2. ENVIRONMENTAL MONITORING

This section provides environmental monitoring data collected by both DOE and the United States Enrichment Corporation (USEC) at or nearby PORTS.

The following tables are included in this section:

- Table 2.1. Radionuclide concentrations in DOE and USEC NPDES outfall water samples – 2006
- Table 2.2. DOE NPDES permit summary – 2006
- Table 2.3. DOE NPDES discharge and compliance rates – 2006
- Table 2.4. USEC NPDES discharge monitoring results – 2006
- Table 2.5. Radionuclides and PCBs in surface water runoff samples from DOE depleted uranium cylinder storage yards – 2006
- Table 2.6. Drainage basin monitoring of surface water and sediment for DOE depleted uranium cylinder storage yards – 2006
- Table 2.7. Ambient air monitoring program summary for radionuclides and fluoride – 2006
- Table 2.8. DOE environmental radiation monitoring program (mrem) – 2006
- Table 2.9. Environmental radiation monitoring (mrem) at locations near DOE depleted uranium cylinder storage yards – 2006
- Table 2.10. Local surface water monitoring program results for chemical and radiological parameters – 2006
- Table 2.11. Sediment monitoring program results – 2006
- Table 2.12. Soil and vegetation monitoring at ambient air monitoring stations – 2006
- Table 2.13. Biota (fish) monitoring program results – 2006
- Table 2.14. Biota (crops) monitoring program results – 2006
- Table 2.15. Off-site dairy monitoring – 2006

Table 2.1. Radionuclide concentrations in DOE and USEC NPDES outfall water samples – 2006

NPDES outfall[a]	Parameter[b]	Number of samples[c]	Minimum[d]	Maximum[d]	Average[e]	DCG[f]
			DOE Outfalls			
012	americium-241	4(4)	0	< 0.037		30
	neptunium-237	4(4)	0	0		30
	plutonium-238	4(4)	0	< 0.009636		40
	plutonium-239/240	4(4)	0	< 0.008326		30
	technetium-99	12(12)	0	< 3.18		100,000
	uranium	12(0)	0.4253	1.548	0.936	
	uranium-233/234	12(0)	0.2579	0.613	0.391	500
	uranium-235	12(12)	0	< 0.03119		600
	uranium-236	12(12)	0	< 0.01035		500
	uranium-238	12(0)	0.1404	0.5173	0.313	600
013	americium-241	4(4)	0	< 0.02512		30
	neptunium-237	4(4)	0	0		30
	plutonium-238	4(4)	< 3.38E-05	< 0.02801		40
	plutonium-239/240	4(4)	< 7E-06	< 0.01693		30
	technetium-99	12(12)	0	< 2.31		100,000
	uranium	12(0)	0.3771	1.672	0.989	
	uranium-233/234	12(0)	0.2205	0.8147	0.513	500
	uranium-235	12(12)	0	< 0.04092		600
	uranium-236	12(12)	0	< 0.01815		500
	uranium-238	12(0)	0.1267	0.5596	0.330	600
015	americium-241	3(3)	0	< 0.00001893		30
	neptunium-237	3(3)	0	< 0.00756		30
	plutonium-238	3(3)	0	< 0.009076		40
	plutonium-239/240	3(3)	< 9.06E-06	< 0.03051		30
	technetium-99	10(10)	0	< 4.96		100,000
	uranium	10(0)	0.4831	1.939	0.927	
	uranium-233/234	10(0)	0.2305	1.472	0.795	500
	uranium-235	10(8)	0	0.05369		600
	uranium-236	10(10)	0	< 0.0143		500
	uranium-238	10(0)	0.1615	0.6491	0.3096	600
608	americium-241	4(4)	0	< 0.008613		
	neptunium-237	4(4)	0	0		
	plutonium-238	4(4)	< 2.22E-05	< 0.02288		
	plutonium-239/240	4(4)	0	< 0.000007611		
	technetium-99	12(0)	41.3	773	182	
	uranium	12(0)	0.5389	1.887	1.192	
	uranium-233/234	12(0)	0.5421	1.666	0.922	
	uranium-235	12(7)	0	0.09541		
	uranium-236	12(12)	0	< 0.02989		
	uranium-238	12(0)	0.1782	0.6283	0.396	
610	americium-241	4(4)	0	< 0.008999		
	neptunium-237	4(4)	0	0		
	plutonium-238	4(4)	0	< 0.02322		
	plutonium-239/240	4(4)	0	< 0.01687		
	technetium-99	12(4)	0	88.2		
	uranium	12(0)	0.2688	103.3	18.076	
	uranium-233/234	12(0)	0.4274	173	30.761	
	uranium-235	12(2)	< 0.02336	8.825		
	uranium-236	12(7)	0	0.8279		
	uranium-238	12(0)	0.0882	33.92	5.937	

Table 2.1. Radionuclide concentrations in DOE and USEC NPDES outfall water samples – 2006 (continued)

NPDES outfall[a]	Parameter[b]	Number of samples[c]	Minimum[d]	Maximum[d]	Average[e]	DCG[f]
611	americium-241	4(4)	0	< 0.009488		
	neptunium-237	4(4)	0	< 0.03083		
	plutonium-238	4(4)	0	< 0.02306		
	plutonium-239/240	4(4)	0	< 0.01679		
	technetium-99	12(3)	0	1610		
	uranium	12(0)	4.039	11.86	5.901	
	uranium-233/234	12(0)	3.228	25.92	7.794	
	uranium-235	12(0)	0.1235	1.057	0.318	
	uranium-236	12(7)	0	0.09638		
	uranium-238	12(0)	1.345	3.888	1.954	
			USEC Outfalls			
001	americium-241	4(4)	< 0.02	< 0.0697		30
	neptunium-237	4(4)	< 0.056	< 0.154		30
	plutonium-238	4(4)	< 0.0524	< 0.085		40
	plutonium-239/240	4(4)	< 0.021	< 0.095		30
	technetium-99	52(42)	< 9	57		100,000
	uranium	52(0)	0.19	2.1	0.69	
002	americium-241	4(4)	< 0.019	< 0.0686		30
	neptunium-237	4(4)	< 0.018	< 0.1218		30
	plutonium-238	4(4)	< 0.024	< 0.062		40
	plutonium-239/240	4(4)	< 0.058	< 0.0751		30
	technetium-99	52(52)	< 9	< 10		100,000
	uranium	52(0)	0.39	5.82	0.89	
003	americium-241	4(4)	< 0.019	< 0.0864		30
	neptunium-237	4(4)	< 0.065	< 0.1445		30
	plutonium-238	4(4)	< 0.055	< 0.067		40
	plutonium-239/240	4(4)	< 0.0585	< 0.09		30
	technetium-99	52(0)	15	196	89	100,000
	uranium	52(0)	1.7	36.6	11.7	
004	americium-241	4(4)	< 0.02	< 0.0719		30
	neptunium-237	4(4)	< 0.051	< 0.125		30
	plutonium-238	4(4)	< 0.02	< 0.0734		40
	plutonium-239/240	4(4)	< 0.02	< 0.09		30
	technetium-99	47(47)	< 9	< 10		100,000
	uranium	47(1)	< 0.1	0.91	0.57	
005	americium-241	1(1)	< 0.0211			30
	neptunium-237	1(1)	< 0.1197			30
	plutonium-238	1(1)	< 0.0263			40
	plutonium-239/240	1(1)	< 0.0988			30
	technetium-99	2(2)	< 8.8	< 8.9		100,000
	uranium	2(0)	0.3	0.33	0.32	

Table 2.1. Radionuclide concentrations in DOE and USEC NPDES outfall water samples – 2006 (continued)

NPDES outfall[a]	Parameter[b]	Number of samples[c]	Minimum[d]	Maximum[d]	Average[e]	DCG[f]
009	americium-241	4(4)	< 0.019	< 0.058		30
	neptunium-237	4(4)	< 0.057	< 0.1543		30
	plutonium-238	4(4)	< 0.0208	< 0.066		40
	plutonium-239/240	4(4)	< 0.021	< 0.074		30
	technetium-99	52(52)	< 9	< 10		100,000
	uranium	52(0)	0.94	8.1	5.53	
010	americium-241	4(4)	< 0.0304	< 0.075		30
	neptunium-237	4(4)	< 0.021	< 0.098		30
	plutonium-238	4(4)	< 0.023	< 0.074		40
	plutonium-239/240	4(4)	< 0.048	< 0.058		30
	technetium-99	52(52)	< 9	< 10		100,000
	uranium	52(0)	0.64	4.28	2.07	
011	americium-241	4(4)	< 0.021	< 0.055		30
	neptunium-237	4(4)	< 0.059	< 0.1217		30
	plutonium-238	4(4)	< 0.019	< 0.083		40
	plutonium-239/240	4(4)	< 0.059	< 0.101		30
	technetium-99	52(52)	< 9	< 10		100,000
	uranium	52(0)	0.19	1.46	0.87	

[a]DOE internal NPDES Outfalls 608, 610, and 611 discharge to USEC NPDES Outfall 003 (X-6619 Sewage Treatment Plant).

[b]Uranium is reported in μg/L; all other radionuclides are reported in pCi/L.

[c]Number in parentheses is the number of samples that were below the detection limit.

[d]Minimum and maximum values reported as "0" may actually be negative results. Because of the statistical nature of radiation detection, results for samples that have no radioactivity are often negative values because background radioactivity is subtracted out. These negative value results are reported as "0" in the table for simplicity. Some results are provided in scientific notation. The number and sign (+ or -) to the right of the "E" indicate the number of places to the right or left of the decimal point. For example, 3.4E-04 is 0.00034 (the decimal point moves four places to the left); 2.1E+02 is 210 (the decimal point moves two places to the right).

[e]Averages were not calculated for outfalls that had greater than 15% of the results below the detection limit. For outfalls with less than 15% of the results below the detection limit, any result below the detection limit was assigned a value at the detection limit to calculate the average for the parameter.

[f]Derived Concentration Guide (DCG)(pCi/L). DCGs are not provided for DOE internal outfalls (Outfalls 608, 610, and 611) because water from these outfalls flows through another outfall prior to discharge from the site. A DCG is not available for uranium.

Table 2.2. DOE NPDES permit summary – 2006

Effluent characteristics		Monitoring requirements		Discharge limitations	
Parameter	Units	Measurement frequency	Sampling type	Concentration	
				Monthly	Daily
Outfall 012 (X-2230M Holding Pond)					
Flow rate	MGD	Daily	24-hour total[a]		
pH	SU	½ weeks	Grab		6.5–9.0
Total suspended solids	mg/L	½ weeks	Grab	30	45
Oil and grease, total	mg/L	½ weeks	Grab	10	20
Chlorine, total residual	mg/L	½ weeks[b]	Grab		
Iron, total recoverable	μg/L	½ weeks	Grab		
Trichloroethene	μg/L	½ weeks	Grab		
PCBs	μg/L	1/quarter	Grab	*c*	*c*
Outfall 013 (X-2230N Holding Pond)					
Flow rate	MGD	Daily	24-hour total[a]		
pH	SU	½ weeks	Grab		6.5–9.0
Total suspended solids	mg/L	½ weeks	Grab	30	45
Oil and grease, total	mg/L	½ weeks	Grab	10	20
Chlorine, total residual	mg/L	½ weeks[b]	Grab		
PCBs	μg/L	1/quarter	Grab	*c*	*c*
Outfall 015 (X-624 Groundwater Treatment Facility)					
Flow rate	MGD	Daily	24-hour total		
Trichloroethene	μg/L	½ weeks	Grab	10	10
PCBs	μg/L	1/quarter	Grab	*c*	*c*
Outfall 608 (X-622 Groundwater Treatment Facility)					
Flow rate	MGD	Daily	24-hour total		
pH	SU	½ weeks	Grab		
Trichloroethene	μg/L	½ weeks	Grab		10
1,2-trans-dichloroethene	μg/L	½ weeks	Grab	25	66
Outfall 610 (X-623 Groundwater Treatment Facility)					
Flow rate	MGD	Daily	24-hour total		
pH	SU	½ weeks	Grab		
Trichloroethene	μg/L	½ weeks	Grab	10	10
1,2-trans-dichloroethene	μg/L	½ weeks	Grab	25	66
Outfall 611 (X-627 Groundwater Treatment Facility)					
Flow rate	MGD	Daily	24-hour total		
Trichloroethene	μg/L	½ weeks	Grab	10	10
Outfall 613 (X-6002 Particulate Separator)					
Flow rate	MGD	Daily	24-hour total[a]		
Chlorine, total residual	mg/L	½ weeks	Grab		
Total suspended solids	mg/L	½ weeks	Grab		

[a]Estimated.
[b]Summer only.
[c]No detectable PCBs.

Table 2.3. DOE NPDES discharge and compliance rates – 2006

Parameter	NPDES compliance rate (%)	Number of measurements[a]	Concentration			Units
			Minimum	Maximum	Average[b]	
Outfall 012 (X-2230M Holding Pond)						
Flow rate	*c*	251	0.012	7.473	0.2671	MGD
pH	100	26	7.05	8.41	7.91	SU
Total suspended solids	100	26(3)	1.2	11	4.3	mg/L
monthly average[f]	100	12	1.2	8.9	3.82	mg/L
Oil and grease, total	100	26(18)	1.4	< 5		mg/L
monthly average[f]	100	12	0	2.95	0.74	mg/L
Chlorine, total residual	*d*	13	0	0.33	0.11	mg/L
Iron, total recoverable	*d*	26(0)	160	1800	517	μg/L
Trichloroethene	*d*	26(25)	0.37	< 2		μg/L
PCBs	*e*	4(4)	< 1	< 1		μg/L
Outfall 013 (X-2230N Holding Pond)						
Flow rate	*c*	251	0.013	5.403	0.2397	MGD
pH	100	26	7.21	8.51	8.01	SU
Total suspended solids	100	26(14)	1.2	6.4		mg/L
monthly average[f]	100	12	0	3.2	1.5	mg/L
Oil and grease, total	100	26(18)	1.5	< 5		mg/L
monthly average[f]	100	12	0	2.45	0.71	mg/L
Chlorine, total residual	*d*	13	0.01	0.16	0.10	mg/L
PCBs	*e*	4(4)	< 1	< 1		μg/L
Outfall 015 (X-624 Groundwater Treatment Facility)						
Flow rate	*c*	304	0	0.0357	0.0071	MGD
Trichloroethene	100	20(4)	0.24	4.4		μg/L
monthly average[f]	100	10	0.125	3.55	0.87	μg/L
PCBs	*e*	3(3)	< 1	< 1		μg/L
Outfall 608 (X-622 Groundwater Treatment Facility)						
Flow rate	*c*	365	0.0247	0.0695	0.0338	MGD
pH	*d*	26	7.24	7.89	7.58	SU
Trichloroethene	100	26(0)	0.81	4	1.6	μg/L
1,2-trans-dichloroethene	100	26(26)	< 0.5	< 0.5		μg/L
monthly average[f]	100	12	0	0	0	μg/L
Outfall 610 (X-623 Groundwater Treatment Facility)						
Flow rate	*c*	365	0	0.0293	0.0084	MGD
pH	*d*	26	6.55	7.59	7.02	SU
Trichloroethene	100	26(20)	0.23	< 1		μg/L
monthly average[f]	100	12	0	0.2933	0.09	μg/L
1,2-trans-dichloroethene	100	26(26)	< 0.5	< 0.5		μg/L
monthly average[f]	100	12	0	0	0	μg/L

Table 2.3. DOE NPDES discharge and compliance rates – 2006 (continued)

Parameter	NPDES compliance rate (%)	Number of measurements[a]	Concentration			Units
			Minimum	Maximum	Average[b]	
Outfall 611 (X-627 Groundwater Treatment Facility)						
Flow rate	*c*	365	0.0113	0.0302	0.0212	MGD
Trichloroethene	100	26(5)	0.24	4.3		μg/L
monthly average[f]	100	12	0	2.8	0.85	μg/L
Outfall 613 (X-6002 Particulate Separator)						
Flow rate	*c*	365	0	0.0012	0.0006	MGD
Total suspended solids	*d*	26(15)	1.6	230		mg/L
Chlorine, total residual	*d*	26	0	0.72	0.17	mg/L

[a]Number in parentheses is the number of samples that were below the detection limit.

[b]Averages were not calculated for outfalls that had greater than 15% of the results below the detection limit. For outfalls with less than 15% of the results below the detection limit, any result below the detection limit was assigned a value at the detection limit for calculating an average for the parameter.

[c]Flow rate does not have a numerical limit; therefore, no compliance rates are generated.

[d]Monitoring only required; therefore, no compliance rates are generated.

[e]The permit specifies no detectable PCBs in the effluent without setting a numerical limit of detection.

[f]The monthly average is computed by the software used to prepare and submit the NPDES Monthly Operating Report. Parameters that are undetected are assumed to be zero in computing the monthly average.

Table 2.4. USEC NPDES discharge monitoring results – 2006

Parameter	Number of samples[a]	Concentration			Units
		Minimum	Maximum	Average[b]	
Outfall 001 (X-230J7 East Holding Pond)					
Cadmium, total recoverable	12(10)	< 0.4	11.3		μg/L
Chlorine, total residual	48(47)	< 0.02	0.11		mg/L
Dissolved solids	48(0)	93	256	184	mg/L
Flow rate	365	0.072	3.22	0.979	MGD
Fluoride, total	12(2)	< 0.1	0.2		mg/L
Oil and grease, total	48(48)	< 5	< 555		mg/L
pH	48(0)	6.8	8.16	7.36	SU
Silver, total recoverable	12(11)	< 1.81	35.6		μg/L
Suspended solids	48(43)	< 1	< 222		mg/L
Zinc, total recoverable	12(0)	10.2	58.4	27.8	μg/L
Outfall 002 (X-230K South Holding Pond)					
Cadmium, total recoverable	12(11)	0.3	< 2.45		μg/L
Flow rate	365	0	1.79	0.454	MGD
Fluoride, total	12(1)	0.1	< 5	0.6	mg/L
Mercury, total	12(0)	1	10	4	ng/L
Oil and grease, total	48(48)	< 5	< 525		mg/L
pH	48(0)	7.05	8.95	7.81	SU
Silver, total recoverable	48(46)	< 1.81	5.44		μg/L
Suspended solids	48(0)	3.8	17.8	9.1	mg/L
Thallium, total recoverable	48(45)	< 2.15	33.2		μg/L
Outfall 003 (X-6619 Sewage Treatment Plant)					
Acute toxicity, *Ceriodaphnia dubia*	6(6)	< 1	< 1		Tua
Acute toxicity, *Pimephales promelas*	6(6)	< 1	< 1		Tua
Ammonia, nitrogen	24(14)	< 0.1	4		mg/L
Biochemical oxygen demand	48(46)	< 5	< 55		mg/L
Chlorine, total residual	127(127)	< 0.02	< 0.2		mg/L
Copper, total recoverable	12(10)	< 4.55	8.12		μg/L
Fecal coliform	24(0)	2	1960	244	#/100 mL
Flow rate	365	0.175	0.592	0.283	MGD
Mercury, total	12(0)	8	179	49	ng/L
Nitrite + nitrate	12(0)	3.1	8	5.2	mg/L
Oil and grease, total	4(4)	< 5	< 5		mg/L
pH	249(0)	6.52	7.98	7.31	SU
Silver, total recoverable	12(12)	< 2.6	< 4.66		μg/L
Suspended solids	48(32)	< 2	< 222		mg/L
Zinc, total recoverable	12(0)	16.2	41.8	27.3	μg/L
Outfall 004 (Cooling Tower Blowdown)					
Acute toxicity, *Ceriodaphnia dubia*	6(6)	< 1	< 1		Tua
Acute toxicity, *Pimephales promelas*	6(6)	< 1	< 1		Tua

Table 2.4. USEC NPDES discharge monitoring results – 2006 (continued)

Parameter	Number of samples[a]	Concentration			Units
		Minimum	Maximum	Average[b]	
Outfall 004 (Cooling Tower Blowdown) (continued)					
Chlorine, total residual	43(43)	< 0.02	< 0.02		mg/L
Copper, total recoverable	13(0)	11.3	71.8	20.8	μg/L
Dissolved solids	13(0)	196	342	288	mg/L
Flow rate	365	0	1.116	0.571	MGD
Mercury, total	12(0)	1	5	2.7	ng/L
Oil and grease, total	13(13)	< 5	< 5		mg/L
pH	13(0)	6.9	7.58	7.33	SU
Suspended solids	14(9)	< 2	22.8		mg/L
Zinc, total recoverable	13(0)	28.8	178	57.1	μg/L
Outfall 005 (X-611B Lime Sludge Lagoon)					
Flow rate	2	0.918	12.925	6.922	MGD
pH	2(0)	8.13	8.33	8.23	SU
Suspended solids	2(0)	3.8	4	3.9	mg/L
Outfall 009 (X-230L North Holding Pond)					
Cadmium, total recoverable	12(11)	< 2.22	3.06		μg/L
Flow rate	365	0.084	1.765	0.344	MGD
Fluoride, total	12(1)	< 0.1	0.3	0.2	mg/L
Oil and grease, total	12(12)	< 5	< 5		mg/L
pH	48(0)	7.14	8.76	7.72	SU
Suspended solids	48(0)	2.2	54	14.4	mg/L
Zinc, total recoverable	12(0)	10.5	43.3	25.0	μg/L
Outfall 010 (X-230J5 Northwest Holding Pond)					
Cadmium, total recoverable	12(11)	< 2.22	2.54		μg/L
Flow rate	365	0.064	0.838	0.343	MGD
Mercury. Total	12(0)	1.2	6	2.9	ng/L
Oil and grease, total	12(12)	< 5	< 5		mg/L
pH	25(0)	6.84	8	7.53	SU
Suspended solids	24(3)	< 2	51.2	8.5	mg/L
Zinc, total recoverable	12(0)	13.9	48.1	28.3	μg/L
Outfall 011 (X-230J6 Northeast Holding Pond)					
Cadmium, total recoverable	12(12)	< 2.22	< 2.45		μg/L
Chlorine, total residual	25(24)	< 0.02	0.02		mg/L
Copper, total recoverable	12(10)	< 4.55	< 7.71		μg/L
Flow rate	365	0	0.206	0.0143	MGD
Fluoride, total	12(1)	< 0.1	0.3	0.2	mg/L
Oil and grease, total	24(24)	< 5	< 55		mg/L
pH	25(0)	7.00	8.00	7.51	SU
Suspended solids	24(14)	< 2	91.6		mg/L
Zinc, total recoverable	12(0)	9.86	76.3	37.9	μg/L
Outfall 602 (X-621 Coal Pile Runoff Treatment Facility)					
Flow rate	365	0	0.059	0.0189	MGD
Iron, total	24(0)	35.8	1350	547	μg/L
Manganese, total	24(0)	37.3	365	115	μg/L
pH	24(0)	6.63	9.14	7.73	SU
Suspended solids	24(0)	3.4	12.8	6.2	mg/L

Table 2.4. USEC NPDES discharge monitoring results – 2006 (continued)

Parameter	Number of samples[a]	Concentration			Units
		Minimum	Maximum	Average[b]	
Outfall 604 (X-700 Biodenitrification Facility)					
Copper, total	7(4)	< 7.71	263		μg/L
Flow rate	215	0	0.024	0.007	MGD
Iron, total	7(0)	97.2	495	245	μg/L
Nickel, total	7(4)	< 9.61	24.1		μg/L
Nitrate, nitrogen	7(4)	< 0.1	34.2		mg/L
pH	7(0)	7.03	7.88	7.50	SU
Zinc, total	7(0)	2.07	121	31.7	μg/L
Outfall 605 (X-705 Decontamination Microfiltration System)					
Ammonia, nitrogen	12(7)	< 0.1	0.2		mg/L
Chromium, hexavalent	12(9)	< 2.75	7.82		mg/L
Chromium, total	12(12)	< 0.01	0.01		μg/L
Copper, total	12(6)	< 4.55	22		μg/L
Flow rate	365	0	0.026	0.003	MGD
Iron, total	12(1)	< 3.52	167	41.9	μg/L
Kjeldahl nitrogen	12(0)	0.7	1.3	1.0	mg/L
Nickel, total	12(5)	< 6.39	31		μg/L
Nitrogen, nitrate	12(1)	< 0.1	41.6	18.5	mg/L
Nitrogen, nitrite	12(11)	< 0.1	0.11		mg/L
Oil and grease, total	12(11)	< 5	7.6		mg/L
pH	12(0)	6.87	8.41	7.72	SU
Sulfate	12(0)	3.57	79	61	mg/L
Suspended solids	12(12)	< 2	< 2		mg/L
Trichloroethene	12(12)	< 5	< 5		μg/L
Zinc, total	12(0)	8.72	38.6	17.4	μg/L
Station Number 801 (Scioto River control sample, upstream of Outfalls 003 and 004)					
48-hr. acute toxicity, *Ceriodaphnia dubia*	6(6)	< 1	< 1		% affected
96-hr. acute toxicity, *Pimephales promelas*	6(6)	< 1	< 1		% affected
Station Number 902 (downstream of Outfall 001)					
Water temperature	97	7	27	18	°C
Station Number 903 (downstream of Outfall 002)					
Water temperature	102	5	28	17	°C

[a]Number in parentheses is the number of samples that were below the detection limit.

[b]Averages were not calculated for outfalls that had greater than 15% of the results below the detection limit. For outfalls with less than 15% of the results below the detection limit, any result below the detection limit was assigned a value at the detection limit for calculating an average for the parameter.

Table 2.5. Radionuclides and PCBs in surface water runoff samples from DOE depleted uranium cylinder storage yards – 2006

Sample location	Parameter[a]	Number of samples[b]	Minimum[c]	Maximum[c]	Average[d]	DCG[e]
X745-C1	americium-241	2(2)	0	< 0.0191		30
	neptunium-237	2(2)	0	< 0.01883		30
	PCB-1242	2(2)	< 0.2	< 0.2		
	PCB-1248	2(2)	< 0.2	< 0.2		
	PCB-1254	2(2)	< 0.2	< 0.2		
	PCB-1260	2(2)	< 0.2	< 0.2		
	PCB-1262	1(1)	< 0.1			
	PCB-1268	2(2)	< 0.2	< 0.2		
	plutonium-238	2(2)	0	< 0.00001876		40
	plutonium-239/240	2(2)	0	< 0.01604		30
	technetium-99	11(10)	0	9.17		100,000
	uranium	11(0)	1.2	13.02	5.1	
	uranium-233/234	11(0)	0.3749	5.241	1.638	500
	uranium-235	11(6)	0	0.1465		600
	uranium-236	11(11)	0	< 0.01732		500
	uranium-238	11(0)	0.3087	4.361	1.396	600
X745-C2	americium-241	2(2)	< 0.000008066	< 0.02483		30
	neptunium-237	2(2)	0	< 0.006851		30
	PCB-1242	2(2)	< 0.2	< 0.2		
	PCB-1248	2(2)	< 0.2	< 0.2		
	PCB-1254	2(2)	< 0.2	< 0.2		
	PCB-1260	2(2)	< 0.2	< 0.2		
	PCB-1262	1(1)	< 0.1			
	PCB-1268	2(2)	< 0.2	< 0.2		
	plutonium-238	2(2)	< 0.01368	< 0.0145		40
	plutonium-239/240	2(2)	< 0.01448	< 0.0205		30
	technetium-99	11(11)	0	< 3.47		100,000
	uranium	11(0)	1.2	10	4.9	
	uranium-233/234	11(0)	0.1369	1.849	0.841	500
	uranium-235	11(8)	0	0.1128		600
	uranium-236	11(11)	0	< 0.02341		500
	uranium-238	11(0)	0.3133	3.312	1.519	600
X745-C3	americium-241	2(2)	< 0.000008644	< 0.0144		30
	neptunium-237	2(2)	0	0		30
	PCB-1242	2(2)	< 0.2	< 0.2		
	PCB-1248	2(2)	< 0.2	< 0.2		
	PCB-1254	2(2)	< 0.2	< 0.2		
	PCB-1260	2(2)	< 0.2	< 0.2		
	PCB-1262	1(1)	< 0.1			
	PCB-1268	2(2)	< 0.2	< 0.2		

Table 2.5. Radionuclides and PCBs in surface water runoff samples from DOE depleted uranium cylinder storage yards – 2006 (continued)

Sample location	Parameter[a]	Number of samples[b]	Minimum[c]	Maximum[c]	Average[d]	DCG[e]
X745-C3	plutonium-238	2(2)	< 0.0144	< 0.01617		40
	plutonium-239/240	2(2)	< 0.000008079	< 0.01439		30
	technetium-99	11(11)	0	< 4.83		100,000
	uranium	11(0)	0.23	5.1	1.9	
	uranium-233/234	11(1)	< 0.03086	1.144	0.478	500
	uranium-235	11(10)	0	0.04704		600
	uranium-236	11(11)	0	< 0.01633		500
	uranium-238	11(1)	< 0.02311	1.218	0.570	600
X745-C4	americium-241	2(2)	< 0.008428	< 0.01854		30
	neptunium-237	2(2)	0	< 0		30
	PCB-1242	2(2)	< 0.2	< 0.2		
	PCB-1248	2(2)	< 0.2	< 0.2		
	PCB-1254	2(2)	< 0.2	< 0.2		
	PCB-1260	2(2)	< 0.2	< 0.2		
	PCB-1262	1(1)	< 0.1			
	PCB-1268	2(2)	< 0.2	< 0.2		
	plutonium-238	2(2)	< 0.0000265	< 0.01745		40
	plutonium-239/240	2(2)	0	< 0.008716		30
	technetium-99	11(11)	0	< 5.16		100,000
	uranium	11(0)	0.9	8.4	3.9	
	uranium-233/234	11(2)	< 0.04246	3.725	0.899	500
	uranium-235	11(9)	0	0.2452		600
	uranium-236	11(11)	0	< 0.03262		500
	uranium-238	11(0)	0.127	5.981	1.424	600
X745-E1	americium-241	2(2)	0	< 0.03217		30
	neptunium-237	2(2)	0	< 0.01897		30
	PCB-1242	2(2)	< 0.2	< 0.2		
	PCB-1248	2(2)	< 0.2	< 0.2		
	PCB-1254	2(2)	< 0.2	< 0.2		
	PCB-1260	2(2)	< 0.2	< 0.2		
	PCB-1262	1(1)	< 0.1			
	PCB-1268	2(2)	< 0.2	< 0.2		
	plutonium-238	2(2)	< 0.00001889	< 0.01312		40
	plutonium-239/240	2(2)	0	0		30
	technetium-99	11(11)	0	< 2.13		100,000
	uranium	11(0)	0.25	1.7	1.0	
	uranium-233/234	11(0)	0.04771	0.7419	0.418	500
	uranium-235	11(10)	0	0.05209		600
	uranium-236	11(11)	0	< 0.0161		500
	uranium-238	11(0)	0.09513	0.5193	0.311	600

Table 2.5. Radionuclides and PCBs in surface water runoff samples from DOE depleted uranium cylinder storage yards – 2006 (continued)

Sample location	Parameter[a]	Number of samples[b]	Minimum[c]	Maximum[c]	Average[d]	DCG[e]
X745-G1A	americium-241	1(1)	0			30
	neptunium-237	1(1)	0			30
	PCB-1242	1(1)	< 0.2			
	PCB-1248	1(1)	< 0.2			
	PCB-1254	1(1)	< 0.2			
	PCB-1260	1(1)	< 0.2			
	PCB-1262	1(1)	< 0.1			
	PCB-1268	1(1)	< 0.2			
	plutonium-238	1(1)	< 0.02945			40
	plutonium-239/240	1(1)	0			30
	technetium-99	8(8)	0	< 6.95		100,000
	uranium	8(0)	0.97	6.4	2.6	
	uranium-233/234	8(0)	0.4097	2.37	1.0	500
	uranium-235	8(6)	0	0.0672		600
	uranium-236	8(8)	0	< 0.01648		500
	uranium-238	8(0)	0.3691	1.876	0.787	600
X745-G2	americium-241	2(2)	< 0.000008668	< 0.00804		30
	neptunium-237	2(2)	0	< 0.01803		30
	PCB-1242	2(2)	< 0.2	< 0.2		
	PCB-1248	2(2)	< 0.2	< 0.2		
	PCB-1254	2(2)	< 0.2	< 0.2		
	PCB-1260	2(2)	< 0.2	< 0.2		
	PCB-1262	1(1)	< 0.1			
	PCB-1268	2(2)	< 0.2	< 0.2		
	plutonium-238	2(2)	< 0.02695	< 0.03373		40
	plutonium-239/240	2(2)	0	0		30
	technetium-99	11(11)	0	< 3.76		100,000
	uranium	11(0)	0.75	4.9	2.2	
	uranium-233/234	11(0)	0.1963	1.561	0.697	500
	uranium-235	11(9)	0	0.06072		600
	uranium-236	11(11)	0	< 0.03074		500
	uranium-238	11(0)	0.2034	1.468	0.693	600

[a]Uranium and PCBs are reported in μg/L; all other parameters are reported in pCi/L.

[b]Number in parentheses is the number of samples that were below the detection limit.

[c]Minimum and maximum values reported as "0" may actually be negative results. Because of the statistical nature of radiation detection, results for samples that have no radioactivity are often negative values because background radioactivity is subtracted out. These negative value results are reported as "0" in the table for simplicity.

[d]Averages were not calculated for locations that had greater than 15% of the results below the detection limit. For locations with less than 15% of the results below the detection limit, any result below the detection limit was assigned a value at the detection limit to calculate the average for the parameter.

[e]Derived Concentration Guide (DCG)(pCi/L). DCGs are not available for PCBs and uranium.

Table 2.6. Drainage basin monitoring of surface water and sediment for DOE depleted uranium cylinder storage yards – 2006

Location	Parameter[a]	First quarter[b]			Second quarter		
		SW-F	SW-UF	Sed	SW-F	SW-UF	Sed
UDS X01	PCB-1242	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1248	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1254	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1260	0.2U	0.2U	33U	0.2U	0.2U	45
	PCB-1268	0.2U	0.2U	33U	0.2U	0.2U	33U
	Total PCB	1U	1U	300U	1U	1U	45J
RM-8	PCB-1242	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1248	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1254	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1260	0.2U	0.2U	33U	0.2U	0.2U	97
	PCB-1268	0.2U	0.2U	33U	0.2U	0.2U	33U
	Total PCB	1U	1U	300U	1U	1U	97J
UDS X02	PCB-1242	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1248	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1254	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1260	0.2U	0.2U	66	0.2U	0.2U	140
	PCB-1268	0.2U	0.2U	33U	0.2U	0.2U	33U
	Total PCB	1U	1U	66J	1U	1U	140J
RM-10	PCB-1242	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1248	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1254	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1260	0.2U	0.2U	33U	0.2U	0.2U	33U
	PCB-1268	0.2U	0.2U	33U	0.2U	0.2U	33U
	Total PCB	1U	1U	300U	1U	1U	300U

Table 2.6. Drainage basin monitoring of surface water and sediment for DOE depleted uranium cylinder storage yards – 2006 (continued)

Location	Parameter[a]	Third quarter[b]			Fourth quarter		
		SW-F	SW-UF	Sed	SW-F	SW-UF	Sed
UDS X01	PCB-1242	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1248	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1254	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1260	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1262	0.17U	0.17U	33U	0.1U	0.1U	33U
	PCB-1268	0.17U	0.17U	33U	0.2U	0.2U	33U
	Total PCB	1U	1U	300U	1U	1U	300U
RM-8	PCB-1242	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1248	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1254	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1260	0.17U	0.17U	33U	0.2U	0.2U	52
	PCB-1262	0.17U	0.17U	33U	0.1U	0.1U	33U
	PCB-1268	0.17U	0.17U	33U	0.2U	0.2U	33U
	Total PCB	1U	1U	300U	1U	1U	52J
UDS X02	PCB-1242	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1248	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1254	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1260	0.17U	0.24B	33U	0.2U	0.2U	98
	PCB-1262	0.17U	0.17U	33U	0.1U	0.1U	33U
	PCB-1268	0.17U	0.17U	33U	0.2U	0.2U	33U
	Total PCB	1U	0.24BJ	300U	1U	1U	98J
RM-10	PCB-1242	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1248	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1254	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1260	0.17U	0.17U	33U	0.2U	0.2U	33U
	PCB-1262	0.17U	0.17U	33U	0.1U	0.1U	33U
	PCB-1268	0.17U	0.17U	33U	0.2U	0.2U	33U
	Total PCB	1U	1U	300U	1U	1U	300U

[a]Results for surface water (SW) are reported in μg/L; results for sediment (Sed) are reported in μg/kg.

[b]Abbreviations and data qualifiers are as follows: SW-F – filtered surface water; SW-UF – unfiltered surface water; Sed – sediment; B – the analyte was detected in the laboratory blank sample.; J – the reported value is an estimated concentration greater than the method detection limit but less than the practical quantitation limit; U – undetected.

Table 2.7. Ambient air monitoring program summary for radionuclides and fluoride – 2006

Sampling Location	Parameter[a]	No. of measurements[b]	Minimum[c, d]	Maximum[c]	Average[d, e]
		On-site air samplers			
A8	americium-241	12(12)	0	7.2E-06	
	fluoride	52(24)	2.1E-02	6.9E-02	
	neptunium-237	12(12)	0	8.5E-06	
	plutonium-238	12(12)	0	9.1E-06	
	plutonium-239/240	12(12)	0	4.1E-06	
	technetium-99	12(11)	0	1.7E-03	
	uranium	12(0)	3.0E-04	8.1E-04	5.5E-04
	uranium-233/234	12(0)	1.3E-04	2.9E-04	1.9E-04
	uranium-235	12(9)	0	1.8E-05	
	uranium-236	12(12)	0	5.3E-06	
	uranium-238	12(0)	1.0E-04	2.7E-04	1.8E-04
A10	americium-241	12(12)	0	8.2E-06	
	fluoride	52(10)	2.0E-02	1.8E-01	
	neptunium-237	12(12)	0	1.1E-05	
	plutonium-238	12(12)	0	9.6E-06	
	plutonium-239/240	12(12)	0	8.0E-06	
	technetium-99	12(11)	0	2.1E-03	
	uranium	12(0)	3.5E-04	7.9E-04	4.9E-04
	uranium-233/234	12(0)	1.1E-04	3.6E-04	1.9E-04
	uranium-235	12(12)	1.2E-06	1.8E-05	
	uranium-236	12(12)	0	4.5E-06	
	uranium-238	12(0)	1.2E-04	2.7E-04	1.6E-04
A29	americium-241	12(12)	0	1.8E-05	
	fluoride	52(22)	1.9E-02	2.8E-01	
	neptunium-237	12(11)	0	1.1E-05	
	plutonium-238	12(12)	0	1.3E-05	
	plutonium-239/240	12(12)	0	7.6E-06	
	technetium-99	12(12)	0	7.3E-04	
	uranium	12(0)	3.0E-04	1.1E-03	6.4E-04
	uranium-233/234	12(0)	1.2E-04	3.6E-04	2.2E-04
	uranium-235	12(7)	0	2.2E-05	
	uranium-236	12(12)	0	6.5E-06	
	uranium-238	12(0)	1.0E-04	3.5E-04	2.2E-04
A36	americium-241	12(12)	0	8.3E-06	
	fluoride	52(9)	2.1E-02	1.3E-01	
	neptunium-237	12(12)	0	4.8E-06	
	plutonium-238	12(12)	0	1.1E-05	
	plutonium-239/240	12(12)	0	8.1E-06	
	technetium-99	12(10)	0	3.2E-03	
	uranium	12(0)	4.9E-04	5.8E-03	1.1E-03
	uranium-233/234	12(0)	1.7E-04	1.9E-03	4.0E-04
	uranium-235	12(7)	2.8E-06	7.6E-05	
	uranium-236	12(12)	0	5.7E-06	
	uranium-238	12(0)	1.6E-04	1.9E-03	3.6E-04
A40	fluoride	52(10)	2.2E-02	2.2E-01	

Table 2.7. Ambient air monitoring program summary for radionuclides and fluoride – 2006 (continued)

Sampling Location	Parameter[a]	No. of measurements[b]	Minimum[c, d]	Maximum[c]	Average[d, e]
		On-site air samplers			
T7	americium-241	12(12)	0	7.0E-06	
	neptunium-237	12(12)	0	4.3E-06	
	plutonium-238	12(12)	5.7E-09	1.9E-05	
	plutonium-239/240	12(12)	0	8.1E-06	
	technetium-99	12(11)	0	1.6E-03	
	uranium	12(0)	2.7E-04	8.6E-04	5.7E-04
	uranium-233/234	12(0)	1.2E-04	4.1E-04	2.1E-04
	uranium-235	12(10)	0	1.9E-05	
	uranium-236	12(12)	0	6.3E-06	
	uranium-238	12(0)	9.2E-05	2.9E-04	1.9E-04
		Off-site air samplers			
A3	americium-241	12(12)	0	1.0E-05	
	fluoride	51(17)	1.5E-02	4.6E-01	
	neptunium-237	12(12)	0	4.3E-06	
	plutonium-238	12(12)	0	1.9E-05	
	plutonium-239/240	12(12)	0	4.6E-06	
	technetium-99	12(12)	0	4.8E-04	
	uranium	12(0)	3.1E-04	9.2E-04	6.0E-04
	uranium-233/234	12(0)	7.4E-05	4.8E-04	2.1E-04
	uranium-235	12(8)	2.2E-09	1.7E-05	
	uranium-236	12(12)	0	8.9E-06	
	uranium-238	12(0)	1.0E-04	3.1E-04	2.0E-04
A6	americium-241	12(12)	0	5.1E-06	
	fluoride	51(32)	1.9E-02	1.2E-01	
	neptunium-237	12(12)	0	8.3E-06	
	plutonium-238	12(12)	0	1.6E-05	
	plutonium-239/240	12(12)	0	4.6E-06	
	technetium-99	12(12)	0	9.1E-04	
	uranium	12(0)	3.3E-04	9.8E-04	6.4E-04
	uranium-233/234	12(0)	1.3E-04	3.3E-04	2.1E-04
	uranium-235	12(9)	0	1.8E-05	
	uranium-236	12(12)	0	5.3E-06	
	uranium-238	12(0)	1.1E-04	3.3E-04	2.2E-04
A9	americium-241	10(10)	0	6.8E-06	
	fluoride	42(14)	2.2E-02	2.4E-01	
	neptunium-237	10(10)	0	7.1E-06	
	plutonium-238	10(10)	6.1E-09	8.4E-06	
	plutonium-239/240	10(10)	0	2.2E-09	
	technetium-99	10(10)	0	1.0E-03	
	uranium	10(0)	4.3E-04	1.0E-03	6.0E-04
	uranium-233/234	10(0)	1.4E-04	3.4E-04	2.1E-04
	uranium-235	10(5)	5.2E-06	2.2E-05	
	uranium-236	10(10)	0	1.0E-05	
	uranium-238	10(0)	1.4E-04	3.3E-04	2.0E-04

Table 2.7. Ambient air monitoring program summary for radionuclides and fluoride – 2006 (continued)

Sampling Location	Parameter[a]	No. of measurements[b]	Minimum[c, d]	Maximum[c]	Average[d, e]
A12	americium-241	12(12)	0	9.6E-06	
	fluoride	52(17)	2.0E-02	2.7E-01	
	neptunium-237	12(12)	0	1.2E-05	
	plutonium-238	12(12)	0	1.5E-05	
	plutonium-239/240	12(12)	0	5.0E-06	
	technetium-99	12(12)	0	1.2E-03	
	uranium	12(0)	3.8E-04	8.2E-04	5.5E-04
	uranium-233/234	12(0)	1.4E-04	3.2E-04	2.0E-04
	uranium-235	12(9)	2.2E-06	2.1E-05	
	uranium-236	12(12)	0	9.3E-06	
	uranium-238	12(0)	1.3E-04	2.8E-04	1.8E-04
A15	americium-241	12(12)	0	4.7E-06	
	fluoride	52(19)	2.1E-02	1.2E-01	
	neptunium-237	12(12)	0	6.2E-06	
	plutonium-238	12(12)	0	1.3E-05	
	plutonium-239/240	12(12)	0	8.8E-06	
	technetium-99	12(12)	0	8.2E-04	
	uranium	12(0)	3.5E-04	7.1E-04	5.4E-04
	uranium-233/234	12(0)	1.4E-04	3.9E-04	2.0E-04
	uranium-235	12(11)	2.3E-09	2.3E-05	
	uranium-236	12(12)	0	4.5E-06	
	uranium-238	12(0)	1.2E-04	2.4E-04	1.8E-04
A23	americium-241	12(12)	0	9.3E-06	
	fluoride	52(15)	2.1E-02	1.2E-01	
	neptunium-237	12(12)	0	7.4E-06	
	plutonium-238	12(12)	0	1.0E-05	
	plutonium-239/240	12(12)	0	9.7E-06	
	technetium-99	12(12)	0	9.8E-04	
	uranium	12(0)	3.2E-04	1.0E-03	6.2E-04
	uranium-233/234	12(0)	1.1E-04	4.9E-04	2.2E-04
	uranium-235	12(7)	0	2.9E-05	
	uranium-236	12(12)	0	7.2E-06	
	uranium-238	12(0)	1.1E-04	3.4E-04	2.1E-04
A24	americium-241	12(12)	0	9.6E-06	
	fluoride	52(24)	1.8E-02	9.3E-02	
	neptunium-237	12(12)	0	5.2E-06	
	plutonium-238	12(12)	0	1.7E-05	
	plutonium-239/240	12(12)	0	2.3E-06	
	technetium-99	12(12)	0	1.5E-03	
	uranium	12(0)	3.5E-04	8.2E-04	6.6E-04
	uranium-233/234	12(0)	9.0E-05	3.6E-04	2.2E-04
	uranium-235	12(12)	0	1.3E-05	
	uranium-236	12(12)	0	6.7E-06	
	uranium-238	12(0)	1.2E-04	2.7E-04	2.2E-04

Table 2.7. Ambient air monitoring program summary for radionuclides and fluoride – 2006 (continued)

Sampling Location	Parameter[a]	No. of measurements[b]	Minimum[c, d]	Maximum[c]	Average[d, e]
A28	americium-241	12(12)	0	6.8E-06	
	fluoride	52(24)	1.6E-02	1.0E-01	
	neptunium-237	12(12)	0	7.4E-06	
	plutonium-238	12(12)	0	1.6E-05	
	plutonium-239/240	12(12)	0	7.3E-06	
	technetium-99	12(12)	0	7.4E-04	
	uranium	12(0)	3.2E-04	7.9E-04	5.6E-04
	uranium-233/234	12(0)	1.3E-04	2.8E-04	1.9E-04
	uranium-235	12(12)	3.1E-06	1.4E-05	
	uranium-236	12(12)	0	4.5E-06	
	uranium-238	12(0)	1.1E-04	2.7E-04	1.9E-04
A37	americium-241	12(12)	0	4.5E-06	
(background)	fluoride	38(16)	2.3E-02	7.3E+00	
	neptunium-237	12(12)	0	6.9E-06	
	plutonium-238	12(12)	0	1.3E-05	
	plutonium-239/240	12(12)	0	4.8E-06	
	technetium-99	12(12)	0	5.8E-04	
	uranium	12(0)	3.7E-04	7.7E-04	5.6E-04
	uranium-233/234	12(0)	1.1E-04	3.1E-04	1.9E-04
	uranium-235	12(8)	2.4E-06	1.8E-05	
	uranium-236	12(12)	0	5.0E-06	
	uranium-238	12(0)	1.2E-04	2.6E-04	1.9E-04
A41	americium-241	12(12)	0	6.9E-06	
	fluoride	52(18)	2.2E-02	9.3E-02	
	neptunium-237	12(12)	0	4.3E-06	
	plutonium-238	12(12)	0	1.1E-05	
	plutonium-239/240	12(12)	0	7.8E-06	
	technetium-99	12(12)	0	9.2E-04	
	uranium	12(0)	4.5E-04	9.9E-04	6.6E-04
	uranium-233/234	12(0)	1.4E-04	4.0E-04	2.2E-04
	uranium-235	12(12)	3.0E-06	1.3E-05	
	uranium-236	12(12)	0	8.9E-06	
	uranium-238	12(0)	1.5E-04	3.3E-04	2.2E-04

[a]All parameters are measured in pCi/m^3 with the exception of uranium and fluoride which are measured in μg/m^3.

[b]Radiological samples are analyzed monthly, samples for fluoride are analyzed weekly. Number in parentheses is the number of samples that were below the detection limit.

[c]Results are provided in scientific notation. The number and sign (+ or -) to the right of the "E" indicate the number of places to the right or left of the decimal point. For example, 3.4E-04 is 0.00034 (the decimal point moves four places to the left); 2.1E+02 is 210 (the decimal point moves two places to the right).

[d]Minimum values reported as "0" may actually be negative results. Because of the statistical nature of radiation detection, results for samples that have no radioactivity are often negative values because background radioactivity is subtracted out. These negative value results are reported as "0" in the table for simplicity.

[e]Averages are not calculated for locations that had greater than 15% of the results below the detection limit. If the analytical result for a sample was below the detection limit, the ambient air concentration was calculated based on the detection limit for the sample.

Table 2.8. DOE environmental radiation monitoring program (mrem) – 2006

Location	First quarter	Second quarter	Third quarter	Fourth quarter	Cumulative annual whole body dose[a]
#1404A	20	21	19	18	78
#518	19	23	20	18	80
#862	28	35	32	27	122
#874	167	205	175	166	713
#906	17	20	18	17	72
#933	31	34	34	41	140
A12	22	22	23	20	87
A15	21	26	22	20	89
A23	20	24	22	20	86
A24	22	24	22	21	89
A28	19	23	20	19	81
A29	20	24	22	22	88
A3	19	22	20	19	80
A36	20	22	20	20	82
A40	18	17	16	16	67
A6	22	23	20	19	84
A8	24	27	23	22	96
A9	20	23	21	21	85
X-230J2	22	24	21	21	88
Control[b]	22	22	20	19	83
Trip blank[b]	22	23	23	22	90

[a]The annual occupational whole body dose limit set by 10 CFR Part 20 is 5000 mrem.

[b]The control dosimeter is sent from the laboratory at the beginning of the quarter, remains at PORTS throughout the quarter in a low background location, and is returned to the laboratory with the other dosimeters at the end of the quarter. The trip blank dosimeter is sent from the laboratory at the beginning of the quarter, accompanies the sample team to the field locations at the beginning and end of each quarter and is returned to the laboratory with the other dosimeters at the end of the quarter. The control and trip blank measurements are an indication of background radiation.

Table 2.9. Environmental radiation monitoring (mrem) at locations near DOE depleted uranium cylinder storage yards – 2006

Location	First quarter			Second quarter		
	Deep[a,b]		Shallow[a,c]	Deep[a,b]		Shallow[a,c]
	X+G	N		X+G	N	
#41	46	ND	46	54	ND	54
#868	339	ND	339	432	ND	432
#874	153	ND	153	187	ND	187
#882	205	ND	205	256	ND	256
#890	36	ND	36	53	ND	53
Trip blank	24	ND	24	25	ND	25

Location	Third quarter			Fourth quarter		
	Deep[a,b]		Shallow[a,c]	Deep[a,b]		Shallow[a,c]
	X+G	N		X+G	N	
#41	53	ND	53	54	ND	54
#868	359	ND	359	388	ND	388
#874	164	ND	164	171	ND	171
#882	224	ND	224	229	ND	229
#890	47	ND	47	45	ND	45
Trip blank	22	ND	22	21	ND	21

[a]ND – not detected above the minimum reportable dose.

[b]Deep dose (dose equivalent at a tissue depth of 1 cm) applies to external whole body exposure and consists of x-ray and gamma radiation (X+G) and neutron radiation (N).

[c]Shallow dose (dose equivalent at a tissue depth of 0.007 cm) applies to exposure of the skin or an extremity.

Table 2.10. Local surface water monitoring program results for chemical and radiological parameters – 2006

Location	Parameter[a,b]	March[c,d]	June[c,d]	September[c,d]	November[c,d]
Scioto	aluminum	1600	587	89.6	1550N
River	americium-241	na	0.0543U	na	0.067U
RW-1	antimony	1.1U	1.1U	0.9U	0.62U
(downstream)	arsenic	2.3	1.5U	2.5*	2.7
	barium	61.9	63.4	65.8	54.8
	beryllium	0.07	0.07	0.03	0.08
	bismuth	1.3U	1.3U	1.2U	1U
	cadmium	0.18U	0.18U	0.1	0.08U
	calcium	53700	60000	61000	45200N
	chromium	2.1	1.3	0.4	2.1
	cobalt	0.74	0.57	0.28	0.93
	copper	4.4	4.2	1.7*	4.9
	fluoride	na	0.39	na	0.24
	iron	2790	1050	159	2690N
	lead	2.4	1*	0.98	2.4
	lithium	5	5.8	13.2E	4.1
	magnesium	19300	21200	20800	16600
	manganese	59.7	47.3	31.7	73
	molybdenum	4.3	6.1	8.1	3.8
	neptunium-237	na	0.000000205U	na	0.000000295U
	nickel	4.2	3	2.3	4.4*
	PCB, total	na	1.2U	1.2U	1.2U
	PCB-1016	na	0.4U	0.4U	0.4U
	PCB-1221	1U	0.4U	0.4U	0.4U
	PCB-1232	1U	0.4U	0.4U	0.4U
	PCB-1242	1U	0.4U	0.4U	0.4U
	PCB-1248	1U	0.4U	0.4U	0.4U
	PCB-1254	1U	0.4U	0.4U	0.4U
	PCB-1260	1U	0.4U	0.4U	0.4U
	PCB-1268	na	0.4U	0.4U	0.4U
	phosphorus	193	176E	285	282
	plutonium-238	na	0.0565U	na	0.0104U
	plutonium-239	na	0.0141U	na	0.000000524U
	potassium	3700	4530E	5260	5090
	selenium	1.2U	1.2U	0.65*U	1.1*U
	silicon	5220	3600N	3410	5510N
	silver	0.18U	0.18U	0.28U	0.12U
	sodium	15400	23100	36300	9480
	technetium-99	na	3.26U	na	2.23U
	thallium	1.8U	1.8U	1.4U	1.4U
	tin	2.7U	2.7U	0.88U	0.9U
	titanium	24.2	10.7	1.5*	22.9
	total phosphate as phosphorus	na	0.27	na	0.48

Table 2.10. Local surface water monitoring program results for chemical and radiological parameters – 2006 (continued)

Location	Parameter[a,b]	March[c,d]	June[c,d]	September[c,d]	November[c,d]
Scioto	uranium	na	2.04	na	1.06
River	uranium-233/234	na	0.727	na	0.638
RW-1	uranium-235	na	0.0253U	na	0.0456U
(downstream)	uranium-236	na	0.0171U	na	0.0102U
	uranium-238	na	0.683	na	0.35
	vanadium	3.5	1.9	0.91	3.7
	zinc	17.7	10.8	10.7E	15.1
Scioto	aluminum	1400	447	111	1590N
River	americium-241	na	0.044U	na	0.0211U
RW-6	antimony	1.1U	1.1U	1.1	0.62U
(upstream)	arsenic	2.2	1.9	2.6*	2.7
	barium	57.9	63	63.1	56.3
	beryllium	0.07	0.05U	0.03	0.09
	bismuth	1.3U	1.3U	1.2U	1U
	cadmium	0.18U	0.18U	0.08U	0.08U
	calcium	54200	59600	61600	47600N
	chromium	1.8	1	0.39	2.1
	cobalt	0.55	0.47	0.39	1.1
	copper	3.9	3.2	5.2*	5.7
	fluoride	na	0.37	na	0.24
	iron	2150	854	260	2840N
	lead	1.5	0.94*	0.62	2.4
	lithium	4.7	5.5	13.2E	4.4
	magnesium	19300	21500	21300	17300
	manganese	45.6	42.5	28.4	76
	molybdenum	4.5	6.6	8.6	4
	neptunium-237	na	-0.0294U	na	0.0223U
	nickel	3.2	2.8	2.3	4.5*
	PCB, total	na	1.2U	1.2U	1.2U
	PCB-1016	na	0.4U	0.4U	0.4U
	PCB-1221	1U	0.4U	0.4U	0.4U
	PCB-1232	1U	0.4U	0.4U	0.4U
	PCB-1242	1U	0.4U	0.4U	0.4U
	PCB-1248	1U	0.4U	0.4U	0.4U
	PCB-1254	1U	0.4U	0.4U	0.4U
	PCB-1260	1U	0.4U	0.4U	0.4U
	PCB-1268	na	0.4U	0.4U	0.4U
	phosphorus	173	178E	246	298
	plutonium-238	na	0.0481U	na	-0.0265U
	plutonium-239/240	na	0.0481U	na	0.000000222U
	potassium	3650	4530E	5440	5270

Table 2.10. Local surface water monitoring program results for chemical and radiological parameters – 2006 (continued)

Location	Parameter[a,b]	March[c,d]	June[c,d]	September[c,d]	November[c,d]
Scioto	selenium	1.2U	1.2U	0.77*	1.1*U
River	silicon	4910	3280N	3600	5650N
RW-6	silver	0.18U	0.18U	0.28U	0.12U
(upstream)	sodium	15600	23500	38100	10100
	technetium-99	na	1.89U	na	1.43U
	thallium	1.8U	1.8U	1.4U	1.4U
	tin	2.7U	2.7U	0.88U	0.9U
	titanium	21.2	6.7	2.7*	23.8
	total phosphate as phosphorus	na	0.27	na	0.44
	uranium	na	1.57	na	1.71
	uranium-233/234	na	0.626	na	0.639
	uranium-235	na	0.0458U	na	0.0228U
	uranium-236	na	0.0103U	na	0.000000172U
	uranium-238	na	0.521	na	0.571
	vanadium	3.1	1.6	0.98	3.9
	zinc	15.6	9	8.1E	15.4

Table 2.10. Local surface water monitoring program results for chemical and radiological parameters – 2006 (continued)

Location	Parameter[a,b]	June[c,d]	November[c,d]
Little Beaver	americium-241	0.017U	0.0346U
Creek	neptunium-237	0.0101U	0.0525U
RW-7	plutonium-238	0.000000575U	0.0105U
(downstream)	plutonium-239/240	0U	0.0419U
	technetium-99	5.75U	7.39
	uranium	0.00162U	1.66
	uranium-233/234	0.689	2.09
	uranium-235	0.0348U	0.0775U
	uranium-236	0.0125U	0.0199U
	uranium-238	0.54	0.545
RW-8	americium-241	0.0543U	0.0382U
(downstream)	neptunium-237	0.000000205U	0.036U
	plutonium-238	0.0565U	0.0988U
	plutonium-239/240	0.0141U	0.0111U
	technetium-99	3.26U	8.99
	uranium	0.00204U	1.56
	uranium-233/234	0.727	1.75
	uranium-235	0.0253U	0.082U
	uranium-236	0.0171U	0.0316U
	uranium-238	0.683	0.511
RW-12	americium-241	0.017U	-0.032U
(upstream)	neptunium-237	0.0101U	0.0413U
	plutonium-238	0.000000575U	-0.0117U
	plutonium-239/240	0U	0.0117U
	technetium-99	5.75U	1.89U
	uranium	0.00162U	-0.00573U
	uranium-233/234	0.689	0.0311U
	uranium-235	0.0348U	-0.0128U
	uranium-236	0.0125U	0.0115U
	uranium-238	0.54	0.000000173U
Big Beaver Creek	americium-241	0.017U	0.0384U
RW-13	neptunium-237	0.0101U	0U
(downstream)	plutonium-238	0.000000575U	0.0117U
	plutonium-239/240	0U	0U
	technetium-99	5.75U	1.51U
	uranium	0.00162U	0.23U
	uranium-233/234	0.689	0.221
	uranium-235	0.0348U	0.026U
	uranium-236	0.0125U	0.0117U
	uranium-238	0.54	0.0733U
RW-5	americium-241	0.0172U	0.0126U
(upstream)	neptunium-237	0.0204U	0.0943U
	plutonium-238	0.0307U	-0.0565U
	plutonium-239/240	0.0307U	0.0452U
	technetium-99	4.22U	2.62U
	uranium	0.0000879U	0.216U
	uranium-233/234	0.0587U	0.128U
	uranium-235	0.00609U	0.000000189U
	uranium-236	0U	0.0202U
	uranium-238	0.0286U	0.0727U

Table 2.10. Local surface water monitoring program results for chemical and radiological parameters – 2006 (continued)

Location	Parameter[a,b]	June[c,d]	November[c,d]
Big Run Creek	americium-241	0.0172U	-0.013U
RW-2	neptunium-237	0.0204U	0.13U
(downstream)	plutonium-238	0.0307U	-0.0225U
	plutonium-239/240	0.0307U	0.0225U
	technetium-99	4.22U	0.82U
	uranium	0.0000879U	0.37U
	uranium-233/234	0.0587U	0.104U
	uranium-235	0.00609U	0.0117U
	uranium-236	0U	0.0105U
	uranium-238	0.0286U	0.123U
RW-3	americium-241	0.0543U	-0.0136U
(downstream)	neptunium-237	0.000000205U	0.0345U
	plutonium-238	0.0565U	0U
	plutonium-239/240	0.0141U	0.0228U
	technetium-99	3.26U	1.5U
	uranium	0.00204U	0.874
	uranium-233/234	0.727	0.55
	uranium-235	0.0253U	0.0357U
	uranium-236	0.0171U	0.0321U
	uranium-238	0.683	0.288
RW-33	americium-241	0.044U	0.0276U
(upstream)	neptunium-237	-0.0294U	0U
	plutonium-238	0.0481U	0.000000195U
	plutonium-239/240	0.0481U	0.0116U
	technetium-99	1.89U	0.982U
	uranium	0.00157U	0.0686U
	uranium-233/234	0.626	0.0388U
	uranium-235	0.0458U	0.0239U
	uranium-236	0.0103U	0.0107U
	uranium-238	0.521	0.0193U
Background creeks	americium-241	0.0172U	-0.0143U
RW-10N	neptunium-237	0.0204U	0.0519U
	plutonium-238	0.0307U	0.0333U
	plutonium-239/240	0.0307U	0.0222U
	technetium-99	4.22U	1.71U
	uranium	0.0000879U	0.219U
	uranium-233/234	0.0587U	0.136U
	uranium-235	0.00609U	0.0112U
	uranium-236	0U	0.000000168U
	uranium-238	0.0286U	0.0721U

Table 2.10. Local surface water monitoring program results for chemical and radiological parameters – 2006 (continued)

Location	Parameter[a,b]	June[c,d]	November[c,d]
Background creeks	americium-241	0.026U	0.00507U
RW-10S	neptunium-237	0.0285U	0.000000297U
	plutonium-238	0.0332U	0.0527U
	plutonium-239/240	0.0221U	0.0211U
	technetium-99	3.6U	0.27U
	uranium	0.372U	0.279U
	uranium-233/234	0.152	0.146U
	uranium-235	0.0138U	0.0277U
	uranium-236	0.00621U	0.0373U
	uranium-238	0.123U	0.0894U
RW-10E	americium-241	0.026U	0.0572U
	neptunium-237	0.0285U	0.0188U
	plutonium-238	0.0332U	0.000000526U
	plutonium-239/240	0.0221U	0.0104U
	technetium-99	3.6U	1.06U
	uranium	0.000372U	0.108U
	uranium-233/234	0.152	0.0772U
	uranium-235	0.0138U	0.0476U
	uranium-236	0.00621U	0U
	uranium-238	0.123	0.0288U
RW-10W	americium-241	0.0172U	-0.0226U
	neptunium-237	0.0204U	0.0561U
	plutonium-238	0.0307U	-0.0341U
	plutonium-239/240	0.0307U	0.0569U
	technetium-99	4.22U	2.41U
	uranium	0.0879U	0.0583U
	uranium-233/234	0.0587U	0.0197U
	uranium-235	0.00609U	0U
	uranium-236	0U	0U
	uranium-238	0.0286U	0.0196U

[a]Parameters are reported in the following units: radionuclides [americium-241, neptunium-237, plutonium isotopes, technetium-99 and uranium isotopes (not including uranium)] in pCi/L, fluoride and total phosphate as phosphorus in mg/L, and all other parameters (metals, including uranium, and PCBs) in μg/L.

[b]The derived concentration guide (DCG) for each radionuclide is as follows: americium-241, 30 pCi/L; neptunium-237, 30 pCi/L; plutonium-238, 40 pCi/L; plutonium-239/240, 30 pCi/L; technetium-99, 100,000 pCi/L; uranium-233/234, 500 pCi/L; uranium-235, 600 pCi/L; uranium-236, 500 pCi/L; uranium-238, 600 pCi/L. All results are well below these DOE standards. A DCG is not available for total uranium.

[c]Abbreviations and data qualifiers are as follows: * – duplicate analysis is not within control limits; E – the reported value is estimated because of the presence of interferences; N – sample spike recovery is not within control limits; U – undetected; na – not analyzed.

[d]Because of the statistical nature of radiation detection, results for samples that have no radioactivity are often negative values because background radioactivity is subtracted out.

Table 2.11. Sediment monitoring program results – 2006

Parameter	Unit	Location/results[a,b]			
		Scioto River and outfalls that discharge to the Scioto River			
		RM-6 Upstream @ Piketon	*RM-1 Downstream @ Lucasville*	*RM-9 Outfall 012*	*RM-10 USEC Outfall 010/DOE Outfall 013*
Aluminum	mg/kg	3910N	2930N	3100*N	2050*N
Americium-241	pCi/g	0.00512U	0.0328U	0.00819U	0.00228U
Antimony	mg/kg	0.41NU	0.42NU	0.42*NU	0.42*NU
Arsenic	mg/kg	6.2	5.1	9.6*	9.4*
Barium	mg/kg	50.7	48.7	111	23.7
Beryllium	mg/kg	0.29	0.23	0.63*	0.31*
Bismuth	mg/kg	0.48U	0.48U	0.49U	0.48U
Cadmium	mg/kg	0.3	0.28	1.7*	0.12*
Calcium	mg/kg	20700N	26700N	1150N	1540N
Chromium	mg/kg	7.1	5.4	7.9*	7.4*
Cobalt	mg/kg	4.3	3.7	62.7	5.7
Copper	mg/kg	11.8	9.8	17.3	9.5
Iron	mg/kg	10900	8840	29600*N	12300*N
Lead	mg/kg	10.5	8.9	12.9*	6.9*
Lithium	mg/kg	6.1	4.8	8.4*	2.4*
Magnesium	mg/kg	7630	6470	1340	1080
Manganese	mg/kg	304N	315N	1770N	276N
Mercury	mg/kg	0.03	0.02	0.02NU	0.01NU
Molybdenum	mg/kg	2.3	2	13.6*	5*
Neptunium-237	pCi/g	0.00475U	0.00515U	0.00253U	0.0028U
Nickel	mg/kg	11.9	10	58.4	11.2
PCB-1016	µg/kg	13U	13U	13U	13U
PCB-1221	µg/kg	13U	13U	13U	13U
PCB-1232	µg/kg	13U	13U	13U	13U
PCB-1242	µg/kg	13U	13U	13U	13U
PCB-1248	µg/kg	15	8.3J	13U	13U
PCB-1254	µg/kg	13U	13U	13U	13U
PCB-1260	µg/kg	13U	13U	13U	18
PCB-1268	µg/kg	13U	13U	na	na
Phosphorus	mg/kg	442N	409N	167N	197N
Plutonium-238	pCi/g	-0.00258U	-0.0102U	0.00526U	0.0051U
Plutonium-239/240	pCi/g	-0.00258U	0.0068U	0.00526U	0.0102U
Potassium	mg/kg	639	477	601	261
Selenium	mg/kg	0.55*	0.5*	0.53	0.44U
Silicon	mg/kg	343N	315N	312N	306N
Silver	mg/kg	0.07U	0.07U	0.07U	0.07U
Sodium	mg/kg	72.6	66.9	43.3	34.1
Technetium-99	pCi/g	0.514	0.322	0.135U	0.547
Thallium	mg/kg	0.65U	0.66U	0.67U	0.66U
Tin	mg/kg	1U	1U	1U	1U
Titanium	mg/kg	50.5N	43.5N	33.6	43.1
Uranium	µg/g	1.97	1.73	2.64	2.15
Uranium-233/234	pCi/g	0.614	0.639	0.801	0.857
Uranium-235	pCi/g	0.0206U	0.0319U	0.0407U	0.0274U
Uranium-236	pCi/g	0.00309U	0.0115U	0.0183U	0.00546U
Uranium-238	pCi/g	0.661	0.577	0.882	0.719
Vanadium	mg/kg	10	7.6	16.8*	10.1*
Zinc	mg/kg	58.8	49.8	124	49.4

Table 2.11. Sediment monitoring program results – 2006 (continued)

Parameter	Unit	Location/results[a,b]			
		Little Beaver Creek			
		RM-12 Upstream	*RM-11 X-230J7 Discharge*	*RM-8 Downstream @ Outfall 009 Discharge*	*RM-7 Downstream @ Confluence*
Aluminum	mg/kg	3430*N	4620*N	2600*N	2280*N
Americium-241	pCi/g	0.00543U	0.0261U	0.0173U	0.025U
Antimony	mg/kg	0.66*N	1.1*N	0.42*NU	0.44*N
Arsenic	mg/kg	22.1*	42.5*	10.4*	13.8*
Barium	mg/kg	35.7	88.8	33.6	32.2
Beryllium	mg/kg	0.72*	1.4*	0.44*	0.47*
Bismuth	mg/kg	0.48U	0.48U	0.48U	0.49U
Cadmium	mg/kg	0.07*U	0.25*	0.34*	0.4*
Calcium	mg/kg	431N	447N	1890N	2540N
Chromium	mg/kg	17.9*	35*	10.5*	10.1*
Cobalt	mg/kg	13.4	30.2	9	7.2
Copper	mg/kg	7.8	11.7	8.5	8.7
Iron	mg/kg	29800*N	93300*N	14500*N	16900*N
Lead	mg/kg	15.6*	33*	9.5*	7.6*
Lithium	mg/kg	4.6*	3.1*	4.2*	3.3*
Magnesium	mg/kg	484	543	1070	1520
Manganese	mg/kg	693N	1510N	490N	383N
Mercury	mg/kg	0.02NU	0.01NU	0.02N	0.01NU
Molybdenum	mg/kg	1.8*	3.2*	4.1*	5.5*
Neptunium-237	pCi/g	0.00599U	0U	0.00115U	0.0225U
Nickel	mg/kg	11	22.6	14.7	18.8
PCB-1016	µg/kg	13U	13U	13U	13U
PCB-1221	µg/kg	13U	13U	13U	13U
PCB-1232	µg/kg	13U	13U	13U	13U
PCB-1242	µg/kg	13U	13U	13U	13U
PCB-1248	µg/kg	13U	13U	13U	13U
PCB-1254	µg/kg	13U	13U	13U	13U
PCB-1260	µg/kg	13U	13U	34	28
PCB-1268	µg/kg	na	na	na	na
Phosphorus	mg/kg	236N	658N	173N	221N
Plutonium-238	pCi/g	0U	-0.0027U	0U	0U
Plutonium-239/240	pCi/g	0.00589U	0.00539U	0.00905U	0.00293U
Potassium	mg/kg	272	270	285	272
Selenium	mg/kg	0.63	1.1	0.9	0.45U
Silicon	mg/kg	320N	501N	366N	258N
Silver	mg/kg	0.07U	0.07U	0.07U	0.07U
Sodium	mg/kg	25.6	25	29.8	35.2
Technetium-99	pCi/g	0.348	0.755	4.04	24.2
Thallium	mg/kg	0.66U	2U	0.66U	0.67U
Tin	mg/kg	1U	1U	1U	1U
Titanium	mg/kg	51.3	40.4	47.9	44.4
Uranium	µg/g	1.66	2.69	2.95	3.51
Uranium-233/234	pCi/g	0.459	1.35	2.37	3.15
Uranium-235	pCi/g	0.038U	0.0587U	0.0966	0.164
Uranium-236	pCi/g	0.0124U	0.0162U	0.02U	0.0201U
Uranium-238	pCi/g	0.551	0.897	0.978	1.15
Vanadium	mg/kg	25.9*	47.1*	14.5*	15.2*
Zinc	mg/kg	36.4	64.4	63.4	57.4

Table 2.11. Sediment monitoring program results – 2006 (continued)

Parameter	Unit	Location/results[a,b]	
		Big Beaver Creek	
		RM-5	*RM-13*
		Upstream	*Downstream*
Aluminum	mg/kg	2260*N	2450*N
Americium-241	pCi/g	0.00548U	0.0176U
Antimony	mg/kg	0.42*NU	0.66*N
Arsenic	mg/kg	4.9*	23*
Barium	mg/kg	26.7	31.2
Beryllium	mg/kg	0.29*	0.54*
Bismuth	mg/kg	0.49U	0.48U
Cadmium	mg/kg	0.21*	0.56*
Calcium	mg/kg	3610N	17400N
Chromium	mg/kg	6.8*	16.8*
Cobalt	mg/kg	5.6	9.7
Copper	mg/kg	6.2	8.4
Iron	mg/kg	8870*N	30300*N
Lead	mg/kg	5.8*	10.4*
Lithium	mg/kg	4.4*	3.4*
Magnesium	mg/kg	2020	8220
Manganese	mg/kg	168N	700N
Mercury	mg/kg	0.02NU	0.01NU
Molybdenum	mg/kg	2*	4.9*
Neptunium-237	pCi/g	0.00272U	0.0331U
Nickel	mg/kg	11.1	26.9
PCB-1016	µg/kg	13U	13U
PCB-1221	µg/kg	13U	13U
PCB-1232	µg/kg	13U	13U
PCB-1242	µg/kg	13U	13U
PCB-1248	µg/kg	13U	13U
PCB-1254	µg/kg	13U	13U
PCB-1260	µg/kg	8.9J	13U
PCB-1268	µg/kg	na	na
Phosphorus	mg/kg	155N	292N
Plutonium-238	pCi/g	0.00532U	-0.00302U
Plutonium-239/240	pCi/g	0.00266U	0.0121U
Potassium	mg/kg	283	221
Selenium	mg/kg	0.45U	0.44U
Silicon	mg/kg	286N	228N
Silver	mg/kg	0.07U	0.07U
Sodium	mg/kg	37.3	52.4
Technetium-99	pCi/g	3.06	9.47
Thallium	mg/kg	0.67U	0.66U
Tin	mg/kg	1U	1U
Titanium	mg/kg	43	38.6
Uranium	µg/g	2.13	4.05
Uranium-233/234	pCi/g	1.92	4.73
Uranium-235	pCi/g	0.0311U	0.181
Uranium-236	pCi/g	0.0217U	0.0543
Uranium-238	pCi/g	0.711	1.33
Vanadium	mg/kg	9.2*	23.5*
Zinc	mg/kg	36.2	73.7

Table 2.11. Sediment monitoring program results – 2006 (continued)

Parameter	Unit	Location/results[a,b]		
			Big Run Creek	
		RM-33 Upstream	*RM-3 Downstream*	*RM-2 Downstream @ Wakefield*
Aluminum	mg/kg	3000*N	3010*N	4170*N
Americium-241	pCi/g	0.00521U	-0.00242U	0.00522U
Antimony	mg/kg	1.1*N	0.42*N	2.9*N
Arsenic	mg/kg	30.4*	18.3*	59.7*
Barium	mg/kg	34.8	31.4	43.8
Beryllium	mg/kg	0.77*	0.52*	0.95*
Bismuth	mg/kg	0.48U	0.49U	0.88
Cadmium	mg/kg	0.32*	0.15*	1.1*
Calcium	mg/kg	21300N	1310N	1060N
Chromium	mg/kg	17.5*	8.4*	61.3*
Cobalt	mg/kg	14.5	12.3	33.4
Copper	mg/kg	10	8.9	88.6
Iron	mg/kg	35000*N	17900*N	136000*N
Lead	mg/kg	16.4*	10.3*	23.5*
Lithium	mg/kg	3.1*	3.5*	6.4*
Magnesium	mg/kg	9130	899	866
Manganese	mg/kg	818N	905N	974N
Mercury	mg/kg	0.01NU	0.01NU	0.01NU
Molybdenum	mg/kg	9.3*	4.2*	23*
Neptunium-237	pCi/g	0.00257U	0.0000000427U	0.000000191U
Nickel	mg/kg	16.3	10.2	79
PCB-1016	µg/kg	13U	13U	13U
PCB-1221	µg/kg	13U	13U	13U
PCB-1232	µg/kg	13U	13U	13U
PCB-1242	µg/kg	13U	13U	13U
PCB-1248	µg/kg	13U	13U	13U
PCB-1254	µg/kg	13U	13U	13U
PCB-1260	µg/kg	14	57	13U
PCB-1268	µg/kg	na	na	na
Phosphorus	mg/kg	370N	356N	443N
Plutonium-238	pCi/g	0.0072U	0U	0.0215U
Plutonium-239/240	pCi/g	0.0048U	0.00275U	-0.00269U
Potassium	mg/kg	229	227	403
Selenium	mg/kg	0.63	0.63	1.4
Silicon	mg/kg	324N	295N	480N
Silver	mg/kg	0.07U	0.07U	0.07U
Sodium	mg/kg	118	135	95.3
Technetium-99	pCi/g	0.984	1.01	0.533
Thallium	mg/kg	0.66U	0.67U	2U
Tin	mg/kg	1U	1U	5.4
Titanium	mg/kg	58.7	43	42
Uranium	µg/g	2.49	2.49	2.46
Uranium-233/234	pCi/g	1.54	1.61	1.15
Uranium-235	pCi/g	0.0539	0.0556	0.055U
Uranium-236	pCi/g	0.0134U	0.0235U	0.0212U
Uranium-238	pCi/g	0.829	0.828	0.819
Vanadium	mg/kg	28.9*	16.1*	38.6*
Zinc	mg/kg	74.9	50.8	127

Table 2.11. Sediment monitoring program results – 2006 (continued)

Parameter	Unit	Location/results[a,b]			
		Background creeks			
		RM-10N North background	*RM-10S South background*	*RM-10E East background*	*RM-10W West background*
Aluminum	mg/kg	2090*N	3710N	597*N	2860N
Americium-241	pCi/g	0.00954U	0.0175U	0.0138U	0U
Antimony	mg/kg	0.42*NU	0.6N	0.42*NU	1.4N
Arsenic	mg/kg	4.1*	25.3	2.4*	26.1
Barium	mg/kg	28.3	44.7	7.9	29
Beryllium	mg/kg	0.3*	0.6	0.15*	0.65
Bismuth	mg/kg	0.49U	0.48U	0.49U	0.48U
Cadmium	mg/kg	0.39*	0.11	0.07*U	1.6
Calcium	mg/kg	3920N	7200N	179N	774N
Chromium	mg/kg	3.9*	20	3.1*	10.6
Cobalt	mg/kg	5.6	11.2	1.1	10.5
Copper	mg/kg	6.5	8.1	0.9	13.3
Iron	mg/kg	7630*N	28800	4100*N	26800
Lead	mg/kg	6.1*	13.5	2.1*	13.2
Lithium	mg/kg	4.1*	5.6	0.55*	4.8
Magnesium	mg/kg	1970	4240	76	703
Manganese	mg/kg	177N	682N	56N	351N
Mercury	mg/kg	0.01NU	0.01U	0.01NU	0.02U
Molybdenum	mg/kg	1.4*	2.6	0.28*U	22.2
Neptunium-237	pCi/g	0.00595U	0.00243U	0.00272U	0U
Nickel	mg/kg	14.2	12.4	1.3	31.3
PCB-1016	µg/kg	13U	13U	13U	13U
PCB-1221	µg/kg	13U	13U	13U	13U
PCB-1232	µg/kg	13U	13U	13U	13U
PCB-1242	µg/kg	13U	13U	13U	13U
PCB-1248	µg/kg	13U	13U	13U	13U
PCB-1254	µg/kg	13U	13U	13U	13U
PCB-1260	µg/kg	13U	13U	13U	13U
PCB-1268	µg/kg	na	13U	na	13U
Phosphorus	mg/kg	171N	264N	49N	181N
Plutonium-238	pCi/g	-0.00306U	-0.00285U	0U	-0.00296U
Plutonium-239/240	pCi/g	0.00306U	0.0057U	0.0117U	0.0237U
Potassium	mg/kg	261	322	51.2	447
Selenium	mg/kg	0.45U	0.44*U	0.45U	0.71*
Silicon	mg/kg	313N	281N	186N	282N
Silver	mg/kg	0.07U	0.07U	0.07U	0.07U
Sodium	mg/kg	37.7	59.6	28.4	30.7
Technetium-99	pCi/g	0.577	0.495	0.305	0.525
Thallium	mg/kg	0.67U	0.66U	0.67U	0.65U
Tin	mg/kg	1U	1U	1U	1U
Titanium	mg/kg	40.6	46.5N	15.6	28.3N

Table 2.11. Sediment monitoring program results – 2006 (continued)

Parameter	Unit	Location/results[a,b]			
		Background creeks			
		RM-10N North background	*RM-10S South background*	*RM-10E East background*	*RM-10W West background*
Uranium	µg/g	1.47	1.78	0.605	3.04
Uranium-233/234	pCi/g	0.433	0.657	0.205	1.05
Uranium-235	pCi/g	0.0142U	0.0249U	0.0101U	0.0572U
Uranium-236	pCi/g	0U	0.0084U	0.0091U	0.00686U
Uranium-238	pCi/g	0.492	0.594	0.202	1.02
Vanadium	mg/kg	7.2*	26.3	4.2*	33.1
Zinc	mg/kg	39.5	60.7	7.3	112

[a]Abbreviations and data qualifiers are as follows: * – duplicate analysis is not within control limits; J – the reported value is an estimated concentration greater than the method detection limit but less than the practical quantitation limit; N – sample spike recovery is not within control limits; U – undetected; na – not analyzed.

[b]Because of the statistical nature of radiation detection, results for samples that have no radioactivity are often negative values because background radioactivity is subtracted out.

Table 2.12. Soil and vegetation monitoring at ambient air monitoring stations – 2006

Parameter[a]	Location/results[b,c]			
	A8 – On site at northwest boundary		*T7 – On site near X-230L North Holding Pond*	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.0105U	0.0357U	0.0103U	0.0497U
Neptunium-237	-0.00627U	0U	0U	0U
Plutonium-238	0.000000122U	0.0135U	0.000000119U	0U
Plutonium-239/240	0.0121U	0.027U	0.00946U	0.0567U
Technetium-99	0.385	0.109U	0.101U	0.025U
Uranium	0.22	3.48	0.128U	2.62
Uranium-233/234	-0.0218U	1.15	-0.0264U	0.893
Uranium-235	0.00329U	0.0424U	0U	0.0289U
Uranium-236	0.0059U	0.0381U	0.00266U	0.0173U
Uranium-238	0.0736	1.16	0.0429U	0.878
	A10 – On site on northwest segment of Perimeter Road		*A29 – On site at OVEC*	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.00614U	0.00592U	0.0243U	0.00813U
Neptunium-237	0.0000000387U	0.00457U	0.0021U	0U
Plutonium-238	0.00192U	-0.00588U	-0.00236U	0.00771U
Plutonium-239/240	0.00575U	0.0118U	0.00943U	0.0116U
Technetium-99	0.131U	0.144U	0.26	0.134U
Uranium	0.0797U	2.87	0.262	2.99
Uranium-233/234	-0.00549U	0.881	-0.0197U	0.943
Uranium-235	0.00462U	0.0652U	0.0051U	0.0704U
Uranium-236	0.00208U	0U	0.00687U	0.00843U
Uranium-238	0.0261U	0.957	0.0872	0.996
	A36 – On site at X-611 Water Treatment Plant		*A6 – North of PORTS in Piketon*	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.0215U	0.0285U	0.0148U	0.0123U
Neptunium-237	0U	-0.00877U	0.00246U	0.00858U
Plutonium-238	-0.00741U	0.0032U	-0.00177U	0U
Plutonium-239/240	0.0123U	0.307	0.00884U	0.0332U
Technetium-99	0.282	0.312U	0.269	0.305U
Uranium	0.134U	2.13	0.149	2.98
Uranium-233/234	-0.00276U	0.75	-0.0166U	0.935
Uranium-235	0.013U	0.0481U	0.00399U	0.0396U
Uranium-236	0U	0.00664U	0.00717U	0.0305U
Uranium-238	0.0431U	0.708	0.0494	0.995

Table 2.12. Soil and vegetation monitoring at ambient air monitoring stations – 2006 (continued)

Parameter[a]	Location/results[b,c]			
	A24 – North of PORTS at Schuster Road		*A41 - North of PORTS at Zahns Corner*	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.0297U	0.0388U	-0.00536U	0.0433U
Neptunium-237	0.0062U	-0.00446U	0U	0.00432U
Plutonium-238	0.0000000399U	0.00406U	0U	0U
Plutonium-239/240	0.0119U	0.00811U	0.0057U	0.0221U
Technetium-99	0.0572U	0.138U	0.151U	0.322U
Uranium	0.183U	2.92	0.23	2.86
Uranium-233/234	-0.00576U	1.05	-0.0177U	0.819
Uranium-235	0.0149U	0.0463U	0.00273U	0.0564U
Uranium-236	0.00535U	0.0125U	0.00491U	0.00921U
Uranium-238	0.0591U	0.975	0.077	0.952
	A23 – Northeastern PORTS boundary		*A12 – Eastern PORTS boundary*	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.0147U	0.0197U	0.00287U	0.0393U
Neptunium-237	0.00214U	0.00473U	0U	0.0132U
Plutonium-238	0U	0.0478U	0U	0.0227U
Plutonium-239/240	0.0173U	0.0143U	0.0119U	0.0189U
Technetium-99	0.0808U	0.195U	0.155U	0.3U
Uranium	0.164U	3.77	0.156	2.87
Uranium-233/234	0.0000687U	0.912	-0.00635U	1.01
Uranium-235	0.00772U	0.0575U	0.00452U	0.0745U
Uranium-236	0.00462U	0.0287U	0.00203U	0.0178U
Uranium-238	0.0539U	1.26	0.0519	0.953
	A15 – Southeast of PORTS on Loop Road		*A3 – Southern PORTS boundary*	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.00642U	0.0279U	0.00448U	0.0377U
Neptunium-237	0U	0.00654U	0.00479U	0U
Plutonium-238	0.00291U	0.0111U	0.002U	-0.00738U
Plutonium-239/240	0.00581U	0.0166U	0.01U	0.0221U
Technetium-99	0.992	0.255U	0.0705U	0.181U
Uranium	0.179U	2.76	0.145U	2.83
Uranium-233/234	-0.00966U	1.09	-0.0097U	0.888
Uranium-235	0.00298U	0.0451U	0.00449U	0.0476U
Uranium-236	0.00535U	0.0232U	0.00403U	0.0233U
Uranium-238	0.0599U	0.921	0.0481U	0.943

Table 2.12. Soil and vegetation monitoring at ambient air monitoring stations – 2006 (continued)

Parameter[a]	Location/results[b,c]			
	A9 – South of PORTS		*A28 – Southwest of PORTS on Camp Creek Road*	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.0225U	0.0535U	0.0181U	0.0341U
Neptunium-237	0U	0U	-0.00423U	0.0044U
Plutonium-238	0.0039U	0.0117U	0.00514U	0.0418U
Plutonium-239/240	0.00585U	0.0391U	0.000000129U	0.0668U
Technetium-99	0.0419U	0.165U	0.129U	0.291U
Uranium	0.209	1.98	0.162U	3.01
Uranium-233/234	-0.0117U	0.564	-0.0132U	1.1
Uranium-235	0.00754U	0.0159U	0.00773U	0.0591U
Uranium-236	0.00226U	0.0191U	0U	0.0332U
Uranium-238	0.0692	0.665	0.0533U	1
	A37 – Background station near Otway			
	Vegetation	Soil		
Americium-241	0.019U	0.04U		
Neptunium-237	0.0000000347U	0.00858U		
Plutonium-238	0U	0.00463U		
Plutonium-239/240	0.00615U	0.037U		
Technetium-99	0.0807U	0.211U		
Uranium	0.129U	2.87		
Uranium-233/234	-0.00734U	0.968		
Uranium-235	0.00741U	0.022U		
Uranium-236	0.00222U	0.00988U		
Uranium-238	0.0424U	0.964		

[a]All parameters are measured in pCi/g with the exception of uranium which is measured in μg/g.
[b]Abbreviations and data qualifiers are as follows: U – undetected.
[c]Because of the statistical nature of radiation detection, results for samples that have no radioactivity are often negative values because background radioactivity is subtracted out.

Table 2.13. Biota (fish) monitoring program results – 2006

Parameter	Unit	Location/type of fish/results[a,b]
		Little Beaver Creek (RW-8)[c]
Americium-241	pCi/g	0.00177U
Chromium	mg/kg	0.34
Neptunium-237	pCi/g	-0.0021U
PCB, total	µg/kg	320
PCB-1016	µg/kg	65U
PCB-1221	µg/kg	65U
PCB-1232	µg/kg	65U
PCB-1242	µg/kg	65U
PCB-1248	µg/kg	65U
PCB-1254	µg/kg	65U
PCB-1260	µg/kg	320
PCB-1268	µg/kg	65U
Plutonium-238	pCi/g	-0.00182U
Plutonium-239/240	pCi/g	0.00727U
Technetium-99	pCi/g	0.0434U
Uranium	µg/g	0.0000839U
Uranium-233/234	pCi/g	0.0189U
Uranium-235	pCi/g	0U
Uranium-236	pCi/g	0.00523U
Uranium-238	pCi/g	0U

[a]Abbreviations and data qualifiers are as follows: U – undetected.

[b]Because of the statistical nature of radiation detection, results for samples that have no radioactivity are often negative values because background radioactivity is subtracted out.

[c]Fish type for PCB analysis: large mouth bass; fish type for chromium analysis: blue gill; fish types for radionuclides: large mouth bass, blue gill, sunfish, rock bass.

Table 2.14. Biota (crops) monitoring program results – 2006

Type	Location	Tc-99[a,b,c]	U	U-233/234	U-235	U-238
Green peppers	Off site #1	0.0491U	0.0105U	0.0117U	-0.00241U	0.00389U
Watermelon	Off site #1	0.0616U	0.00468U	0.0133U	-0.00235U	0.0019U
Corn	Off site #2	0.0666U	0.0246U	0.0167U	0.0129U	0.00624U
Green beans	Off site #2	0.0473U	0.0125U	0.0135U	0.00238U	0.00384U
Tomatoes	Off site #2	0.0479U	0.0186U	0.0118U	0.00242U	0.00587U
Turnips	Off site #2	0.0933U	0.0126U	0.0772U	0.00238U	0.00384U
Corn	Off site #3	0.0101U	0.0196U	0.0184U	0.00682U	0.00551U
Green beans	Off site #3	0.156U	0.0421U	0.0122U	0U	0.0142U
Tomatoes	Off site #3	0.0796U	0.0154U	0.0065U	0.00535U	0.00432U
Field corn	Off site #4	0.0609U	0.0399U	0.00936U	0.00231U	0.013U
Banana Pepper	Off site #5	0.136U	-0.0000329U	0.0129U	0.00455U	-0.00184U
Corn	Off site #5	0.0815U	0.0244U	0.062U	0.00464U	0.00749U
Cucumber	Off site #5	0.0661U	0.0188U	0.0912	0.00245U	0.00592U
Tomatoes	Off site #5	0.102U	0.0119U	0.00398U	0U	0.00396U

[a]Results are reported in μg/g (uranium) and pCi/g (all other parameters). Abbreviations are as follows: Tc-99 – technetium-99, U – uranium, U-233/234 – uranium-233/234, U-235 – uranium-235, U-238 – uranium-238. Data qualifiers are as follows: U – undetected.

[b]Because of the statistical nature of radiation detection, results for samples that have no radioactivity are often negative values because background radioactivity is subtracted out.

[c]Samples were also analyzed for transuranic radionuclides (americium-241, neptunium-237, plutonium-238, and plutonium-239/240) and uranium-236. None of these radionuclides were detected in the samples.

Table 2.15. Off-site dairy monitoring – 2006

Parameter	Units	Milk[a,b]	
		regular[c]	duplicate
Americium-241	pCi/L	-0.00993U	0.057U
Neptunium-237	pCi/L	0.0539U	0U
Plutonium-238	pCi/L	0.0901U	-0.0221U
Plutonium-239/240	pCi/L	0.585	0.22U
Technetium-99	pCi/L	1150	2650
Uranium	µg/L	0.529U	1.1
Uranium-233/234	pCi/L	0.157U	0.206
Uranium-235	pCi/L	0U	0.0268U
Uranium-236	pCi/L	-0.0248U	0.0361U
Uranium-238	pCi/L	0.178U	0.367
Parameter	Units	Eggs	
		regular	duplicate
Americium-241	pCi/L	0.218U	0.11U
Neptunium-237	pCi/L	0.132U	0.259U
Plutonium-238	pCi/L	0.197U	0.332U
Plutonium-239/240	pCi/L	0.393U	1.33U
Technetium-99	pCi/L	8800	8140
Uranium	µg/L	0.574U	0.0638U
Uranium-233/234	pCi/L	0.461U	0.109U
Uranium-235	pCi/L	0.0569U	0.134U
Uranium-236	pCi/L	0.102U	0.12U
Uranium-238	pCi/L	0.184U	0U

[a]Abbreviations and data qualifiers are as follows: U – undetected.

[b]Because of the statistical nature of radiation detection, results for samples that have no radioactivity are often negative values because background radioactivity is subtracted out.

[c]Milk and egg samples were split into regular and duplicate samples.

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