Appendix C: Reference Standards and Data for Water

Table C.1. Reference standards for radionuclides in water (pCi/L)

Parameter[a]	National primary drinking water standard[b]	4% of DCG[c]	DCG[d]
^{241}Am		1.2	30
^{214}Bi		24,000	600,000
^{109}Cd		400	10,000
^{143}Ce		1,200	30,000
^{60}Co		200	5,000
^{51}Cr		40,000	1,000,000
^{137}Cs		120	3,000
^{155}Eu		4,000	100,000
Gross alpha[e]	15		
Gross beta (mrem/year)	4[f]		
^{3}H	20,000[g]	80,000	2,000,000
^{131}I		120	3,000
^{40}K		280	7,000
^{237}Np		1.2	30
^{234m}Pa		2,800	70,000
^{238}Pu		1.6	40
$^{239/240}$Pu		1.2	30
^{226}Ra	5[h]	4	100
^{228}Ra	5[h]	4	100
^{106}Ru		240	6,000
^{90}Sr	8[g]	40	1,000
^{99}Tc		4,000	100,000
^{228}Th		16	400
^{230}Th		12	300
^{232}Th		2	50
^{234}Th		400	10,000
Thorium, natural		2	50
^{234}U		20	500
^{235}U		24	600
^{236}U		20	500
^{238}U		24	600
Uranium, natural		24	600
Uranium, total[i]		20	500

[a]Only the radionuclides included in the Oak Ridge Reservation monitoring programs are listed.

[b]40 CFR Part 141 National Primary Drinking Water Regulations Subparts B and G.

[c]Four percent of the derived concentration guide represents the DOE criterion of 4 mrem effective dose equivalent from ingestion of drinking water.

[d]U.S. DOE Order 5400.5 Chapter III, "Derived Concentration Guides for Air and Water."

[e]Excludes radon and uranium.

[f]Per the discussion in 40 CFR 141.26(b), compliance with the 4 mrem/year standard can be assumed if the average annual gross beta particle activity is less than 50 pCi/L and if the average annual concentrations of ^{3}H and ^{90}Sr are less than 20,000 pCi/L and 8 pCi/L, respectively, provided that, if both radionuclides are present, the sum of their annual dose equivalents to bone marrow is less than 4 mrem/year. In the text of this document, 50 pCi/L is referred to as the "screening level."

[g]These values are not maximum contaminant levels (MCLs), but are concentrations that result in the effective dose equivalent of the MCL for gross beta emissions, which is 4 mrem/year.

[h]Applies to combined ^{226}Ra and ^{228}Ra.

[i]Minimum of uranium isotopes.

Table C.2. Reference standards for chemicals and metals in water

Parameter	National drinking water standards		Tennessee water quality criteria[c]			
	Primary[a]	Secondary[b]	Domestic water supply	Fish and aquatic life CMC	Recreation	
					Organisms	Water and organisms[d]
Anions (mg/L)						
Chloride		250				
Fluoride	4	2				
Nitrate	10					
Nitrite	1					
Sulfate, as SO_4		250				
Base/neutral/acid extractable organics (µg/L)						
1,2-Dichlorobenzene (*ortho*)	600		600		17,000	2,700
1,2,4-Trichlorobenzene	70		70			
1,3-Dichlorobenzene (*meta*)					2,600	400
1,4-Dichlorobenzene (*para*)	75		75		2,600	400
2,4-Dinitrophenol					14,000	70
2,4-Dinitrotoluene					91	1.1
2,4,6-Trichlorophenol					65	21
2-Methyl-4,6-Dinitrophenol					765	13.4
3,4-Benzo(b)fluoranthene					0.49	0.044
Benzo(k)fluoranthene					0.49	0.044
Acenaphthylene					2,700	1,200
Anthracene					110,000	9,600
Benzo(a)anthracene					0.49	0.044
Benzo(a)pyrene	0.2		0.2		0.49	0.044
bis-(2-chloroethyl)ether					14	0.31
bis-(2-ethylhexyl)phthalate	6	6			59	18
Di-n-butyl phthalate					12,000	2,700
Diethyl phthalate					120,000	23,000
Dimethyl phthalate					2,900,000	313,000
Fluoranthene					370	300
Fluorene					14,000	1,300
Hexachlorobenzene	1		1		0.0077	0.0075
Hexachlorocyclopentadiene	50		50		17,000	240
Hexachloroethane					89	19
Nitrobenzene					1,900	17
Pentachlorophenol (pH 7.8)	1		1	20	82	2.8
Pyrene					11,000	960
Field measurements						
Chlorine, mg/L				19		
Dissolved oxygen, mg/L				5		
Temperature, °C			30.5		30.5	30.5
Turbidity, JTU[e]	1					
pH, standard units		(6.5, 8.5)	(6.0, 9.0)	(6.5, 8.5)	(6.0, 9.0)	(6.0, 9.0)

Table C.2 (continued)

Parameter	National drinking water standards		Tennessee water quality criteria[c]			
	Primary[a]	Secondary[b]	Domestic water supply	Fish and aquatic life CMC	Recreation	
					Organisms	Water and organisms[d]
Metals (mg/L)						
Aluminum		0.05-0.2				
Antimony	0.006		0.006		4.30	0.014
Arsenic	0.05		0.05	360 (III)	0.0014	0.00018
Barium	2		2			
Beryllium	0.004		0.004			
Cadmium	0.005		0.005	0.0039[f]		
Chromium, total	0.1		0.1			
Chromium (hexavalent)				0.016		
Copper	1.3[g]	1		0.0177[f]		
Iron		0.3				
Lead	0.015[g]		0.005	0.0817[f]		
Manganese		0.05				
Mercury	0.002		0.002	1.69	0.00005	0.000051
Nickel			0.1	1.418[f]	4.6	0.61
Selenium	0.05		0.050	0.02		
Silver		0.1		0.0041[f]		
Thallium	0.002		0.002		0.0063	0.0017
Zinc		5		0.117[f]		
Others						
Asbestos (fibers/L)	7,000,000					
Coliform bacteria[h]						
Color (color units)		15				
Cyanide (mg/L)	0.2		0.2	0.022	220	0.7
Odor (threshold odor number)		3				
Total dissolved solids (mg/L)		500	500			
Pesticides/herbicides/PCBs (µg/L)						
2,3,7,8-TCDD (Dioxin)	0.00003		0.00003		0.000001	0.000001
2,4-D	70		70			
2,4,5-TP (Silvex)	50		50			
4,4′-DDT				1.1	0.0059	0.0059
4,4′-DDE					0.0059	0.0059
4,4′-DDD					0.0084	0.0083
Alachlor	2		2			
Aldrin				3	0.0014	0.0013
Atrazine	3		3			
Carbofuran	40		40			
Chlordane	2		2	2.4	0.0059	0.0057
Dalapon	200		200			
1,2-Dibromo-3-chloropropane	0.2		0.2			
Di(ethylhexyl)adipate	400		400			

Table C.2 (continued)

Parameter	National drinking water standards		Tennessee water quality criteria[c]			
	Primary[a]	Secondary[b]	Domestic water supply	Fish and aquatic life CMC	Recreation	
					Organisms	Water and organisms[d]
Di(ethylhexyl)phthalate[i]						
Dinoseb	7		7			
Diquat	20		20			
a-Endosulfan				0.22	159	74
b-Endosulfan				0.22	159	74
Endothall	100		100			
Endrin	2		2	0.18	0.81	0.76
Ethylene dibromide	0.05		0.05			
Glyphosate	700		700			
Heptachlor	0.4		0.4	0.52	0.0021	0.0021
Heptachlor epoxide	0.2		0.2	0.52	0.0011	0.001
g-BHC (Lindane)	0.2		0.2	2	0.63	0.19
Methoxychlor	40		40			
Oxamyl (Vydate)	200		200			
PCB-1242					0.00045	0.00044
PCB-1254					0.00045	0.00044
PCB-1221					0.00045	0.00044
PCB-1232					0.00045	0.00044
PCB-1248					0.00045	0.00044
PCB-1260					0.00045	0.00044
PCB-1016					0.00045	0.00044
PCB, total	0.5		0.5		0.00045	0.00044
Picloram	500		500			
Simazine	4		4			
Toxaphene	3		3	0.73	0.0075	0.0073
Volatile organics (µg/L)						
1,1,1-Trichloroethane	200		200			
1,1-Dichloroethene	7		7		32	0.57
1,1,2-Trichloroethane	5		5		420	6
1,1,2,2-Tetrachloroethane					110	1.7
1,2-Dichloroethane	5		5		990	3.8
1,2-Dichloroethene[j]						
cis-1,2-Dichloroethene	70		70			
trans-1,2-Dichloroethene	100		100			700
1,2-Dichloropropane	5		5		39	0.52
cis-1,3-Dichloropropene					1,700	10
trans-1,3-Dichloropropene					1,700	10
Acrolein					780	320
Acrylonitrile					6.6	0.59
Benzene	5		5		710	12
Bromodichloromethane	100[k]				220	2.7

Table C.2 (continued)

Parameter	National drinking water standards		Tennessee water quality criteria[c]			
	Primary[a]	Secondary[b]	Domestic water	Fish and aquatic life CMC	Recreation	
					Organisms	Water and organisms[d]
Bromoform	100[k]				3,600	43
Carbon tetrachloride	5		5		44	2.5
Chlorobenzene	100				21,000	680
Chloroform	100[k]				4,700	57
Dibromochloromethane	100[k]				340	4.1
Ethylbenzene	700		700		29,000	3,100
Methylene chloride (Dichloromethane)	5		5		16,000	47
Styrene	100		100			
Tetrachloroethene	5		5		88.5	8
Toluene	1,000		1,000		200,000	6,800
Trichloroethene	5		5		810	27
Trihalomethanes, total	100					
Vinyl chloride	2		2		5,250	20
Xylene, total	10,000		10,000			

[a]40 CFR Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.

[b]40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.

[c]Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, as amended. CMC = criterion maximum concentration.

[d]These criteria, for the protection of public health, pertain to the consumption of water and organisms. They are applied only to waters designated for *both* recreation and domestic water supply.

[e]Jackson turbidity unit (JTU) and nephelometric turbidity unit (NTU) are roughly equivalent in the range of 25 to 1000 JTU.

[f]The standard is a function of total hardness. The values in this table correspond to a total-hardness value of 100 mg/L.

[g]"Action level" for initiation of corrosion control studies and treatment techniques, applicable to community water systems and nontransient, noncommunity water systems.

[h]Standard no longer numeric, but based on presence or absence in sample.

[i]See bis(2-ethylhexyl)phthalate.

[j]See *cis*-1,3-Dichlorethene and *trans*-1,3-Dichloroethene.

[k]Limit for total trihalomethanes (bromodichloromethane + bromoform + chloroform + dibromochloromethane).

Table C.3. Surface water analyses (2001) at Environmental Monitoring Plan surface water locations[a]

Parameter	N det/ N total	Concentration			Standard error[d]	TWQC[e]
		Max[b]	Min[b]	Avg[c]		
First Creek just upstream of Northwest Tributary (FCK 0.1)						
Field measurements						
Dissolved oxygen (ppm)	2/2	11	8.4	9.6	1.2	*f*
pH (SU)	2/2	7.8	7.8	*f*	*f*	*f*
Temperature (°C)	2/2	19	12	15	3.4	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	2/2	32*	4.1*	18	14	*f*
Gross beta	2/2	350*	55*	200	150	*f*
Total rad Sr	2/2	200*	27*	110	87	40
Total uranium	1/1	20*	20*	20	*f*	20
$^{233/234}$U	2/2	19*	2.4*	11	8.3	*f*
^{238}U	½	0.88*	0.074	0.48	0.40	24
Bear Creek downstream from all DOE inputs (BCK 0.6)						
Field measurements						
Dissolved oxygen (ppm)	2/2	11	10	11	0.30	*f*
pH (SU)	2/2	8.0	7.9	*f*	*f*	*f*
Temperature (°C)	2/2	15	12	14	1.8	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	2/2	12*	8.7*	10	1.7	*f*
Gross beta	2/2	13*	13*	13	0	*f*
Total uranium	2/2	8.9*	8.7*	8.8*	0.10	20
^{234}U	2/2	2.7*	2.5*	2.6*	0.10	20
^{235}U	½	0.28*	0.065	0.17	0.11	24
^{238}U	2/2	6.1*	5.9*	6.0*	0.10	24
Clinch River downstream from all DOE inputs (CRK 16)						
Field measurements						
Dissolved oxygen (ppm)	12/12	13	5.1	8.9	0.61	*f*
pH (SU)	12/12	8.4	7.5	*f*	*f*	*f*
Temperature (°C)	12/12	23	6.0	16	1.8	*f*
Metals (mg/L)						
Aluminum, total	9/12	0.79	<0.20	~0.38	0.051	*f*
Barium, total	12/12	0.045	0.032	0.039	0.0010	*f*
Calcium, total	12/12	40	33	37	0.55	*f*
Iron, total	12/12	0.69	0.11	0.36	0.049	*f*
Magnesium, total	12/12	12	9.7	11	0.17	*f*
Manganese, total	12/12	0.12	0.030	0.066	0.0094	*f*
Potassium, total	7/12	2.2	<2.0	~2.0	0.020	*f*
Sodium, total	12/12	8.6	4.8	7.3	0.37	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	2/12	2.2*	–0.98	0.44*	0.23	*f*
Gross beta	2/12	5.4	0.38	2.8*	0.47	*f*
^{40}K	2/12	130*	–26	15	12	280

Table C.3 (continued)

Parameter	N det/ N total	Concentration			Standard error[d]	TWQC[e]
		Max[b]	Min[b]	Avg[c]		
Water supply intake for the ETTP (CRK 23)						
Field measurements						
Dissolved oxygen (ppm)	12/12	12	5.1	9.1	0.63	*f*
pH (SU)	12/12	8.4	7.3	*f*	*f*	*f*
Temperature (°C)	12/12	22	6.5	16	1.6	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	2/12	3.5	–0.85	0.45	0.34	*f*
Gross beta	5/12	7.5	–4.7	3.2*	0.90	*f*
^{3}H	4/12	1,400*	–2,300	120	270	80,000
^{40}K	7/12	190*	–27	42*	15	280
Clinch River downstream from ORNL (CRK 32)						
Field measurements						
Dissolved oxygen (ppm)	12/12	11	5.0	8.1	0.51	*f*
pH (SU)	12/12	8.3	7.2	*f*	*f*	*f*
Temperature (°C)	12/12	24	6.3	15	1.7	*f*
Radionuclides (pCi/L)[g]						
Gross beta	7/12	14*	0.38	4.0*	1.2	*f*
^{3}H	4/12	21,000*	–1,900	2,100	1,700	80,000
^{40}K	4/12	210*	–15	46*	22	280
Total rad Sr	2/12	5.5*	–1.5	0.90	0.67	40
Water supply intake for Knox County (CRK 58)						
Field measurements						
Dissolved oxygen (ppm)	12/12	14	6.7	9.1	0.56	*f*
pH (SU)	12/12	8.6	6.8	*f*	*f*	*f*
Temperature (°C)	12/12	26	7.6	17	1.9	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	1/12	3.2	–0.31	0.77*	0.27	*f*
Gross beta	1/12	4.6	0.59	2.4*	0.35	*f*
^{40}K	9/12	200*	–6.1	66*	20	280
Melton Hill Reservoir above City of Oak Ridge water intake (CRK 66)						
Field measurements						
Dissolved oxygen (ppm)	12/12	13	7.6	9.2	0.43	*f*
pH (SU)	12/12	8.5	6.6	*f*	*f*	*f*
Temperature (°C)	12/12	26	7.9	18	1.9	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	1/12	2.3	–0.26	0.52*	0.20	*f*
Gross beta	4/12	4.7*	0	2.8*	0.43	*f*
^{40}K	5/12	150*	–40	35*	18	280
Clinch River (Solway Bridge) upstream from all DOE inputs (CRK 70)						
Field measurements						
Dissolved oxygen (ppm)	12/12	12	5.1	8.3	0.49	*f*
pH (SU)	12/12	8.1	6.1	*f*	*f*	*f*
Temperature (°C)	12/12	26	10	18	1.6	*f*

Table C.3 (continued)

Parameter	N det/ N total	Concentration			Standard error[d]	TWQC[e]
		Max[b]	Min[b]	Avg[c]		
Metals (mg/L)						
Aluminum, total	9/12	0.89	<0.20	~0.39	0.074	*f*
Barium, total	12/12	0.045	0.032	0.037	0.0010	*f*
Calcium, total	12/12	40	33	37	0.57	*f*
Iron, total	12/12	0.89	0.085	0.36	0.073	*f*
Magnesium, total	12/12	12	10	12	0.19	*f*
Manganese, total	12/12	0.21	0.037	0.068	0.014	*f*
Potassium, total	6/12	2.2	<2.0	~2.0	0.022	*f*
Sodium, total	12/12	9.6	7.4	8.4	0.16	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	2/12	19*	–1.0	2.0	1.6	*f*
Gross beta	1/12	5.4*	–4.6	1.6*	0.71	*f*
^{40}K	4/12	200*	–32	36	21	280
East Fork Poplar Creek prior to entering Poplar Creek (EFK 0.1)						
Field measurements						
Dissolved oxygen (ppm)	2/2	9.1	7.4	8.3	0.85	*f*
pH (SU)	2/2	7.9	7.8	*f*	*f*	*f*
Temperature (°C)	2/2	16	13	14	1.9	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	½	4.9*	3.2	4.1	0.85	*f*
Gross beta	½	16*	5.0	11	5.5	*f*
^{40}K	½	54*	–38	8.0	46	280
Total uranium	2/2	3.9*	2.1*	3.0	0.90	20
^{234}U	2/2	1.7*	0.90*	1.3	0.40	20
^{238}U	2/2	2.2*	1.2*	1.7	0.50	24
East Fork Poplar Creek downstream from floodplain (EFK 5.4)						
Field measurements						
Dissolved oxygen (ppm)	2/2	10	9.1	9.7	0.55	*f*
pH (SU)	2/2	7.8	7.8	*f*	*f*	*f*
Temperature (°C)	2/2	17	13	15	1.9	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	½	13*	2.8	7.9	5.1	*f*
Gross beta	½	8.9*	6.1	7.5	1.4	*f*
^{40}U	½	50*	32	41	9.0	280
Total uranium	1/1	3.1*	3.1*	3.1	*f*	20
^{234}U	1/1	1.1*	1.1*	1.1	*f*	20
^{238}U	1/1	1.8*	1.8*	1.8	*f*	24
Fifth Creek just upstream of White Oak Creek at ORNL (FFK 0.1)						
Field measurements						
Dissolved oxygen (ppm)	2/2	10	8.7	9.5	0.80	*f*
pH (SU)	2/2	7.8	7.8	*f*	*f*	*f*
Temperature (°C)	2/2	19	13	16	3.0	*f*
Radionuclides (pCi/L)[g]						
Gross beta	2/2	36*	33*	35*	1.5	*f*
^{3}H	½	280*	150	220	65	80,000
Total rad Sr	2/2	19*	9.0*	14	5.0	40

Table C.3 (continued)

Parameter	N det/ N total	Concentration			Standard error[d]	TWQC[e]
		Max[b]	Min[b]	Avg[c]		
Grassy Creek upstream of SEG and IT Corp. at CRK 23 (GCK 3.6)						
Field measurements						
Dissolved oxygen (ppm)	2/2	11	8.2	9.4	1.2	*f*
pH (SU)	2/2	8.0	8.0	*f*	*f*	*f*
Temperature (°C)	2/2	13	11	12	1.2	*f*
Ish Creek prior to entering CRK 30.8 (ICK 0.7)						
Field measurements						
Dissolved oxygen (ppm)	2/2	10	9.7	10	0.25	*f*
pH (SU)	2/2	8.3	7.7	*f*	*f*	*f*
Temperature (°C)	2/2	13	10	12	1.4	*f*
Radionuclides (pCi/L)[g]						
Gross beta	½	16*	–1.3	7.4	8.7	*f*
^{40}K	½	180*	8.1	94	86	280
McCoy Branch prior to entering CRK 60.3 (MCCBK 1.8)						
Field measurements						
Dissolved oxygen (ppm)	2/2	9.4	7.2	8.3	1.1	*f*
pH (SU)	2/2	7.7	7.5	*f*	*f*	*f*
Temperature (°C)	2/2	21	9.3	15	6.0	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	½	10*	2.0	6.0	4.0	*f*
Gross beta	½	11*	5.9	8.5	2.6	*f*
Melton Branch downstream from ORNL (MEK 0.2)						
Field measurements						
Dissolved oxygen (ppm)	6/6	12	6.2	10	0.99	*f*
pH (SU)	6/6	7.9	7.6	*f*	*f*	*f*
Temperature (°C)	6/6	22	5.2	13	3.0	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	2/6	2.3*	0.40	1.6*	0.31	*f*
Gross beta	6/6	660*	410*	590*	42	*f*
^{3}H	6/6	560,000*	180,000*	330,000*	54,000	80,000
^{40}K	2/6	61*	–19	18	12	280
Total rad Sr	6/6	310*	190*	250*	19	40
Northwest Tributary prior to entering 1st Creek at ORNL (NWTK 0.1)						
Field measurements						
Dissolved oxygen (ppm)	2/2	11	8.9	9.8	0.85	*f*
pH (SU)	2/2	7.9	7.7	*f*	*f*	*f*
Temperature (°C)	2/2	16	11	13	2.4	*f*
Radionuclides (pCi/L)[g]						
Gross alpha	½	5.7*	–0.060	2.8	2.9	*f*
Gross beta	2/2	190*	78*	130	54	*f*
^{40}K	½	49*	–9.2	20	29	280
Total rad Sr	2/2	93*	40*	67	27	40
Raccoon Creek sampling station prior to entering CRK 31 (RCK 2.0)						
Field measurements						
Dissolved oxygen (ppm)	2/2	7.8	7.7	7.8	0.050	*f*
pH (SU)	2/2	7.6	7.5	*f*	*f*	*f*
Temperature (°C)	2/2	12	10	11	1.1	*f*

Table C.3 (continued)

Parameter	N det/ N total	Concentration			Standard error[d]	TWQC[e]
		Max[b]	Min[b]	Avg[c]		
Radionuclides (pCi/L)[g]						
Gross beta	2/2	22*	12*	17	5.0	*f*
Total rad Sr	2/2	14*	5.9*	10	4.1	40
Walker Branch prior to entering CRK 53.4 (WBK 0.1)						
Field measurements						
Dissolved oxygen (ppm)	2/2	9.3	8.0	8.7	0.65	*f*
pH (SU)	2/2	7.7	6.8	*f*	*f*	*f*
Temperature (°C)	2/2	15	13	14	0.85	*f*
Radionuclides (pCi/L)[g]						
^{40}K	½	62*	28	45	17	280
White Oak Lake at White Oak Dam (WCK 1.0)						
Field measurements						
Dissolved oxygen (ppm)	12/12	10	3.7	7.6	0.61	*f*
pH (SU)	12/12	8.4	7.1	*f*	*f*	*f*
Temperature (°C)	12/12	27	5.2	16	2.3	*f*
Metals (mg/L)						
Aluminum, total	10/12	1.6	<0.20	~0.52	0.12	*f*
Barium, total	12/12	0.051	0.031	0.042	0.0017	*f*
Calcium, total	12/12	48	39	45	0.79	*f*
Cobalt, total	1/12	<0.020	0.00073	~0.018	0.0016	*f*
Iron, total	12/12	1.3	0.21	0.58	0.10	*f*
Magnesium, total	12/12	12	8.2	10	0.30	*f*
Manganese, total	12/12	0.24	0.021	0.12	0.017	*f*
Potassium, total	10/12	2.9	<2.0	~2.4	0.087	*f*
Sodium, total	12/12	27	13	22	1.0	*f*
PCBs[h]						
Aroclor-1254	1/11	U0.50	J0.11	~0.46	0.035	*f*
Total aroclors	1/11	U0.50	J0.11	~0.46	0.035	*f*
Radionuclides (pCi/L)[g]						
^{60}Co	2/12	4.5*	–0.56	1.7*	0.47	200
^{137}Cs	12/12	350*	6.9*	59*	28	120
Gross alpha	12/12	20*	3.1*	8.2*	1.3	*f*
Gross beta	12/12	700*	250*	350*	36	*f*
^{3}H	12/12	140,000*	26,000*	75,000*	11,000	80,000
^{40}K	3/12	130*	–44	17	14	280
Total rad Sr	12/12	170*	80*	130*	8.2	40
Total uranium	5/5	10*	3.0*	4.9*	1.3	20
$^{233/234}$U	9/9	9.3*	3.2*	4.9*	0.66	*f*
^{234}U	3/3	3.6*	2.4*	3.1*	0.37	20
^{238}U	11/12	1.3*	0.27*	0.67*	0.094	24
Volatile organics (μg/L)						
1,1,1-Trichloroethane	1/12	U5.0	J1.0	~4.7	0.33	*f*
Chloroform	1/12	U5.0	J1.0	~4.7	0.33	*f*
White Oak Creek downstream from ORNL (WCK 2.6)						
Field measurements						
Dissolved oxygen (ppm)	6/6	11	7.6	9.3	0.55	*f*
pH (SU)	6/6	8.0	7.4	*f*	*f*	*f*
Temperature (°C)	6/6	23	9.4	16	2.3	*f*

Table C.3 (continued)

Parameter	N det/ N total	Concentration			Standard error[d]	TWQC[e]
		Max[b]	Min[b]	Avg[c]		
Radionuclides (pCi/L)[g]						
^{60}Co	1/6	10*	–0.29	2.1	1.6	200
^{137}Cs	6/6	120*	28*	48*	15	120
Gross alpha	3/6	5.1*	0	2.5*	0.81	*f*
Gross beta	6/6	380*	80*	180*	48	*f*
^{3}H	6/6	80,000*	1,300*	24,000	12,000	80,000
^{40}K	1/6	43*	–60	–5.5	15	280
Total rad Sr	6/6	92*	22*	58*	12	40
Total uranium	1/1	2.8*	2.8*	2.8	*f*	20
$^{233/234}$U	1/1	3.8*	3.8*	3.8	*f*	*f*
^{234}U	2/2	2.8*	1.6*	2.2	0.60	20
^{235}U	1/3	0.13*	0	0.047	0.042	24
^{238}U	2/3	1.1*	–0.0048	0.51	0.32	24
White Oak Creek upstream from ORNL (WCK 6.8)						
Field measurements						
Dissolved oxygen (ppm)	4/4	13	8.9	11	0.94	*f*
pH (SU)	4/4	8.3	6.8	*f*	*f*	*f*
Temperature (°C)	4/4	17	6.8	12	2.5	*f*
Radionuclides (pCi/L)[g]						
^{40}K	1/4	47*	–9.2	21	12	280

[a]All values were included in the calculations. Only parameters that have one or more samples detected are listed in the table. The sampling and analysis plan contains a complete list of analyses performed.

[b]Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit, "U" indicates the value for an organic parameter was undetected at the analytical detection limit, and "J" indicates the value was estimated at or below the analytical detection limit by the laboratory.

[c]A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

[d]Standard error of the mean.

[e]Tennessee General Water Quality Criteria for Recreation and Domestic Use, as amended (CRK 16, CRK 23, CRK 32, CRK 58, CRK 66, CRK 70) or Tennessee General Water Quality Criteria for Freshwater Fish and Aquatic Life, as amended (BCK 0.6, EFK 0.1, EFK 5.4, MEK 0.2, WCK 1.0, WCK 2.6, WCK 6.8). Four percent of DOE DCG used for radionuclides, where applicable.

[f] Not applicable.

[g]Individual and average radionuclide concentrations significantly greater than zero are identified by an asterisk (*). Detected radionuclides are those with values detected above minimum detectable activity.

[h]The February WCK 1.0 sample was not analyzed for PCBs.