

2. ENVIRONMENTAL MONITORING

This section provides environmental monitoring data collected by both the Department of Energy (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 for 2004
- Table 2.2. DOE NPDES permit summary for 2004
- Table 2.3. 2004 DOE NPDES discharge and compliance rates
- Table 2.4. 2004 USEC NPDES discharge monitoring results
- Table 2.5. Radionuclides and PCBs in surface water runoff samples from DOE depleted uranium hexafluoride cylinder storage yards for 2004
- Table 2.6. Ambient air monitoring program summary for radionuclides and fluoride – 2004
- Table 2.7. DOE environmental radiation monitoring program (mrem) – 2004
- Table 2.8. Quarterly dose measurements (mrem/quarter) at locations near the depleted uranium cylinder storage yards – 2004
- Table 2.9. Local surface water monitoring program results for chemical and radiological parameters – 2004
- Table 2.10. Sediment monitoring program results – 2004
- Table 2.11. Soil and vegetation monitoring at ambient air monitoring stations – 2004
- Table 2.12. Biota (fish) monitoring program results – 2004
- Table 2.13. Biota (crops) monitoring program results – 2004

**Table 2.1. Radionuclide concentrations in DOE and USEC
NPDES outfall water samples for 2004**

NPDES outfall ^a	Parameter ^b	Number of samples ^c	Minimum ^d	Maximum ^d	Average ^e	DCG ^f
<i>DOE Outfalls</i>						
012	americium-241	4(4)	< 9.31E-06	< 0.01047		30
	neptunium-237	4(4)	< 9.35E-06	< 0.01609		30
	plutonium-238	4(4)	0	< 0.05253		40
	plutonium-239/240	4(4)	0	< 0.009355		30
	technetium-99	12(12)	0	< 6.79		100,000
	uranium	12(0)	0.5763	1.662	1.032	
	uranium-233/234	12(0)	0.2502	1.184	0.489	500
	uranium-235	12(11)	0	< 0.07791		600
	uranium-236	12(12)	0	< 0.03869		500
	uranium-238	12(0)	0.1927	0.5515	0.345	600
013	americium-241	4(4)	0	< 0.03902		30
	neptunium-237	4(4)	0	< 0.09218		30
	plutonium-238	4(4)	< 8.34E-06	< 0.01556		40
	plutonium-239/240	4(4)	0	< 0.01055		30
	technetium-99	12(12)	0	< 3.53		100,000
	uranium	12(0)	0.5978	1.827	0.977	
	uranium-233/234	12(0)	0.2243	0.9417	0.581	500
	uranium-235	12(11)	0	0.06479		600
	uranium-236	12(12)	0	< 0.02781		500
	uranium-238	12(0)	0.198	0.608	0.326	600
015	americium-241	4(4)	< 9.2E-06	< 0.009796		30
	neptunium-237	4(4)	0	< 0.04203		30
	plutonium-238	4(4)	0	< 0.02657		40
	plutonium-239/240	4(4)	0	< 0.01014		30
	technetium-99	12(12)	0	< 1.37		100,000
	uranium	12(0)	0.6606	1.86	1.159	
	uranium-233/234	12(0)	0.5498	1.221	0.799	500
	uranium-235	12(10)	0	0.0809		600
	uranium-236	12(12)	0	< 0.04022		500
	uranium-238	12(0)	0.2211	0.6239	0.386	600
608	americium-241	4(4)	0	< 0.0404		
	neptunium-237	4(4)	0	< 0.01743		
	plutonium-238	4(4)	0	< 0.03474		
	plutonium-239/240	4(4)	0	< 0.01738		
	technetium-99	12(1)	< 1.32	2830	1276	
	uranium	12(0)	0.8572	2.276	1.495	
	uranium-233/234	12(0)	0.6831	3.518	1.266	
	uranium-235	12(6)	< 0.01065	0.1755		
	uranium-236	12(12)	0	< 0.03538		
	uranium-238	12(0)	0.2847	0.7487	0.496	
610	americium-241	4(4)	0	< 0.02159		
	neptunium-237	4(4)	< 1.52E-05	< 0.03285		
	plutonium-238	4(4)	< 0.00819	< 0.02953		
	plutonium-239/240	4(4)	0	< 0.007588		
	technetium-99	12(4)	0	51.5		
	uranium	12(1)	< 0.08096	5.674	1.177	
	uranium-233/234	12(0)	0.2562	8.97	2.05	
	uranium-235	12(6)	0	0.3733		
	uranium-236	12(12)	0	< 0.04022		
	uranium-238	12(1)	< 0.02533	1.873	0.388	

**Table 2.1. Radionuclide concentrations in DOE and USEC
NPDES outfall water samples for 2004 (continued)**

NPDES outfall ^a	Parameter ^b	Number of samples ^c	Minimum ^d	Maximum ^d	Average ^e	DCG ^f
611	americium-241	4(4)	< 1.06E-05	< 0.0194		
	neptunium-237	4(3)	0	0.04815		
	plutonium-238	4(4)	< 0.009612	< 0.03506		
	plutonium-239/240	4(4)	0	< 0.02629		
	technetium-99	12(11)	0	21.5		
	uranium	12(0)	2.073	11.3	5.8	
	uranium-233/234	12(0)	0.4364	14.97	7.19	
	uranium-235	12(2)	< 0.01631	0.5831		
	uranium-236	12(7)	0	0.1219		
	uranium-238	12(0)	0.2771	3.742	1.893	
<i>USEC Outfalls</i>						
001	americium-241	4(4)	< 0.057	< 0.065		30
	neptunium-237	4(4)	< 0.147	< 0.468		30
	plutonium-238	4(4)	< 0.054	< 0.157		40
	plutonium-239/240	4(4)	< 0.054	< 0.229		30
	technetium-99	52(37)	< 8	45		100,000
	uranium	52(0)	0.33	2.59	0.98	
002	americium-241	4(4)	< 0.058	< 0.207		30
	neptunium-237	4(4)	< 0.056	< 0.266		30
	plutonium-238	4(4)	< 0.06	< 0.156		40
	plutonium-239/240	4(4)	< 0.056	< 0.163		30
	technetium-99	51(51)	< 9	< 12		100,000
	uranium	51(0)	0.41	4.01	1.04	
003	americium-241	4(4)	< 0.058	< 0.17		30
	neptunium-237	4(4)	< 0.166	< 0.387		30
	plutonium-238	4(4)	< 0.061	< 0.18		40
	plutonium-239/240	4(4)	< 0.09	< 0.226		30
	technetium-99	52(3)	< 10	276	156	100,000
	uranium	52(0)	0.8	19.4	7.1	
004	americium-241	4(4)	< 0.064	< 0.227		30
	neptunium-237	4(4)	< 0.065	< 0.528		30
	plutonium-238	4(4)	< 0.063	< 0.266		40
	plutonium-239/240	4(4)	< 0.065	< 0.208		30
	technetium-99	52(52)	< 8	< 12		100,000
	uranium	52(1)	< 0.1	2.56	1.07	
005	americium-241	3(3)	< 0.063	< 0.157		30
	neptunium-237	3(3)	< 0.055	< 0.234		30
	plutonium-238	3(3)	< 0.045	< 0.072		40
	plutonium-239/240	3(3)	< 0.055	< 0.247		30
	technetium-99	47(47)	< 8	< 12		100,000
	uranium	47(0)	0.29	0.61	0.42	

**Table 2.1. Radionuclide concentrations in DOE and USEC
NPDES outfall water samples for 2004 (continued)**

NPDES outfall ^a	Parameter ^b	Number of samples ^c	Minimum ^d	Maximum ^d	Average ^e	DCG ^f
009	americium-241	4(4)	< 0.057	< 0.303		30
	neptunium-237	4(4)	< 0.155	< 0.352		30
	plutonium-238	4(4)	< 0.057	< 0.299		40
	plutonium-239/240	4(3)	< 0.053	< 0.183		30
	technetium-99	52(50)	< 8	20		100,000
	uranium	52(0)	0.67	8.84	5.80	
010	americium-241	4(4)	< 0.063	< 0.226		30
	neptunium-237	4(4)	< 0.056	< 0.571		30
	plutonium-238	4(4)	< 0.052	< 0.202		40
	plutonium-239/240	4(4)	< 0.057	< 0.33		30
	technetium-99	52(52)	< 8	< 12		100,000
	uranium	52(1)	< 0.1	5.3	2.8	
011	americium-241	4(4)	< 0.157	< 0.207		30
	neptunium-237	4(4)	< 0.121	< 0.23		30
	plutonium-238	4(4)	< 0.12	< 0.223		40
	plutonium-239/240	4(4)	< 0.06	< 0.152		30
	technetium-99	52(52)	< 8	< 12		100,000
	uranium	52(0)	0.73	6.54	1.22	

^aDOE internal NPDES Outfalls 608, 610, and 611 discharge to USEC NPDES Outfall 003 (X-6619 Sewage Treatment Plant).

^bUranium is reported in $\mu\text{g/L}$; all other radionuclides are reported in pCi/L.

^cNumber in parentheses is the number of samples that were below the detection limit.

^dMinimum 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.

^eAverages 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.

^fDerived 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 for 2004

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	1/2 weeks	Grab		6.5–9.0
Total suspended solids	mg/L	1/2 weeks	Grab	30	45
Oil and grease, total	mg/L	1/2 weeks	Grab	10	20
Chlorine, total residual	mg/L	1/2 weeks ^b	Grab		
Iron, total recoverable	µg/L	1/2 weeks	Grab		
Trichloroethene	µg/L	1/2 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	1/2 weeks	Grab		6.5–9.0
Total suspended solids	mg/L	1/2 weeks	Grab	30	45
Oil and grease, total	mg/L	1/2 weeks	Grab	10	20
Chlorine, total residual	mg/L	1/2 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	1/2 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	1/2 weeks	Grab		
Trichloroethene	µg/L	1/2 weeks	Grab		10
1,2-trans-dichloroethene	µg/L	1/2 weeks	Grab	25	66
Outfall 610 (X-623 Groundwater Treatment Facility)					
Flow rate	MGD	Daily	24-hour total		
pH	SU	1/2 weeks	Grab		
Trichloroethene	µg/L	1/2 weeks	Grab	10	10
1,2-trans-dichloroethene	µg/L	1/2 weeks	Grab	25	66
Outfall 611 (X-622T or X-627 Groundwater Treatment Facility) ^d					
Flow rate	MGD	Daily	24-hour total		
Trichloroethene	µg/L	1/2 weeks	Grab	10	10
Outfall 613 (X-6002 Particulate Separator)					
Flow rate	MGD	Daily	24-hour total ^a		
Chlorine, total residual	mg/L	1/2 weeks	Grab		
Total suspended solids	mg/L	1/2 weeks	Grab		

^aEstimated.^bSummer only.^cNo detectable PCBs.^dThe X-622T Groundwater Treatment facility was replaced by the X-627 Groundwater Treatment Facility in September 2004.

Table 2.3. 2004 DOE NPDES discharge and compliance rates

Parameter	NPDES compliance rate (%)	Number of measurements ^a	Concentration			Units
			Minimum	Maximum	Average ^b	
Outfall 012 (X-2230M Holding Pond)						
Flow rate	c	252	0.012	20.927	0.4614	MGD
pH	100	26	7.35	8.32	8.02	SU
Total suspended solids	100	26(1)	1.5	12.5	5.5	mg/L
monthly average ^f	100	12	1.2	9.4	5.5	mg/L
Oil and grease, total	100	26(8)	0.73	< 5		mg/L
monthly average ^f	100	12	0.5	2.1667	0.94	mg/L
Chlorine, total residual	d	13	0	0.16	0.08	mg/L
Iron, total recoverable	d	26(0)	160	2100	668	μg/L
Trichloroethene	d	26(21)	0.23	< 1		μg/L
PCBs	e	4(4)	< 1	< 1		μg/L
Outfall 013 (X-2230N Holding Pond)						
Flow rate	c	252	0.013	22.279	0.4574	MGD
pH	100	26	7.71	8.73	8.16	SU
Total suspended solids	100	26(10)	1.6	12		mg/L
monthly average ^f	100	12	0	6	2.47	mg/L
Oil and grease, total	100	26(9)	0.76	< 5		mg/L
monthly average ^f	100	12	0.2533	2.0267	0.88	mg/L
Chlorine, total residual	d	13	0.06	0.4	0.15	mg/L
PCBs	e	4(4)	< 1	< 1		μg/L
Outfall 015 (X-624 Groundwater Treatment Facility)						
Flow rate	c	366	0	0.0497	0.0083	MGD
Trichloroethene	100	26(7)	0.22	< 1		μg/L
monthly average ^f	100	12	0	0.345	0.11	μg/L
PCBs	e	4(4)	< 1	< 1		μg/L
Outfall 608 (X-622 Groundwater Treatment Facility)						
Flow rate	c	366	0.0208	0.0685	0.0445	MGD
pH	d	26	7.61	8.18	7.89	SU
Trichloroethene	100	26(0)	0.87	1.9	1.4	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	366	0	0.0364	0.0113	MGD
pH	d	26	6.91	7.43	7.11	SU
Trichloroethene	100	26(2)	0.27	3.3	0.8	μg/L
monthly average ^f	100	12	0	1.4133	0.73	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. 2004 DOE NPDES discharge and compliance rates (continued)

Parameter	NPDES compliance rate (%)	Number of measurements ^a	Concentration			Units
			Minimum	Maximum	Average ^b	
Outfall 611 (X-622T or X-627 Groundwater Treatment Facility)						
Flow rate	c	366	0.0074	0.0475	0.0300	MGD
Trichloroethene	100	26(14)	0.21	3.7		μg/L
monthly average ^f	100	12	0	2.3333	0.41	μg/L
Outfall 613 (X-6002 Particulate Separator)						
Flow rate	c	366	0.00008	0.0012	0.0005	MGD
Total suspended solids	d	27(22)	1.2	< 4		mg/L
Chlorine, total residual	d	26	0	0.57	0.14	mg/L

^aNumber in parentheses is the number of samples that were below the detection limit.

^bAverages 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.

^cFlow rate does not have a numerical limit; therefore, no compliance rates are generated.

^dMonitoring only required; therefore, no compliance rates are generated.

^eThe permit specifies no detectable PCBs in the effluent without setting a numerical limit of detection.

^fThe 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. 2004 USEC NPDES discharge monitoring results

Parameter	Number of samples ^a	Concentration			Units
		Minimum	Maximum	Average ^b	
Outfall 001 (X-230J7 East Holding Pond)					
Arsenic, total recoverable	12(10)	< 9.53	17.7		µg/L
Copper, total recoverable	12(3)	2.76	22.7		µg/L
Flow rate	349	0.172	6.611	1.073	MGD
Fluoride, total	12(1)	< 0.1	0.3	0.2	mg/L
Manganese, total recoverable	12(0)	6.9	26.8	16	µg/L
Nickel, total recoverable	52(33)	< 1.85	16.1		µg/L
Oil and grease, total	52(51)	< 5	< 555		mg/L
pH	52	6.75	8.55	7.87	SU
Suspended solids	52(38)	< 2	< 222		mg/L
Zinc, total recoverable	12(1)	< 4.53	61.2	30.3	µg/L
Outfall 002 (X-230K South Holding Pond)					
Flow rate	343	0	2.688	0.508	MGD
Fluoride, total	13(0)	0.02	0.2	0.2	mg/L
Manganese, total recoverable	51(1)	< 0.685	409	141	µg/L
Mercury, total recoverable	25(8)	0.0001	0.018		µg/L
Oil and grease, total	51(51)	< 5	< 555		mg/L
pH	53	6.85	8.81	7.75	SU
Silver, total recoverable	51(46)	< 1.25	11.8		µg/L
Suspended solids	51(0)	4.2	23.2	10.8	mg/L
Thallium, total recoverable	25(20)	< 11.4	49.5		µg/L
Outfall 003 (X-6619 Sewage Treatment Plant)					
Acute toxicity, <i>Ceriodaphnia dubia</i>	4(4)	< 1	< 1		TUa
Ammonia, nitrogen	26(19)	0.01	0.5		mg/L
Biochemical oxygen demand	52(52)	< 5	< 555		mg/L
Chlorine, total residual	125(125)	< 0.01	< 0.01		mg/L
Copper, total recoverable	26(16)	< 2.17	9.19		µg/L
Fecal coliform	26(0)	1	200	22	#/100 mL
Flow rate	366	0	0.652	0.299	MGD
Mercury, total recoverable	12(0)	0	0.0045	0.0025	µg/L
Nitrate, nitrogen	12(0)	4.2	7.4	5.5	mg/L
Oil and grease, total	4(4)	< 5	< 5		mg/L
pH	250	6.41	8.07	7.36	SU
Silver, total recoverable	12(12)	< 1.28	< 4.37		µg/L
Suspended solids	52(49)	< 2	< 222		mg/L
Zinc, total recoverable	12(0)	11.3	49.6	25.5	µg/L
Outfall 004 (Cooling Tower Blowdown)					
Acute toxicity, <i>Ceriodaphnia dubia</i>	4(4)	< 1	< 1		TUa
Acute toxicity, <i>Pimephales promelas</i>	4(0)	1.34	1.93	1.57	TUa
Copper, total recoverable	12(2)	< 3.01	16.2		µg/L
Dissolved solids	12(0)	185	320	255	mg/L
Flow rate	366	0	1.656	0.915	MGD

Table 2.4. 2004 USEC NPDES discharge monitoring results (continued)

Parameter	Number of samples ^a	Concentration			Units
		Minimum	Maximum	Average ^b	
Outfall 004 (Cooling Tower Blowdown) (continued)					
Oil and grease, total	12(12)	< 5	< 5		mg/L
pH	12	6.76	7.63	7.21	SU
Suspended solids	12(6)	< 2	10		mg/L
Total residual oxidants	103(103)	< 0.01	< 0.1		mg/L
Zinc, total recoverable	12(0)	10.2	54.8	26.8	µg/L
Outfall 005 (X-611B Lime Sludge Lagoon)					
Flow rate	230	0	17.783	3.744	MGD
PCB, total	3(3)	< 0.5	< 0.5		µg/L
pH	47	8.41	9.98	9.15	SU
Suspended solids	47(5)	< 2	10.6	3.5	mg/L
Outfall 009 (X-230L North Holding Pond)					
Flow rate	366	0.004	1.652	0.445	MGD
Fluoride, total	12(0)	0.1	0.3	0.2	mg/L
Manganese, total recoverable	12(0)	47.7	185	109	µg/L
Oil and grease, total	12(12)	< 5	< 5		mg/L
pH	52	6.8	8.36	7.51	SU
Suspended solids	52(2)	< 2	75	12	mg/L
Zinc, total recoverable	12(1)	< 4.53	106	38	µg/L
Outfall 010 (X-230J5 Northwest Holding Pond)					
Flow rate	366	0.128	0.814	0.350	MGD
Manganese, total recoverable	26(0)	24.9	230	93	µg/L
Oil and grease, total	12(12)	< 5	< 5		mg/L
pH	26	6.71	8.5	7.42	SU
Suspended solids	26(2)	< 2	37	9	mg/L
Zinc, total recoverable	12(1)	3.79	69.5	31.1	µg/L
Outfall 011 (X-230J6 Northeast Holding Pond)					
Copper, total recoverable	12(3)	2.7	9.19		µg/L
Flow rate	356	0.001	0.338	0.028	MGD
Fluoride, total	12(0)	0.1	0.3	0.2	mg/L
Oil and grease, total	26(24)	< 5	< 55		mg/L
pH	26	6.53	8.38	7.25	SU
Suspended solids	26(10)	< 2	18.6		mg/L
Water temperature	26	0.62	23.5	14.1	°C
Zinc, total recoverable	12(0)	5.43	205	58	µg/L
Outfall 602 (X-621 Coal Pile Runoff Treatment Facility)					
Flow rate	366	0	0.35	0.019	MGD
Iron, total	25(0)	62.3	1100	323	µg/L
Manganese, total	25(1)	< 0.685	178	69	µg/L
pH	25	7.25	9.43	8.29	SU
Settleable residue	7(7)	< 0.2	< 0.2		mL/L
Suspended solids	25(3)	< 2	12.6	5.5	mg/L

Table 2.4. 2004 USEC NPDES discharge monitoring results (continued)

Parameter	Number of samples ^a	Concentration			Units
		Minimum	Maximum	Average ^b	
Outfall 604 (X-700 Biondenitrification Facility)					
Copper, total	2(0)	14.2	216	115	μg/L
Flow rate	61	0	0.022	0.001	MGD
Iron, total	2(0)	1160	1610	1385	μg/L
Nickel, total	2(0)	7.98	14.5	11.2	μg/L
Nitrate, nitrogen	2(0)	0.82	1.3	1.1	mg/L
pH	2	7.73	8.06	7.90	SU
Zinc, total	2(0)	24.2	161	93	μg/L
Outfall 605 (X-705 Decontamination Microfiltration System)					
Ammonia, nitrogen	12(5)	< 0.1	1.4		mg/L
Chromium, hexavalent	12(12)	< 0.01	< 0.1		mg/L
Chromium, total	12(7)	1.5	6.9		μg/L
Copper, total	12(3)	< 2.41	105		μg/L
Flow rate	366	0	0.02	0.002	MGD
Iron, total	12(4)	< 3.34	37.8		μg/L
Kjeldahl nitrogen	12(1)	< 0.1	3.1	1.3	mg/L
Nickel, total	12(2)	< 4.5	26.1		μg/L
Nitrogen, nitrate	12(0)	0.33	89	32	mg/L
Nitrogen, nitrite	12(6)	< 0.01	2.1		mg/L
Oil and grease, total	12(11)	< 5	7.7		mg/L
pH	12	6.86	8.63	8.04	SU
Sulfate	12(0)	53	84	65	mg/L
Suspended solids	12(12)	< 2	< 2		mg/L
Trichloroethene	12(12)	< 5	< 5		μg/L
Zinc, total	12(1)	< 4.53	172	26	μg/L
Station Number 801 (Scioto River control sample, upstream of Outfalls 003 and 004)					
48-hr. acute toxicity, Ceriodaphnia dubia	4(4)	< 1	< 1		% affected
96-hr. acute toxicity, Pimephales promelas	4(2)	< 1	25		% affected
Station Number 901 (Scioto River near-field sample, midplume downstream of Outfalls 003 and 004)					
48-hr. acute toxicity, Ceriodaphnia dubia	4(4)	< 1	< 1		% affected
96-hr. acute toxicity, Pimephales promelas	4(2)	< 1	30		% affected
Station Number 902 (downstream of Outfall 001)					
Water temperature	104	5	28	17	°C
Station Number 903 (downstream of Outfall 002)					
Water temperature	104	1	28	16	°C

^aNumber in parentheses is the number of samples that were below the detection limit.

^bAverages 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 hexafluoride cylinder storage yards for 2004

Sample location	Parameter ^a	Number of samples ^b	Minimum ^c	Maximum ^c	Average ^d	DCG ^e
X745-C1	americium-241	2(2)	< 8.89E-06	< 0.009		30
	neptunium-237	2(2)	0	< 0.0161		30
	plutonium-238	2(2)	< 0.02409	< 0.02716		40
	plutonium-239/240	2(2)	< 3.62E-05	< 0.01606		30
	technetium-99	12(12)	0	< 6.06		100,000
	total PCBs	2(2)	< 9	< 9		
	uranium	12(0)	0.1257	6.298	2.801	
	uranium-233/234	12(1)	< 0.08466	2.274	1.070	500
	uranium-235	12(8)	0	0.1297		600
	uranium-236	12(12)	0	< 0.03004		500
	uranium-238	12(0)	0.04223	2.107	0.938	600
X745-C2	americium-241	2(2)	< 0.01786	< 0.02982		30
	neptunium-237	2(2)	0	0		30
	plutonium-238	2(2)	< 0.00879	< 0.02442		40
	plutonium-239/240	2(2)	0	0		30
	technetium-99	12(12)	0	< 8.46		100,000
	total PCBs	2(2)	< 9	< 9		
	uranium	12(0)	0.543	9.415	5.090	
	uranium-233/234	12(1)	< 0.08716	2.375	1.067	500
	uranium-235	12(9)	0	0.1101		600
	uranium-236	12(12)	0	< 0.01125		500
	uranium-238	12(0)	0.1824	3.161	1.707	600
X745-C3	americium-241	2(2)	< 0.02982	< 0.03976		30
	neptunium-237	2(2)	0	< 0.007173		30
	plutonium-238	2(2)	0	< 0.02146		40
	plutonium-239/240	2(2)	0	0		30
	technetium-99	12(11)	0	10.9		100,000
	total PCBs	2(2)	< 9	< 9		
	uranium	12(3)	< 0.07766	4.341		
	uranium-233/234	12(2)	< 0.009027	1.468		500
	uranium-235	12(11)	0	0.06478		600
	uranium-236	12(12)	0	< 0.01899		500
	uranium-238	12(3)	< 0.02609	1.455		600
X745-C4	americium-241	2(2)	0	< 0.009765		30
	neptunium-237	2(2)	0	0		30
	plutonium-238	2(2)	< 2.13E-05	< 0.01533		40
	plutonium-239/240	2(2)	0	< 0.007111		30
	technetium-99	12(11)	0	20.2		100,000
	total PCBs	2(2)	< 9	< 9		
	uranium	12(1)	< 0.07583	6.361	2.002	
	uranium-233/234	12(0)	0.08696	1.159	0.461	500
	uranium-235	12(11)	0	0.08988		600
	uranium-236	12(12)	0	< 0.009401		500
	uranium-238	12(1)	< 0.02543	2.135	0.671	600

Table 2.5. Radionuclides and PCBs in surface water runoff samples from DOE depleted uranium hexafluoride cylinder storage yards for 2004 (continued)

Sample location	Parameter ^a	Number of samples ^b	Minimum ^c	Maximum ^c	Average ^d	DCG ^e
X745-E1	americium-241	2(2)	0	0		30
	neptunium-237	2(2)	0	0		30
	plutonium-238	2(2)	0	< 0.008328		40
	plutonium-239/240	2(2)	0	< 0.008312		30
	technetium-99	12(12)	0	< 5.57		100,000
	total PCBs	2(2)	< 9	< 9		
	uranium	12(0)	0.2152	2.477	1.160	
	uranium-233/234	12(0)	0.1276	0.9691	0.527	500
	uranium-235	12(12)	< 0.008928	< 0.0484		600
	uranium-236	12(12)	0	< 0.02174		500
	uranium-238	12(0)	0.07074	0.829	0.387	600
X745-G1 ^f	americium-241	2(2)	0	0		30
	neptunium-237	2(2)	0	0		30
	plutonium-238	2(2)	0	< 0.03631		40
	plutonium-239/240	2(2)	< 7.67E-06	< 0.009095		30
	technetium-99	4(4)	0	< 6.69		100,000
	total PCBs	2(2)	< 9	< 9		
	uranium	4(0)	1.809	4.041	3.287	
	uranium-233/234	4(0)	0.8341	1.741	1.340	500
	uranium-235	4(2)	< 0.04303	0.09217		600
	uranium-236	4(4)	0	< 0.01932		500
	uranium-238	4(0)	0.6037	1.35	1.099	600

^aUranium and total PCBs are reported in $\mu\text{g/L}$; all other parameters are reported in pCi/L .

^bNumber in parentheses is the number of samples that were below the detection limit.

^cMinimum 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.

^dAverages 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.

^eDerived Concentration Guide (DCG)(pCi/L). DCGs are not available for total PCBs and uranium.

^fSample location X745-G1 was added to the monitoring program in September 2004.

Table 2.6. Ambient air monitoring program summary for radionuclides and fluoride – 2004

Sampling Location	Parameter ^a	No. of measurements ^b	Minimum ^{c, d}	Maximum ^c	Average ^{d, e}
<i>On-site air samplers</i>					
A8	americium-241	12(12)	0	5.4E-06	
	fluoride	51(31)	2.0E-02	7.0E-02	
	neptunium-237	12(12)	0	8.2E-06	
	plutonium-238	12(12)	0	7.6E-06	
	plutonium-239/240	12(12)	0	3.3E-06	
	technetium-99	12(12)	0	8.2E-04	
	uranium	12(0)	2.3E-04	5.5E-03	1.6E-03
	uranium-233/234	12(0)	8.9E-05	1.8E-03	5.4E-04
	uranium-235	12(4)	5.5E-06	6.7E-05	
	uranium-236	12(11)	0	1.8E-05	
A10	uranium-238	12(0)	7.7E-05	1.9E-03	5.4E-04
	americium-241	12(12)	0	5.9E-06	
	fluoride	51(24)	1.0E-02	7.0E-02	
	neptunium-237	12(12)	0	8.4E-06	
	plutonium-238	12(11)	0	1.8E-05	
	plutonium-239/240	12(12)	0	6.7E-06	
	technetium-99	12(12)	0	1.1E-03	
	uranium	12(0)	2.7E-04	3.7E-03	9.0E-04
	uranium-233/234	12(0)	9.5E-05	1.2E-03	3.3E-04
	uranium-235	12(7)	0	6.2E-05	
A29	uranium-236	12(12)	0	5.4E-06	
	uranium-238	12(0)	9.0E-05	1.2E-03	3.0E-04
	americium-241	12(12)	0	6.6E-06	
	fluoride	51(19)	2.0E-02	1.0E-01	
	neptunium-237	12(12)	0	6.8E-06	
	plutonium-238	12(12)	0	1.3E-05	
	plutonium-239/240	12(12)	0	8.7E-06	
	technetium-99	12(12)	0	9.9E-04	
	uranium	12(0)	3.1E-04	3.3E-03	9.3E-04
	uranium-233/234	12(0)	1.0E-04	1.3E-03	3.4E-04
A36	uranium-235	12(7)	2.3E-06	3.7E-05	
	uranium-236	12(12)	0	5.6E-06	
	uranium-238	12(0)	1.0E-04	1.1E-03	3.1E-04
	americium-241	12(12)	0	3.9E-06	
	fluoride	51(12)	2.0E-02	3.9E-01	
	neptunium-237	12(12)	0	7.7E-06	
	plutonium-238	12(11)	0	1.5E-05	
	plutonium-239/240	12(12)	0	5.7E-06	
	technetium-99	12(12)	0	1.4E-03	
	uranium	12(0)	3.4E-04	1.9E-02	7.0E-03
A40	uranium-233/234	12(0)	1.3E-04	6.3E-03	2.3E-03
	uranium-235	12(6)	2.2E-06	3.8E-04	
	uranium-236	12(9)	0	2.5E-05	
	uranium-238	12(0)	1.1E-04	6.5E-03	2.3E-03
	fluoride	51(16)	2.0E-02	1.2E-01	

Table 2.6. Ambient air monitoring program summary for radionuclides and fluoride – 2004 (continued)

Sampling Location	Parameter ^a	No. of measurements ^b	Minimum ^{c, d}	Maximum ^c	Average ^{d, e}
<i>On-site air samplers</i>					
T7	americium-241	12(12)	0	5.5E-06	
	neptunium-237	12(12)	0	6.4E-06	
	plutonium-238	12(12)	0	7.6E-06	
	plutonium-239/240	12(12)	0	3.6E-06	
	technetium-99	12(12)	0	1.1E-03	
	uranium	12(0)	1.9E-04	5.4E-03	1.4E-03
	uranium-233/234	12(0)	9.1E-05	1.7E-03	4.8E-04
	uranium-235	12(6)	2.1E-06	8.2E-05	
	uranium-236	12(12)	0	1.2E-05	
	uranium-238	12(0)	6.5E-05	1.8E-03	4.8E-04
<i>Off-site air samplers</i>					
A3	americium-241	12(12)	0	5.5E-06	
	fluoride	51(20)	1.0E-02	1.6E-01	
	neptunium-237	12(12)	0	8.6E-06	
	plutonium-238	12(12)	0	1.1E-05	
	plutonium-239/240	12(12)	0	3.3E-06	
	technetium-99	12(12)	0	1.2E-03	
	uranium	12(0)	3.7E-04	5.8E-03	1.7E-03
	uranium-233/234	12(0)	1.2E-04	1.9E-03	5.6E-04
	uranium-235	12(6)	2.1E-06	8.0E-05	
	uranium-236	12(9)	0	1.2E-05	
A6	uranium-238	12(0)	1.2E-04	1.9E-03	5.6E-04
	americium-241	12(12)	0	6.6E-06	
	fluoride	51(34)	2.0E-02	7.0E-02	
	neptunium-237	12(12)	0	9.8E-06	
	plutonium-238	12(12)	1.8E-06	2.9E-05	
	plutonium-239/240	12(12)	0	2.0E-05	
	technetium-99	12(12)	0	7.8E-04	
	uranium	12(0)	3.2E-04	9.2E-04	6.0E-04
	uranium-233/234	12(0)	1.1E-04	2.9E-04	1.9E-04
	uranium-235	12(9)	0	2.6E-05	
A9	uranium-236	12(12)	0	3.0E-06	
	uranium-238	12(0)	1.1E-04	3.1E-04	2.0E-04
	americium-241	12(12)	0	7.0E-06	
	fluoride	51(25)	1.0E-02	1.0E-01	
	neptunium-237	12(12)	0	9.0E-06	
	plutonium-238	12(12)	2.3E-09	1.2E-05	
	plutonium-239/240	12(12)	0	9.0E-06	
	technetium-99	12(12)	0	1.4E-03	
	uranium	12(0)	2.9E-04	2.1E-03	8.1E-04
	uranium-233/234	12(0)	1.2E-04	6.8E-04	2.6E-04
	uranium-235	12(8)	2.2E-06	4.0E-05	
	uranium-236	12(10)	0	9.6E-06	
	uranium-238	12(0)	9.8E-05	7.1E-04	2.7E-04

**Table 2.6. Ambient air monitoring program summary for radionuclides
and fluoride – 2004 (continued)**

Sampling Location	Parameter ^a	No. of measurements ^b	Minimum ^{c, d}	Maximum ^c	Average ^{d, e}
A12	americium-241	12(12)	0	5.5E-06	
	fluoride	51(17)	2.0E-02	1.0E-01	
	neptunium-237	12(12)	0	7.6E-06	
	plutonium-238	12(12)	0	8.7E-06	
	plutonium-239/240	12(12)	0	6.6E-06	
	technetium-99	12(12)	0	1.2E-03	
	uranium	12(0)	3.5E-04	6.7E-03	1.9E-03
	uranium-233/234	12(0)	1.1E-04	2.3E-03	6.7E-04
	uranium-235	12(6)	7.1E-09	1.1E-04	
	uranium-236	12(11)	0	1.7E-05	
	uranium-238	12(0)	1.2E-04	2.2E-03	6.5E-04
A15	americium-241	12(12)	0	7.1E-06	
	fluoride	51(32)	1.0E-02	6.0E-02	
	neptunium-237	12(12)	0	5.2E-06	
	plutonium-238	12(12)	0	1.1E-05	
	plutonium-239/240	12(12)	0	7.2E-06	
	technetium-99	12(12)	0	8.4E-04	
	uranium	12(0)	3.9E-04	3.2E-03	1.5E-03
	uranium-233/234	12(0)	1.2E-04	1.3E-03	5.4E-04
	uranium-235	12(4)	2.1E-06	5.8E-05	
	uranium-236	12(10)	0	1.8E-05	
	uranium-238	12(0)	1.3E-04	1.1E-03	5.2E-04
A23	americium-241	12(12)	0	7.0E-06	
	fluoride	50(22)	1.0E-02	8.0E-02	
	neptunium-237	12(12)	0	6.0E-06	
	plutonium-238	12(12)	0	9.0E-06	
	plutonium-239/240	12(12)	0	5.6E-06	
	technetium-99	12(11)	0	2.4E-03	
	uranium	12(0)	2.9E-04	4.2E-03	1.4E-03
	uranium-233/234	12(0)	9.0E-05	1.4E-03	4.9E-04
	uranium-235	12(5)	0	4.6E-05	
	uranium-236	12(11)	0	1.2E-05	
	uranium-238	12(0)	9.9E-05	1.4E-03	4.6E-04
A24	americium-241	12(12)	0	3.9E-06	
	fluoride	51(21)	1.0E-02	1.0E-01	
	neptunium-237	12(12)	0	8.9E-06	
	plutonium-238	12(12)	1.8E-06	8.0E-06	
	plutonium-239/240	12(12)	0	4.1E-06	
	technetium-99	12(12)	0	1.3E-03	
	uranium	12(0)	3.2E-04	6.6E-03	2.1E-03
	uranium-233/234	12(0)	1.3E-04	2.2E-03	7.3E-04
	uranium-235	12(6)	5.0E-09	1.1E-04	
	uranium-236	12(12)	0	1.4E-05	
	uranium-238	12(0)	1.1E-04	2.2E-03	7.1E-04

Table 2.6. Ambient air monitoring program summary for radionuclides and fluoride – 2004 (continued)

Sampling Location	Parameter ^a	No. of measurements ^b	Minimum ^{c, d}	Maximum ^c	Average ^{d, e}
A28	americium-241	12(12)	0	3.9E-06	
	fluoride	51(22)	1.0E-02	9.0E-02	
	neptunium-237	12(12)	0	5.4E-06	
	plutonium-238	12(12)	0	7.7E-06	
	plutonium-239/240	12(12)	0	6.0E-06	
	technetium-99	12(12)	0	9.5E-04	
	uranium	12(0)	2.2E-04	6.6E-04	4.2E-04
	uranium-233/234	12(0)	6.5E-05	2.0E-04	1.3E-04
	uranium-235	12(9)	0	1.7E-05	
	uranium-236	12(12)	0	3.7E-06	
A37 (background)	uranium-238	12(0)	7.4E-05	2.2E-04	1.4E-04
	americium-241	12(12)	0	6.4E-06	
	fluoride	51(17)	2.0E-02	9.0E-02	
	neptunium-237	12(12)	0	9.9E-06	
	plutonium-238	12(12)	0	7.9E-06	
	plutonium-239/240	12(12)	0	4.0E-06	
	technetium-99	12(12)	0	7.1E-04	
	uranium	12(0)	2.8E-04	8.2E-04	4.4E-04
	uranium-233/234	12(0)	1.0E-04	2.1E-04	1.4E-04
	uranium-235	12(10)	0	1.2E-05	
A41	uranium-236	12(12)	0	4.0E-06	
	uranium-238	12(0)	9.4E-05	2.7E-04	1.5E-04
	americium-241	12(12)	0	4.0E-06	
	fluoride	51(28)	1.0E-02	1.0E+00 ^f	
	neptunium-237	12(12)	0	7.2E-06	
	plutonium-238	12(12)	0	8.8E-06	
	plutonium-239/240	12(12)	0	7.4E-06	
	technetium-99	12(12)	0	9.5E-04	
	uranium	12(0)	3.2E-04	1.6E-03	6.6E-04
	uranium-233/234	12(0)	1.1E-04	5.6E-04	2.3E-04
	uranium-235	12(10)	2.6E-06	2.7E-05	
	uranium-236	12(12)	0	4.7E-06	
	uranium-238	12(0)	1.1E-04	5.3E-04	2.2E-04

^aAll parameters are measured in pCi/m³ with the exception of uranium and fluoride which are measured in µg/m³.

^bRadiological samples are analyzed monthly, samples for fluoride are analyzed weekly. Number in parentheses is the number of samples that were below the detection limit.

^cResults 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).

^dMinimum 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.

^eAverages 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.

^fThe maximum value reported for this location is based on a measurement of fluoride that was undetected with a high detection limit because the sample required dilution for analysis.

Table 2.7. DOE environmental radiation monitoring program (mrem) – 2004

Location	Second quarter ^a	Third quarter	Fourth quarter	Cumulative annual whole body dose ^b
#1404A	20	22	16	77
#518	22	21	18	81
#862	31	31	26	117
#874	163	190	137	653
#906	20	20	15	73
#933	31	32	26	119
A12	24	23	17	85
A15	23	23	18	85
A23	21	c	17	76
A24	23	24	17	85
A28	21	23	16	80
A29	22	23	21	88
A3	21	21	17	79
A36	21	23	16	80
A40	16	17	13	61
A6	20	21	15	75
A8	23	24	20	89
A9	22	24	18	85
X-230J2	21	22	17	80

^aData are not available for the first quarter of 2004.

^bThe cumulative annual whole body dose is calculated by adding results for the second through fourth quarters and then adding the average of the second through fourth quarter results (second and fourth quarter for location A23 multiplied by 2). The annual occupational whole body dose limit set by 10 CFR Part 20 is 5000 mrem.

^cThe dosimeter for this location was missing at the end of the quarter.

Table 2.8. Quarterly dose measurements (mrem/quarter) at locations near the depleted uranium cylinder storage yards – 2004

Location	<u>First quarter</u>			<u>Second quarter</u>		
	<u>Deep^{a,b}</u>		<u>Shallow^{a,c}</u>	<u>Deep^{a,b}</u>		<u>Shallow^{a,c}</u>
	X+G	N		X+G	N	
#41	136	ND	136	dosimeter missing		
#868	ND	ND	ND	268	ND	284
#874	121	ND	121	138	21	157
#882	70	ND	70	185	ND	187
#890	136	ND	136	32	ND	30

Location	<u>Third quarter</u>			<u>Fourth quarter</u>		
	<u>Deep^{a,b}</u>		<u>Shallow^{a,c}</u>	<u>Deep^{a,b}</u>		<u>Shallow^{a,c}</u>
	X+G	N		X+G	N	
#41	ND	ND	ND	159	ND	170
#868	314	23	357	233	ND	236
#874	115	ND	117	89	24	114
#882	143	ND	145	121	ND	122
#890	30	ND	28	26	ND	25

^aND – not detected above background or below the minimum reportable dose.

^bDeep 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).

^cShallow dose (dose equivalent at a tissue depth of 0.007 cm) applies to exposure of the skin or an extremity.

Table 2.9. Local surface water monitoring program results for chemical and radiological parameters – 2004

Location	Parameter ^{a,b}	March/ April ^c	June ^c	August/ October ^c	December ^c
Scioto River RW-1 (downstream)	aluminum	2140	1910N	187N	3030
	americium-241	0.05184U	na	0.0524U	na
	antimony	26.3U	26.3U	26.3U	17.4U
	arsenic	12.3U	12.3U	12.3U	15.6U
	barium	63.9	76.5	78.7	76
	beryllium	0.37B	0.126U	2.64	0.17U
	cadmium	1.57U	1.57U	2.1B	2.49U
	calcium	59200	80500	78200	58700
	chromium	5.36B	3.69B	6.85B	4.99U
	cobalt	2.33U	2.33U	3.31B	3.17U
	copper	3.89B	2.17U	5.53B	7.83B
	fluoride	0.2	na	0.3	na
	iron	3350	1710N	392J	5320
	lead	15.7U	15.7U	17.8B	20.5U
	lithium	6.59B	3.6B	11B	5.71B
	magnesium	21000	26900	29300	24100
	manganese	92.8	54.9	50.7	160
	molybdenum	3.02U	4.75B	11.4B	3.72U
	neptunium-237	0.119U	na	-0.244U	na
	nickel	5.41U	5.41U	6.13B	7.36B
	PCB, total	0.5U	0.5U	0.5U	0.5U
	phosphorus	208	218	149	190
	plutonium-238	0.05938U	na	0.0004259U	na
	plutonium-239	0U	na	0.00004733U	na
	potassium	3560B	4430B	5310B	4210B
	selenium	23.2U	23.2U	41.6B	26.7U
	silicon	6190J	9060J	1560J	8360J
	silver	3.66U	3.66U	3.66U	4.37U
	sodium	21600	20900	44100	15600J
	technetium-99	-4.59U	na	-0.901U	na
	thallium	15.6U	15.6U	15.6U	12.5U
	tin	13.6JU	13.6JU	13.6U	10.8JU
	titanium	29.7	70.4	4.67B	39.4
	total phosphate as phosphorus	0.11	na	0.11	na
	uranium	1.539	na	1.064	na
	uranium-233/234	0.8476	na	0.9337	na
	uranium-235	0U	na	0.02743U	na
	uranium-236	0U	na	0U	na
	uranium-238	0.517	na	0.355	na
	vanadium	5.11B	5.73B	6.61B	5.17B
	zinc	34.8B	12.1B	4.53U	43.5

Table 2.9. Local surface water monitoring program results for chemical and radiological parameters – 2004 (continued)

Location	Parameter ^{a,b}	March/ April ^c	June ^c	August/ October ^c	December ^c
Scioto	aluminum	2130	2800N	374N	2180
River	americium-241	0.00002642U	na	0.07505U	na
RW-6	antimony	26.3U	26.3U	26.3U	17.4U
(upstream)	arsenic	12.3U	12.3U	12.3U	15.6U
	barium	61.3	82.6	84.6	70.4
	beryllium	0.53B	0.126U	0.126U	0.17U
	cadmium	1.57U	1.57U	1.57U	2.49U
	calcium	60300	85000	89700	56800
	chromium	6.46B	5.88B	3.4U	4.99U
	cobalt	3.41B	2.97B	2.33U	3.17U
	copper	4.61B	4.28B	2.17U	3.8B
	fluoride	0.2	na	0.3	na
	iron	3170	2690N	811J	3640
	lead	15.7U	22B	15.7U	20.5U
	lithium	6.45B	5.21B	9.42B	5.43B
	magnesium	20700	27400	30300	22900
	manganese	94.8	84.2	65.4	105
	molybdenum	3.02U	8.62B	9.24B	3.72U
	neptunium-237	0.04872U	na	-0.1451U	na
	nickel	6.13B	5.41U	5.41U	5.29B
	PCB, total	0.5U	0.5U	0.5U	0.5U
	phosphorus	212	262	134	130
	plutonium-238	0.04858U	na	0.1271U	na
	plutonium-239/240	0.02429U	na	0.00001779U	na
	potassium	3910B	4960B	5120B	4320B
	selenium	23.2U	23.2U	27B	26.7U
	silicon	6080J	11100J	2410J	7150J
	silver	3.66U	3.66U	3.66U	4.37U
	sodium	21100	21100	48500	15800J
	technetium-99	-7.3U	na	-3.58U	na
	thallium	15.6U	16.1B	15.6U	12.5U
	tin	13.6JU	13.6JU	13.6U	10.8JU
	titanium	28.6	97.9	4.4B	26.8
	total phosphate as phosphorus	0.11	na	0.12	na
	uranium	1.674	na	2.31	na
	uranium-233/234	0.8494	na	0.8638	na
	uranium-235	-0.02908U	na	0.02732U	na
	uranium-236	0U	na	0U	na
	uranium-238	0.5651	na	0.7736	na
	vanadium	4.6B	9.82B	2.43B	3.4U
	zinc	22.1B	17.4B	4.53U	22.2B

Table 2.9. Local surface water monitoring program results for chemical and radiological parameters – 2004 (continued)

Location	Parameter ^{a,b}	May ^c	September ^c
Little Beaver Creek RW-7 (downstream)	americium-241	0U	-0.05546U
	neptunium-237	0.02416U	-0.04915U
	plutonium-238	0.07231U	0.04941U
	plutonium-239/240	0.0241U	0.09836U
	technetium-99	5.27U	-3.06U
	uranium	1.883	1.859
	uranium-233/234	2.4	2.278
	uranium-235	0.1592	0.1263U
	uranium-236	0.05716U	0.02838U
	uranium-238	0.6181	0.613
RW-8 (downstream)	americium-241	0.06233U	0.1508U
	neptunium-237	0U	-0.2072U
	plutonium-238	0.06153U	0.1038U
	plutonium-239/240	0.03074U	0.02593U
	technetium-99	4.03U	-1.89U
	uranium	1.591	1.939
	uranium-233/234	1.486	1.462
	uranium-235	0.03461U	0.03343U
	uranium-236	-0.03102U	0.00002996U
	uranium-238	0.5315	0.6484
RW-12 (upstream)	americium-241	0U	0.02727U
	neptunium-237	0.08378U	0.2452U
	plutonium-238	0.06267U	-0.1355U
	plutonium-239/240	0.00004173U	0.00002533U
	technetium-99	-2.61U	-2.77U
	uranium	0.06947U	0.3872U
	uranium-233/234	0.02328U	0.1824U
	uranium-235	0U	0U
	uranium-236	0.02576U	0U
	uranium-238	0.02321U	0.1301U
Big Beaver Creek RW-13 (downstream)	americium-241	0U	0.12U
	neptunium-237	0.02823U	-0.1685U
	plutonium-238	0.00002812U	0.19U
	plutonium-239/240	0.02818U	0.08428U
	technetium-99	1.08U	-2.25U
	uranium	0.627	1.761
	uranium-233/234	0.6642	2.023
	uranium-235	0.05651U	0.09019U
	uranium-236	-0.02534U	0.00005394U
	uranium-238	0.2057	0.5837
RW-5 (upstream)	americium-241	0.1674U	-0.08841U
	neptunium-237	0.01991U	-0.1346U
	plutonium-238	0.05952U	-0.08015U
	plutonium-239/240	0.01984U	0.05386U
	technetium-99	-2.68U	-5.16U
	uranium	0.1324U	0.781
	uranium-233/234	0.07077U	0.2926U
	uranium-235	-0.02906U	0U
	uranium-236	0U	-0.03235U
	uranium-238	0.04707U	0.2626

Table 2.9. Local surface water monitoring program results for chemical and radiological parameters – 2004 (continued)

Location	Parameter ^{a,b}	May ^c	September ^c
Big Run Creek RW-2 (downstream)	americium-241	0.05184U	0.1527U
	neptunium-237	-0.1771U	-0.582U
	plutonium-238	-0.0221U	0.02532U
	plutonium-239/240	0.02219U	0.00005468U
	technetium-99	0.135U	-4.1U
	uranium	0.2488U	0.6423
	uranium-233/234	0.1616U	0.4798
	uranium-235	0.03322U	0.03287U
	uranium-236	0U	0.02951U
	uranium-238	0.08064U	0.2127
RW-3 (downstream)	americium-241	-0.0248U	-0.09558U
	neptunium-237	0.00002217U	-0.01738U
	plutonium-238	0.02212U	0.05329U
	plutonium-239/240	-0.0221U	-0.03522U
	technetium-99	-0.743U	-4.98U
	uranium	1.942	3.815
	uranium-233/234	2.126	4.062
	uranium-235	0.122U	0.3437
	uranium-236	0.05476U	0U
	uranium-238	0.6415	1.251
RW-33 (upstream)	americium-241	0.00002651U	0.02769U
	neptunium-237	-0.02042U	0.02757U
	plutonium-238	0.04078U	0.2445U
	plutonium-239/240	-0.04072U	-0.0542U
	technetium-99	-1.15U	-1.15U
	uranium	0.07578U	0.4231U
	uranium-233/234	0.1522	-0.08516U
	uranium-235	0U	0U
	uranium-236	0.02809U	0.03155U
	uranium-238	0.02531U	0.142U
Background creeks RW-10N	americium-241	-0.03006U	-0.2429U
	neptunium-237	0U	0.1272U
	plutonium-238	0.1034U	0.3808U
	plutonium-239/240	0U	-0.02106U
	technetium-99	-4.28U	-4.53U
	uranium	0.4464	0.3033U
	uranium-233/234	0.1503	0.2479U
	uranium-235	0U	0.03057U
	uranium-236	0U	0.02745U
	uranium-238	0.15	0.09903U

Table 2.9. Local surface water monitoring program results for chemical and radiological parameters – 2004 (continued)

Location	Parameter ^{a,b}	May ^c	September ^c
Background creeks	americium-241	-0.0265U	-0.1006U
RW-10S	neptunium-237	-0.03018U	-0.2168U
	plutonium-238	-0.06018U	0.1972U
	plutonium-239/240	0.00003009U	0.09844U
	technetium-99	-2.84U	-1.98U
	uranium	0.08216U	0.1761U
	uranium-233/234	0.00002748U	0.1117U
	uranium-235	0U	0.03438U
	uranium-236	0.03047U	0.09252U
	uranium-238	0.02745U	0.0556U
RW-10E	americium-241	0.00002864U	-0.1399U
	neptunium-237	-0.03353U	-0.06418U
	plutonium-238	0.06694U	0.1073U
	plutonium-239/240	0.03347U	0.0000235U
	technetium-99	-2.36U	-3.58U
	uranium	0.06915U	-0.2127U
	uranium-233/234	0.1046U	0.04979U
	uranium-235	-0.03224U	0.03057U
	uranium-236	0U	-0.02742U
	uranium-238	0.02611U	-0.07408U
RW-10W	americium-241	-0.02589U	0.2653U
	neptunium-237	0U	0.09106U
	plutonium-238	0.02633U	0.2493U
	plutonium-239/240	0.00002628U	0.00004748U
	technetium-99	-7.12U	-5.14U
	uranium	0.07019U	0.31U
	uranium-233/234	0.09343U	0.1564U
	uranium-235	0U	0.00003211U
	uranium-236	0.05175U	0.02885U
	uranium-238	0.02331U	0.104U

^aParameters 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.

^bThe 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.

^cAbbreviations and data qualifiers are as follows: B – result is less than the practical quantitation limit but greater than or equal to the instrument detection limit; J – estimated value; N – sample spike recovery is not within control limits; U – undetected; na – not analyzed.

Table 2.10. Sediment monitoring program results – 2004

Parameter	Unit	Location/results ^a			
		<i>Scioto River and outfalls that discharge to the Scioto River</i>			
		<i>RM-6 Upstream @ Piketon</i>	<i>RM-1 Downstream @ Lucasville</i>	<i>RM-9 Outfall 012</i>	<i>RM-10 USEC Outfall 010/DOE Outfall 013</i>
Aluminum	mg/kg	3220	2230	2500*	4350*
Americium-241	pCi/g	0.003605U	-0.01242U	0.00001428U	0.04055U
Antimony	mg/kg	2.6NU	2.55NU	2.48*NU	2.53*NU
Arsenic	mg/kg	8.09B	1.19U	8.09B	10.2B
Barium	mg/kg	35.4	24.1	27.6	45.3
Beryllium	mg/kg	0.108B	0.062B	0.194	0.266
Bismuth	mg/kg	2.9JNU	5.72BJN	2.77JNU	2.83JNU
Cadmium	mg/kg	0.552B	0.504B	0.303B	0.151U
Calcium	mg/kg	18800	21200	1380	1310
Chromium	mg/kg	5.4	4.8	6.81	8.46
Cobalt	mg/kg	3.5	3.49	6.23	6.44
Copper	mg/kg	7.89	5.9	7.41	10.2
Iron	mg/kg	8030	7430	12700*	14100*
Lead	mg/kg	7.41B	3.77B	12.3B	8.72B
Lithium	mg/kg	4.38	3.39	2.66	4.01
Magnesium	mg/kg	7940	8050	685*	1230*
Manganese	mg/kg	197*	188*	333	364
Mercury	mg/kg	0.048U	0.049U	0.049U	0.048U
Molybdenum	mg/kg	1.53B	0.824B	5.49	0.75B
Neptunium-237	pCi/g	-0.05931U	-0.05175U	-0.01705U	0.003179U
Nickel	mg/kg	9.29	8.1	10.9	9.63
PCB-1016	µg/g	0.48U	0.48U	0.47U	0.5U
PCB-1221	µg/g	0.48U	0.48U	0.47U	0.5U
PCB-1232	µg/g	0.48U	0.48U	0.47U	0.5U
PCB-1242	µg/g	0.48U	0.48U	0.47U	0.5U
PCB-1248	µg/g	0.48U	0.48U	0.47U	0.5U
PCB-1254	µg/g	0.48U	0.48U	0.47U	0.5U
PCB-1260	µg/g	0.48U	0.48U	0.47U	0.5U
PCB-1268	µg/g	0.48U	0.48U	0.47U	0.5U
Phosphorus	mg/kg	261	229	174N	239
Plutonium-238	pCi/g	0.02542U	0.01992U	0.02562U	-0.003053U
Plutonium-239/240	pCi/g	0.008467U	0.01989U	-0.008503U	-0.003119U
Potassium	mg/kg	553BN	324BN	356*BN	335*BN
Selenium	mg/kg	6.54B	4.98B	2.19U	2.24U
Silicon	mg/kg	165*J	170*J	172J	91.4J
Silver	mg/kg	0.361U	0.355U	0.346U	0.353U
Sodium	mg/kg	70.8N	59.9	1940J	71.8J
Technetium-99	pCi/g	-0.0234U	0.0363U	-0.00895U	0.217
Thallium	mg/kg	4.07B	4.46B	8.66B	9.59B
Tin	mg/kg	11.4BN	3.91BN	3.31*B	2.72*B
Titanium	mg/kg	35.5N	33.3N	39.5N	41.5
Uranium	µg/g	3.715	2.554	2.5	3.07
Uranium-233/234	pCi/g	1.532	0.8462	0.9873	0.9392
Uranium-235	pCi/g	0.03654U	0.02809U	0.02981	0.04205
Uranium-236	pCi/g	0.02051U	0.004206U	0.01147U	0.008389U
Uranium-238	pCi/g	1.245	0.8558	0.8372	1.028
Vanadium	mg/kg	8.5	7.27	14.7	13.8
Zinc	mg/kg	44.9*J	38.9*J	51.7J	68.5J

Table 2.10. Sediment monitoring program results – 2004 (continued)

Parameter	Unit	Location/results ^a			
		Little Beaver Creek			
		RM-12 Upstream	RM-11 X-230J7 Discharge	RM-8 Downstream @ Outfall 009 Discharge	RM-7 Downstream @ Confluence
Aluminum	mg/kg	2520	2260*	3720*	2070
Americium-241	pCi/g	-0.03079U	-0.01271U	0.005213U	0.01868U
Antimony	mg/kg	2.4NU	2.56NU	2.58*NU	2.61NU
Arsenic	mg/kg	5.76B	7.75B	12.7	6.17B
Barium	mg/kg	30	28.9	42.4	33.9
Beryllium	mg/kg	0.172	0.168	0.364	0.226
Bismuth	mg/kg	2.69JNU	2.87JNU	2.89NU	2.92JNU
Cadmium	mg/kg	0.144U	0.202B	0.558B	0.718B
Calcium	mg/kg	505	746	7230	3340
Chromium	mg/kg	4.3	6.11	17.9	7.78
Cobalt	mg/kg	6.31	5.88	10.9	7.05
Copper	mg/kg	4.78	6.48	11.9	6.49
Iron	mg/kg	10000	10100*	17000*	9810
Lead	mg/kg	5.35B	6.69B	10.8B	8.29B
Lithium	mg/kg	4.87	4.18	5.76	3.15
Magnesium	mg/kg	531	684*	2310*	1720
Manganese	mg/kg	581*	345	585	424*
Mercury	mg/kg	0.049U	0.049U	0.067	0.049U
Molybdenum	mg/kg	0.276U	0.294U	5.1	2.23B
Neptunium-237	pCi/g	-0.06117U	-0.02151U	-0.02277U	-0.03394U
Nickel	mg/kg	5.61	7.7	23.1	14.4
PCB-1016	µg/g	0.46U	0.5U	0.5U	0.44U
PCB-1221	µg/g	0.46U	0.5U	0.5U	0.44U
PCB-1232	µg/g	0.46U	0.5U	0.5U	0.44U
PCB-1242	µg/g	0.46U	0.5U	0.5U	0.44U
PCB-1248	µg/g	0.46U	0.5U	0.5U	0.44U
PCB-1254	µg/g	0.46U	0.5U	0.5U	0.44U
PCB-1260	µg/g	0.46U	0.5U	0.6	0.44U
PCB-1268	µg/g	0.46U	0.5U	0.5U	0.44U
Phosphorus	mg/kg	117N	128	224	166
Plutonium-238	pCi/g	0.003652U	0.02153U	0.05014U	-0.02111U
Plutonium-239/240	pCi/g	-0.003586U	0.00000889U	0.02278U	0.01698U
Potassium	mg/kg	321BN	304*BN	526*BN	271BN
Selenium	mg/kg	2.12U	2.26U	2.28U	2.3U
Silicon	mg/kg	91.4JN	128J	115JN	89.6*J
Silver	mg/kg	0.335U	0.357U	0.359U	0.363U
Sodium	mg/kg	51.3J	62.5J	67.2J	49.1
Technetium-99	pCi/g	-0.0638U	0.317	9.33	13.1
Thallium	mg/kg	6.86B	4.08B	13.8B	3.65B
Tin	mg/kg	8.41*BN	5.68*B	2.69*B	2.04BN
Titanium	mg/kg	23.2	34.6	34.5	29.5N
Uranium	µg/g	2.647	3.495	4.653	4.351
Uranium-233/234	pCi/g	0.9119	2.095	4.976	3.808
Uranium-235	pCi/g	0.04815	0.07218	0.1346	0.1692
Uranium-236	pCi/g	-0.007849U	0.008641U	0.0293	0.01233U
Uranium-238	pCi/g	0.8853	1.168	1.551	1.447
Vanadium	mg/kg	10.2	10.7	19.6	9.59
Zinc	mg/kg	31.5J	36.9J	131J	67.7*J

Table 2.10. Sediment monitoring program results – 2004 (continued)

Parameter	Unit	Location/results ^a	
		<i>Big Beaver Creek</i>	
		<i>RM-5</i>	<i>RM-13</i>
		<i>Upstream</i>	<i>Downstream</i>
Aluminum	mg/kg	2690	1700
Americium-241	pCi/g	0.00003645U	0.04568U
Antimony	mg/kg	2.58NU	2.62U
Arsenic	mg/kg	3.82B	1.31B
Barium	mg/kg	39.2	18.6
Beryllium	mg/kg	0.152	0.0629B
Bismuth	mg/kg	2.88JNU	na
Cadmium	mg/kg	0.533B	0.157U
Calcium	mg/kg	2800	2930
Chromium	mg/kg	4.68	4.12
Cobalt	mg/kg	5.93	na
Copper	mg/kg	5.96	4.73
Iron	mg/kg	8260	5870*
Lead	mg/kg	4.39B	4.37B
Lithium	mg/kg	5.29	na
Magnesium	mg/kg	1820	1600
Manganese	mg/kg	694*	196N
Mercury	mg/kg	0.05U	0.017U
Molybdenum	mg/kg	0.296U	na
Neptunium-237	pCi/g	-0.01381U	0.01447U
Nickel	mg/kg	9.54	7.31
PCB-1016	µg/g	0.48U	0.46U
PCB-1221	µg/g	0.48U	0.46U
PCB-1232	µg/g	0.48U	0.46U
PCB-1242	µg/g	0.48U	0.46U
PCB-1248	µg/g	0.48U	0.46U
PCB-1254	µg/g	0.48U	0.46U
PCB-1260	µg/g	0.48U	0.46U
PCB-1268	µg/g	0.48U	0.46U
Phosphorus	mg/kg	167	na
Plutonium-238	pCi/g	-0.004579U	-0.0336U
Plutonium-239/240	pCi/g	0.009199U	-0.01441U
Potassium	mg/kg	378BN	na
Selenium	mg/kg	2.37B	2.32U
Silicon	mg/kg	129*J	157*JN
Silver	mg/kg	0.359U	0.365U
Sodium	mg/kg	75.2	na
Technetium-99	pCi/g	0.129U	1.06
Thallium	mg/kg	1.98B	1.56U
Tin	mg/kg	7.98BN	na
Titanium	mg/kg	31.6N	na
Uranium	µg/g	2.654	3.304
Uranium-233/234	pCi/g	0.8788	1.18
Uranium-235	pCi/g	0.02682U	0.03227U
Uranium-236	pCi/g	0.00345U	0.02482
Uranium-238	pCi/g	0.8894	1.107
Vanadium	mg/kg	8.73	na
Zinc	mg/kg	40.9*J	26.9

Table 2.10. Sediment monitoring program results – 2004 (continued)

Parameter	Unit	Location/results ^a		
		RM-33 Upstream	RM-3 Downstream	RM-2 Downstream @ Wakefield
Aluminum	mg/kg	3850	2550	3180
Americium-241	pCi/g	0.04228U	-0.04799U	-0.00504U
Antimony	mg/kg	2.57NU	2.62NU	2.63NU
Arsenic	mg/kg	13.7	12.7	9.36B
Barium	mg/kg	45.9	30.9	45.4
Beryllium	mg/kg	0.372	0.319	0.311
Bismuth	mg/kg	2.87JNU	2.93JNU	2.94JNU
Cadmium	mg/kg	0.8B	0.663B	0.761B
Calcium	mg/kg	770	1840	2470
Chromium	mg/kg	7.75	9.17	6.43
Cobalt	mg/kg	7.84	10.1	9.59
Copper	mg/kg	7.08	6.39	7.49
Iron	mg/kg	14700	14500	13900
Lead	mg/kg	12.7B	10.2B	475
Lithium	mg/kg	7.25	2.69	6.22
Magnesium	mg/kg	633	1110	1400
Manganese	mg/kg	234*	742*	480*
Mercury	mg/kg	0.05U	0.05U	0.05U
Molybdenum	mg/kg	3.77	5.17	1.32B
Neptunium-237	pCi/g	0.00002218U	-0.03265U	-0.0204U
Nickel	mg/kg	11.5	9.23	14.7
PCB-1016	µg/g	0.48U	0.48U	0.5U
PCB-1221	µg/g	0.48U	0.48U	0.5U
PCB-1232	µg/g	0.48U	0.48U	0.5U
PCB-1242	µg/g	0.48U	0.48U	0.5U
PCB-1248	µg/g	0.48U	0.48U	0.5U
PCB-1254	µg/g	0.48U	0.48U	0.5U
PCB-1260	µg/g	0.48U	0.48U	0.5U
PCB-1268	µg/g	0.48U	0.48U	0.5U
Phosphorus	mg/kg	198	226	189
Plutonium-238	pCi/g	0.02254U	0.03915U	-0.03254U
Plutonium-239/240	pCi/g	0.01877U	-0.00325U	0.004082U
Potassium	mg/kg	473BN	231BN	380BN
Selenium	mg/kg	2.26U	2.31U	2.32U
Silicon	mg/kg	168*J	157*J	130*J
Silver	mg/kg	0.357U	0.365U	0.366U
Sodium	mg/kg	36.9	76.5	79.4
Technetium-99	pCi/g	-0.014U	0.602	0.104U
Thallium	mg/kg	5.61B	6.12B	6.67B
Tin	mg/kg	3.92BN	4.53BN	7.62BN
Titanium	mg/kg	31.1N	34.1N	32N
Uranium	µg/g	3.872	4.503	3.47
Uranium-233/234	pCi/g	1.287	2.416	1.283
Uranium-235	pCi/g	0.06882	0.09788	0.04708
Uranium-236	pCi/g	-0.004114U	-0.01096U	-0.01267U
Uranium-238	pCi/g	1.295	1.504	1.162
Vanadium	mg/kg	16.6	16.5	12.7
Zinc	mg/kg	44.5*J	56.4*J	107*J

Table 2.10. Sediment monitoring program results – 2004 (continued)

Parameter	Unit	Location/results ^a			
		<i>Background creeks</i>			
		<i>RM-10N North background</i>	<i>RM-10S South background</i>	<i>RM-10E East background</i>	<i>RM-10W West background</i>
Aluminum	mg/kg	2760	3870	1470	3680
Americium-241	pCi/g	-0.0108U	0.004195U	-0.0219U	-0.04624U
Antimony	mg/kg	2.62U	2.61U	2.62U	2.61U
Arsenic	mg/kg	1.23U	7.87B	1.23U	28.3
Barium	mg/kg	31.1	42.9	20.9	31.8
Beryllium	mg/kg	0.207	0.31	0.0838B	0.611
Cadmium	mg/kg	0.752B	0.247B	0.157U	1.18B
Calcium	mg/kg	6270	4970	342	776
Chromium	mg/kg	6.29	12.1	3.52	12.3
Copper	mg/kg	10	9.13	2.05B	15.1
Iron	mg/kg	8720*	11900*	4020*	26500*
Lead	mg/kg	10.1B	14.9B	4.46B	17
Magnesium	mg/kg	3420	2750	221	717
Manganese	mg/kg	172N	291N	164N	581N
Mercury	mg/kg	0.018	0.024	0.017U	0.018
Neptunium-237	pCi/g	-0.01221U	0.009804U	0.0000372U	0.003271U
Nickel	mg/kg	14.2	8.26	3.45B	27.6
PCB-1016	µg/g	0.5U	0.47U	0.47U	0.49U
PCB-1221	µg/g	0.5U	0.47U	0.47U	0.49U
PCB-1232	µg/g	0.5U	0.47U	0.47U	0.49U
PCB-1242	µg/g	0.5U	0.47U	0.47U	0.49U
PCB-1248	µg/g	0.5U	0.47U	0.47U	0.49U
PCB-1254	µg/g	0.5U	0.47U	0.47U	0.49U
PCB-1260	µg/g	0.5U	0.47U	0.47U	0.49U
PCB-1268	µg/g	0.5U	0.47U	0.47U	0.49U
Plutonium-238	pCi/g	0.02447U	0.000006512U	0.0000265U	0.006524U
Plutonium-239/240	pCi/g	0.008174U	0.003259U	0.0000106U	-0.003259U
Selenium	mg/kg	2.31U	2.3U	2.32U	2.3U
Silicon	mg/kg	106*JN	349*JN	93.3*JN	161*JN
Silver	mg/kg	0.365U	0.363U	0.365U	0.363U
Technetium-99	pCi/g	0.0409U	0.134U	0.0115U	0.157U
Thallium	mg/kg	1.56U	2.53B	1.56U	4.55B
Uranium	µg/g	2.611	2.682	2.005	5.495
Uranium-233/234	pCi/g	0.7607	0.7769	0.5761	1.784
Uranium-235	pCi/g	0.05775	0.0623	0.0214	0.08995
Uranium-236	pCi/g	0.000004459U	0.008615U	0.007695U	0.004259U
Uranium-238	pCi/g	0.8721	0.8955	0.6719	1.838
Zinc	mg/kg	59.8	57.9	16.4	102

^aAbbreviations and data qualifiers are as follows: * - duplicate analysis is not within control limits; B - result is less than the practical quantitation limit but greater than or equal to the instrument detection limit; J - estimated value; N - sample spike recovery is not within control limits; U - undetected; na - not analyzed.

Table 2.11. Soil and vegetation monitoring at ambient air monitoring stations – 2004

Parameter ^a	Location/results ^b			
	<i>A8 – On site at northwest boundary</i>		<i>T7 – On site near X-230L North Holding Pond</i>	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.005952U	0.008262U	0.002567U	-0.04543U
Neptunium-237	0.000003668U	-0.00328U	-0.004816U	0.006008U
Plutonium-238	0U	0.009844U	0.009615U	0.01796U
Plutonium-239/240	0U	0.006561U	0U	0.005985U
Technetium-99	0.225U	0.0342U	0.102U	0.123U
Uranium	0.1297	3.091	0.2213	2.585
Uranium-233/234	0.08375	1.135	0.4443	0.8762
Uranium-235	0U	0.04045	0.01993	0.02514U
Uranium-236	-0.004024U	0.009081U	0.002988U	0.000004659U
Uranium-238	0.0436	1.035	0.07255	0.8663
	<i>A10 – On site on northwest segment of Perimeter Road</i>		<i>A29 – On site at OVEC</i>	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.000004561U	0.0048U	0U	0.0000605U
Neptunium-237	0U	0.01337U	0U	-0.0101U
Plutonium-238	0.0391U	0.006671U	0.005769U	0.01349U
Plutonium-239/240	0.00003904U	0.003337U	0.005769U	0.02699
Technetium-99	0.154U	0.0536U	-0.0939U	0.0981U
Uranium	0.03075U	2.777	0.02029U	3.155
Uranium-233/234	0.07068	0.8375	0.03952	1.079
Uranium-235	0.002493U	0.07762	0.002708U	0.0801
Uranium-236	0.004473U	0.0000124U	0U	0.000009428U
Uranium-238	0.01008U	0.9261	0.006573U	1.053
	<i>A36 – On site at X-611 Water Treatment Plant</i>		<i>A6 – North of PORTS in Piketon</i>	
	Vegetation	Soil	Vegetation	Soil
Americium-241	-0.009636U	0.02393U	-0.002895U	0.043U
Neptunium-237	-0.01465U	-0.00336U	0U	-0.06127U
Plutonium-238	0.007311U	0.000006728U	0U	-0.007186U
Plutonium-239/240	0.007311U	0U	0.003458U	-0.003593U
Technetium-99	-0.042U	0.00631U	0.148U	0.0595U
Uranium	0.04023U	2.916	0.3809	3.219
Uranium-233/234	0.03313U	0.8308	0.6215	0.9904
Uranium-235	-0.0136U	0.03324	0.01991	0.0472U
Uranium-236	0.008151U	-0.004968U	-0.002971U	0.01884U
Uranium-238	0.01469U	0.977	0.1262	1.077

Table 2.11. Soil and vegetation monitoring at ambient air monitoring stations – 2004 (continued)

Parameter ^a	Location/results ^b			
	<i>A24 – North of PORTS at Schuster Road</i>		<i>A41 – North of PORTS at Zahns Corner</i>	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0U	0.00501U	0U	0.02469U
Neptunium-237	0.00000306U	-0.04435U	-0.005135U	-0.0728U
Plutonium-238	0.006108U	0.01612U	0.005126U	0.03066U
Plutonium-239/240	0.003057U	0.01209U	0U	0.02296U
Technetium-99	-0.101U	0.137U	-0.115U	0.0104U
Uranium	0.04904	2.491	0.04318	2.635
Uranium-233/234	0.2077	0.8689	0.03873	0.7976
Uranium-235	0.003328U	0.04663U	0U	0.03059U
Uranium-236	0.002988U	0.01522U	0.002681U	0.02288
Uranium-238	0.01615	0.8329	0.0145	0.8825
	<i>A23 – Northeastern PORTS boundary</i>		<i>A12 – Eastern PORTS boundary</i>	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.000005375U	-0.008204U	-0.004286U	0.00005355U
Neptunium-237	0.008883U	-0.03317U	-0.001923U	-0.0101U
Plutonium-238	0.004427U	-0.01417U	0.007676U	0.0101U
Plutonium-239/240	-0.008845U	-0.01418U	0U	0.0303
Technetium-99	-0.0971U	0.0884U	-0.0187U	0.121U
Uranium	0.09058	2.945	0.02015U	2.835
Uranium-233/234	0.0432	1.101	0.01865	0.8418
Uranium-235	0U	0.06468	0U	0.03635
Uranium-236	0U	0U	0U	0.004662U
Uranium-238	0.03043	0.9837	0.006771U	0.9493
	<i>A15 – Southeast of PORTS on Loop Road</i>		<i>A3 – Southern PORTS boundary</i>	
	Vegetation	Soil	Vegetation	Soil
Americium-241	0.002494U	-0.03416U	0U	0.009936U
Neptunium-237	-0.003784U	-0.01616U	0.000005134U	-0.00691U
Plutonium-238	0U	0.006457U	0.0205U	0.003458U
Plutonium-239/240	0U	0.006454U	0.01025U	-0.01034U
Technetium-99	-0.126U	0.1U	-0.187U	0.0672U
Uranium	0.05282U	3.437	0.02421U	3.34
Uranium-233/234	0.04881	1.176	0.03936U	1.104
Uranium-235	0.01672	0.05942	0.003238U	0.05006
Uranium-236	0.003003U	0.004446U	-0.002899U	0.008989U
Uranium-238	0.01624U	1.15	0.00786U	1.118

Table 2.11. Soil and vegetation monitoring at ambient air monitoring stations – 2004 (continued)

Parameter ^a	Location/results ^b			
	<i>A9 – South of PORTS</i>		<i>A28 – Southwest of PORTS on Camp Creek Road</i>	
	Vegetation	Soil	Vegetation	Soil
Americium-241	-0.006915U	0.01639U	-0.002262U	0.00005468U
Neptunium-237	-0.00272U	-0.003709U	0.009008U	-0.003146U
Plutonium-238	0U	0.007439U	0.005989U	-0.006332U
Plutonium-239/240	-0.002715U	0.02232U	-0.002991U	0.01271U
Technetium-99	0.211U	-0.0234U	-0.06U	0.243U
Uranium	0.07039	4.855	0.04262	3.013
Uranium-233/234	0.04851	1.49	0.103	1.032
Uranium-235	0.004787U	0.05725	0.002491U	0.03442
Uranium-236	-0.002147U	0.01144U	-0.002234U	-0.003852U
Uranium-238	0.02324	1.626	0.01411	1.009
	<i>A37 – Background station near Otway</i>			
	Vegetation	Soil		
Americium-241	0.000004309U	0.01445U		
Neptunium-237	-0.003022U	-0.01109U		
Plutonium-238	0U	0.003702U		
Plutonium-239/240	0.003016U	0.003691U		
Technetium-99	-0.132U	0.254U		
Uranium	0.1085	3.154		
Uranium-233/234	0.162	0.983		
Uranium-235	0.008815U	0.0413U		
Uranium-236	0U	0.0139U		
Uranium-238	0.03566	1.056		

^aAll parameters are measured in pCi/g with the exception of uranium which is measured in $\mu\text{g/g}$.

^bAbbreviations and data qualifiers are as follows: U – undetected.

Table 2.12. Biota (fish) monitoring program results – 2004

Parameter	Unit	Location/type of fish/results ^a		
		<i>Little Beaver Creek (RW-8) blue gill</i>	<i>Little Beaver Creek (RW-8) creek chub</i>	<i>Little Beaver Creek (RW-8) bass</i>
Americium-241	pCi/g	0.001753U	-0.001602U	0.000001489U
Chromium	mg/kg	8.18N	2.79B	5.17
Neptunium-237	pCi/g	-0.002816U	0.000002488U	0.005359U
Plutonium-238	pCi/g	0.001406U	0.001243U	0.006681U
Plutonium-239/240	pCi/g	0.000001405U	0.001242U	0.002672U
Technetium-99	pCi/g	-0.0469U	-0.0244U	-0.105U
Total PCB	µg/g	1U	1U	2.1
Uranium (total)	µg/g	-0.00005196U	0.02063U	-0.01133U
Uranium-233/234	pCi/g	0.02353U	0.01099U	-0.007623U
Uranium-235	pCi/g	0U	-0.004516U	0U
Uranium-236	pCi/g	-0.004339U	0.004059U	0U
Uranium-238	pCi/g	0.00000391U	0.007314U	-0.003806U
Parameter	Unit	<i>Scioto River (RW-1) drum 1</i>		<i>Scioto River (RW-1) drum 2</i>
Americium-241	pCi/g	0.004538U	0.000003488U	
Chromium	mg/kg	4.09*	0.0638U	
Neptunium-237	pCi/g	0.00002725U	0.000003189U	
PCB-1016	µg/g	1U	1U	
PCB-1221	µg/g	1U	1U	
PCB-1232	µg/g	1U	1U	
PCB-1242	µg/g	1U	1U	
PCB-1248	µg/g	1U	1U	
PCB-1254	µg/g	1U	1U	
PCB-1260	µg/g	1U	1U	
PCB-1268	µg/g	1U	1U	
Plutonium-238	pCi/g	0.05441U	-0.003177U	
Plutonium-239/240	pCi/g	0.0544U	0.003183U	
Technetium-99	pCi/g	-0.00961U	0.203U	
Total PCB	µg/g	1U	1U	
Uranium (total)	µg/g	0.00416U	0.02121U	
Uranium-233/234	pCi/g	-0.007282U	0.02142U	
Uranium-235	pCi/g	0.008992U	0U	
Uranium-236	pCi/g	0U	0U	
Uranium-238	pCi/g	0U	0.007125U	

^aAbbreviations and data qualifiers are as follows: * - duplicate analysis is not within control limits; B – result is less than the practical quantitation limit but greater than or equal to the instrument detection limit; N – sample spike recovery is not within control limits; U – undetected.

Table 2.13. Biota (crops) monitoring program results – 2004

Type	Location	Tc-99 ^{a, b}	U	U-233/234	U-235	U-238
Tomato	Offsite 1	-0.0525U	0.01035U	0.0104U	0U	0.003459U
Corn	Offsite 1	-0.0694U	0.0000696U	0.006796U	0U	0.000003388U
Green beans	Offsite 1	-0.114U	-0.00000057U	-0.003587U	0U	0U
Broccoli	Offsite 2	-0.199U	-0.0174U	0.005306U	-0.006529U	-0.005279U
Squash	Offsite 2	-0.162U	0.001151U	-0.007335U	0.004538U	0.000003668U
Tomato	Offsite 2	0.00943U	0.008639U	0.003272U	-0.004029U	0.003262U
Cucumber	Offsite 2	-0.164U	-0.01844U	0.0155	0U	-0.006178U
Potato	Offsite 2	-0.202U	0.03012U	-0.009086U	0.01123U	0.009086U
Corn	Offsite 2	-0.109U	0.01024U	-0.006889U	0U	0.003441U
Tomato	Offsite 3	-0.194U	0.008943U	0.000006011U	0U	0.003005U
Nova squash	Offsite 4	-0.172U	0.04337U	0.0365	0U	0.01457U
Jericho squash	Offsite 4	0.00793U	0.03421U	0.0000111U	0.004569U	0.01109U
Prancer squash	Offsite 4	-0.163U	0.03054U	0.01711U	0U	0.01024U
Goldie squash	Offsite 4	0.168U	-0.008907U	0.003389U	0.004172U	-0.003365U
Green beans	Offsite 5	-0.0931U	0.009115U	0.006179U	0U	0.00308U
Green peppers	Offsite 5	-0.151U	0.00001153U	0.003694U	0U	0.000003676U
Tomato	Offsite 5	-0.101U	0.00119U	0.03143U	0.004306U	0.00001392U
Corn	Offsite 5	-0.0966U	0.00001931U	-0.00687U	0U	0.00000686U
Cucumber	Offsite 5	-0.159U	0.01175U	0.003568U	0.004397U	0.003558U

^aResults are reported in $\mu\text{g/g}$ (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.

^bSamples 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.

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