (10^{-6} µCi/L) Maximum	1995 Concentration,[a] pCi/L (10^{-6} µCi/L) Median	1990-1994 No. of Samples	1990-1994 Concentration,[a] pCi/L Maximum	1990-1994 Concentration,[a] pCi/L Median	Washington Ambient Surface Water Quality Standard, pCi/L
100-B Spring							
Alpha	1	2.44 ± 1.24	2.44	4	3.54 ± 1.78	1.61	15[b]
Beta	1	12.4 ± 2.6	12.4	4	38.1 ± 4.6	9.63	50
^{3}H	1	22,500 ± 1,730	22,500	4	14,300 ± 1,190	13,400	20,000
^{90}Sr	1	0.0198 ± 0.149	0.0198	4	0.0724 ± 0.109	0.0150	8
^{99}Tc	1	25.3 ± 3.2	25.3	4	23.5 ± 4.18	10.1	900
U-total	1	3.16 ± 0.40	3.16	4	1.98 ± 0.282	1.65	--
100-K Spring							
Alpha	1	0.609 ± 0.722	0.609	2	1.63 ± 1.23	1.50	15[b]
Beta	1	1.84 ± 1.61	1.84	2	3.60 ± 2.53	3.16	50
^{3}H	1	19,700 ± 1,530	19,700	2	18,300 ± 1,470	18,050	20,000
^{90}Sr	1	-0.0244 ± 0.116	-0.0244	2	0.106 ± 0.129	0.0375	8
^{99}Tc	1	-0.0211 ± 0.512	-0.0211	2	0.805 ± 0.579	0.628	900
U-total	1	1.27 ± 0.22	1.27	2	2.28 ± 0.32	2.24	--
100-N Spring							
Alpha	1	0.0426 ± 0.356	0.0426	5	8.92 ± 13.8	1.67	15[b]
Beta	1	1.48 ± 1.49	1.48	5	24,100 ± 1,730	8.79	50
^{3}H	1	12,000 ± 969	12,000	5	30,900 ± 2,380	28,500	20,000
^{90}Sr	1	0.0790 ± 0.104	0.0790	5	10,900 ± 2,020	0.129	8
^{99}Tc	1	0.842 ± 0.617	0.842	5	2.44 ± 0.68	2.09	900
U-total	1	0.239 ± 0.078	0.239	3	2.47 ± 0.37	0.771	--
100-D Spring							
Alpha	2	1.28 ± 0.83	1.10	4	2.90 ± 1.91	1.92	15[b]
Beta	2	9.30 ± 2.39	5.72	4	20.8 ± 3.3	13.4	50
^{3}H	2	5,870 ± 531	2,980	4	12,500 ± 1,040	7,270	20,000
^{90}Sr	2	3.96 ± 0.87	2.01	4	9.41 ± 1.78	5.72	8
^{99}Tc	2	-0.117 ± 0.542	-0.150	4	0.0782 ± 0.522	-0.00680	900
U-total	2	1.25 ± 0.21	0.768	4	1.92 ± 0.28	1.40	--
100-H Spring							
Alpha	1	3.91 ± 1.64	3.91	4	4.59 ± 1.93	4.38	15[b]
Beta	1	39.4 ± 4.7	39.4	4	69.1 ± 7.05	61.6	50
^{3}H	1	1,100 ± 194	1,100	4	1,190 ± 236	1,140	20,000
^{90}Sr	1	12.4 ± 2.4	12.4	4	25.2 ± 4.5	17.9	8
^{99}Tc	1	136 ± 15	136	4	133 ± 15	87.2	900
U-total	1	7.95 ± 1.01	7.95	4	8.35 ± 1.22	6.12	--

Table A.8. Radionuclide Concentrations Measured in Riverbank Spring Water, 1995 Compared to Values from the Previous 5 Years (contd)

Location/Radionuclide	1995 No. of Samples	1995 Concentration,[a] pCi/L (10^{-6} µCi/L) Maximum	1995 Median	1990-1994 No. of Samples	1990-1994 Concentration,[a] pCi/L Maximum	1990-1994 Median	Washington Ambient Surface Water Quality Standard, pCi/L
100-F Spring							
Alpha	1	3.73 ± 1.71	3.73	1	2.61 ± 1.40	2.61	15[b]
Beta	1	1.74 ± 1.63	1.74	1	2.04 ± 1.63	2.04	50
^{3}H	1	1,620 ± 233	1,620	1	623 ± 215	623	20,000
^{90}Sr	1	-0.0303 ± 0.0427	-0.0303	1	0.0986 ± 0.0906	0.0986	8
^{99}Tc	1	NR[c]	NR	1	-0.0303 ± 0.629	-0.0303	900
U-total	1	3.37 ± 0.46	3.37	1	4.62 ± 0.67	4.62	--
Old Hanford Townsite							
Alpha	1	0.821 ± 0.854	0.821	6	4.88 ± 2.17	3.26	15[b]
Beta	1	6.12 ± 2.08	6.12	6	94.9 ± 137	28.8	50
^{3}H	1	22,200 ± 1,710	22,200	6	173,000 ± 12,700	148,000	20,000
^{90}Sr	1	0.0823 ± 0.115	0.0823	4	0.123 ± 0.167	-0.244	8
^{99}Tc	1	6.11 ± 1.09	6.11	6	131 ± 16	114	900
^{129}I	1	0.0638 ± 0.0057	0.0638	1	0.0435 ± 0.347	0.0435	1
U-total	1	2.32 ± 0.34	2.32	4	4.29 ± 0.52	3.38	--
300 Area							
Alpha	1	41.6 ± 8.8	41.6	6	110 ± 21.2	72.6	15[b]
Beta	1	6.42 ± 2.03	6.42	6	29.3 ± 4.7	17.8	50
^{3}H	1	11,600 ± 940	11,600	6	11,300 ± 954	9,700	20,000
^{90}Sr	1	0.195 ± 0.11	0.195	4	0.198 ± 0.107	0.132	8
^{99}Tc	1	13.5 ± 1.9	13.5	5	12.7 ± 2.0	2.07	900
^{129}I	1	0.00492 ± 0.00063	0.00492	1	0.00439 ± 0.00042	0.00439	1
U-total	1	86.9 ± 9.2[d]	86.9[d]	6	129 ± 12	82.4	--

(a) Maximum values are ±2 total propagated analytical uncertainty.
(b) Total alpha activity (excluding uranium).
(c) NR = not reported.
(d) 1995 result is the sum of uranium-234 and uranium-238 concentrations. Uranium-235 was not reported.

Table A.9. Concentrations of Polycyclic Aromatic Hydrocarbons (PAH) in Air, 1995

Analyte	200-East SE Concentration,[a] pg/m^3 Maximum	200-East SE Concentration,[a] pg/m^3 Average	300 Area Concentration,[a] pg/m^3 Maximum	300 Area Concentration,[a] pg/m^3 Average	Rattlesnake Springs Concentration,[a] pg/m^3 Maximum	Rattlesnake Springs Concentration,[a] pg/m^3 Average	pg/m^3 Risk-Based[b] Concentration
Phenanthrene	1,200	800 ± 720	3,000	2,500 ± 980	3,400	1,400 ± 2,700	NA[c]
Fluoranthene	180	140 ± 90	570	460 ± 230	650	320 ± 440	150,000,000 N[d]
Pyrene	94	58 ± 62	530	380 ± 250	240	110 ± 180	110,000,000 N
Fluorene	360	170 ± 340	610	270 ± 470	130	50 ± 110	150,000,000 N
Chrysene	51	30 ± 36	400	150 ± 330	37	26 ± 22	1,000,000 C[e]
Benzo(b)fluoranthene	72	43 ± 48	240	130 ± 190	50	33 ± 30	10,000 C
Anthracene	8.2	5.6 ± 4.7	160	116 ± 92	110	38 ± 100	1,100,000,000 N
Benz(a)anthracene			62	36 ± 74			10,000 C
Indeno(123-cd)pyrene	5	3.4 ± 4.7	62	35 ± 48	8.1	8.1	10,000 C
Acenaphthene	13	13	43	27 ± 33	7.7	3.5 ± 7.3	220,000,000 N
Benzo(k)fluoranthene	15	9 ± 12	44	25 ± 41	8.1	3.5 ± 8	100,000 C
Benzo(g,h,i)perylene	0.65	0.65	48	23 ± 44			NA
Dibenzo(a,h)anthracene			16	16			1,000 C
Acenaphthylene			24	16 ± 23			220,000,000 N

(a) Average ±2 standard error of the calculated mean.
(b) From *U.S. EPA Region III Risk-Based Concentration Table*, R. L. Smith, February 9, 1995. The listed values are the lowest of the carcinogenic (target cancer risk 1 x 10^{-6}) and non-carcinogenic (target hazard quotient of 1.0) risk-based concentrations.
(c) NA = not available.
(d) N = non-carcinogenic risk.
(e) C = carcinogenic risk.

Table A.10. Concentrations of Polychlorinated Biphenyls (PCBs) in Air, 1995

PCB Number	200-East SE Concentration,[a] pg/m^3 Maximum	200-East SE Concentration,[a] pg/m^3 Average	300 Area Concentration,[a] pg/m^3 Maximum	300 Area Concentration,[a] pg/m^3 Average	Rattlesnake Springs Concentration,[a] pg/m^3 Maximum	Rattlesnake Springs Concentration,[a] pg/m^3 Average
101	150	150	270	160 ± 330	180	110 ± 140
138	190	110 ± 180	240	130 ± 200	210	100 ± 160
87	120	120	190	110 ± 170	140	100 ± 110
118	220	140 ± 230	300	150 ± 270	250	89 ± 210
105	120	120	160	70 ± 150	130	54 ± 130
153	140	140	190	68 ± 160	160	53 ± 140
28	89	89	70	70	40	40 ± 1.9
52	86	86	82	58 ± 53	28	25 ± 8.9
187	24	24	35	9.4 ± 34	29	29
44			46	46	17	17
128	45	45	60	20 ± 53	51	17 ± 46
18					15	15
180	34	18 ± 45	42	15 ± 37	36	12 ± 32
170	14	7.8 ± 18	17	7.2 ± 13	15	8.8 ± 17
49	16	16	74	45 ± 81	9	6.5 ± 7.1
183	13	13	19	7.2 ± 20	15	4.1 ± 15
195	0.90	0.90	0.96	0.96	0.84	0.84
104					0.73	0.73
184			0.32	0.32	0.54	0.54
Total PCBs[b,c]	1,100	490 ± 530	1,700	660 ± 720	1,300	500 ± 550

(a) Average ±2 standard error of the calculated mean.
(b) Sum of the individual congeners.
(c) Risk-based concentration of 810 pg/m^3 for a 1 x 10^{-6} target carcinogenic risk for total PCBs: from *U.S. EPA Region III Risk-Based Concentration Table*, R. L. Smith, February 9, 1995. Risk-based concentrations were not available for the individual PCBs.

Table A.11. Concentrations of Chlorinated Pesticides in Air, 1995

Analyte	200-East SE Concentration,[a] pg/m³ Maximum	200-East SE Concentration,[a] pg/m³ Average	300 Area Concentration,[a] pg/m³ Maximum	300 Area Concentration,[a] pg/m³ Average	Rattlesnake Springs Concentration,[a] pg/m³ Maximum	Rattlesnake Springs Concentration,[a] pg/m³ Average	pg/m³ Risk-Based Concentrations[b]
Endosulfan I	1,300	590 ± 1,010	13,000	3,500 ± 6,500	1,200	550 ± 990	22,000,000 N[c]
Endosulfan II	120	89 ± 89	2,100	750 ± 2,400	120	66 ± 92	22,000,000 N
g-BHC[d]	71	39 ± 59	150	80 ± 120	65	30 ± 60	4,800 C[e]
a-BHC	120	85 ± 57	98	78 ± 33	93	68 ± 37	990 C
Methoxyclor	160	98 ± 180	98	69 ± 83	102	42 ± 106	NA[f]
Hexachlorbenzene	120	40 ± 110	140	55 ± 120	63	38 ± 72	3,900 C
4,4'-DDE	38	27 ± 35	98	52 ± 74	42	22 ± 31	18,000 C
Dieldrin	14	9.7 ± 8.6	80	41 ± 59	8.5	7.6 ± 2.6	390 C
Endosulfan sulfate	17	8.1 ± 15	63	28 ± 62	16	8 ± 15	NA
4,4'-DDT	30	13 ± 29	48	26 ± 31	36	14 ± 30	18,000 C
d-BHC	15	9.1 ± 18	30	22 ± 22	6.9	5.3 ± 4.7	3,500 C[g]
g-Chlordane	11	6.4 ± 9.7	28	12 ± 23	3.9	3.4 ± 1.5	4,900 C
2,4'-DDT	4.6	3.8 ± 2.3	12	8.3 ± 7.7	3.3	2.9 ± 1.2	18,000 C
Trans Nonachlor	2.8	2.8	17	7.7 ± 12	0.44	0.44	NA
Mirex	1.3	1.3	5.3	3.4 ± 5.4			3,500 C
a-Chlordane	1.4	0.87 ± 1.6	7.9	3.2 ± 8.2			4,900 C

(a) Average ±2 standard error of the calculated mean.
(b) From: *U.S EPA Region III Risk-Based Concentration Table*, R. L. Smith, February 9, 1995. The listed values are the lowest of the carcinogenic (target cancer risk 1 x 10^{-6}) and non-carcinogenic (target hazard quotient of 1.0) risk-based concentrations.
(c) N = non-carcinogenic risk.
(d) BHC = hexachlorocyclohexane; g-BHC is also called lindane.
(e) C = carcinogenic risk.
(f) NA = not available.
(g) Risk-based concentration for technical BHC.