

**MARTIN MARIETTA**

**Environmental Monitoring  
and Surveillance on the  
Oak Ridge Reservation:  
1993 Data**

**MANAGED BY  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
FOR THE UNITED STATES  
DEPARTMENT OF ENERGY**

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ENVIRONMENTAL MONITORING AND SURVEILLANCE  
ON THE OAK RIDGE RESERVATION:  
1993 DATA

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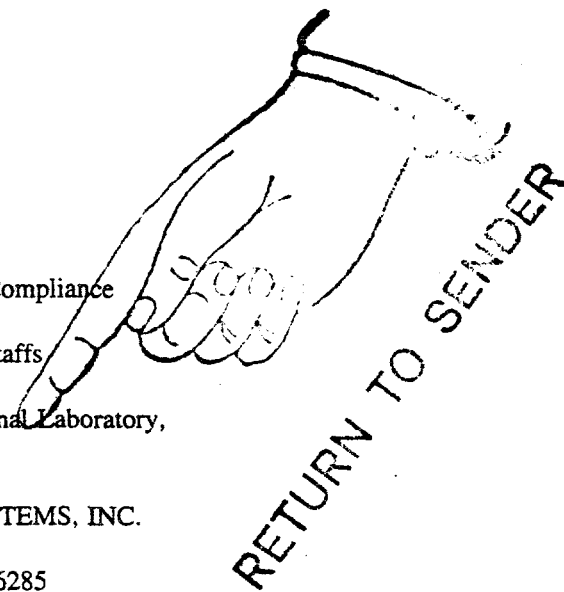
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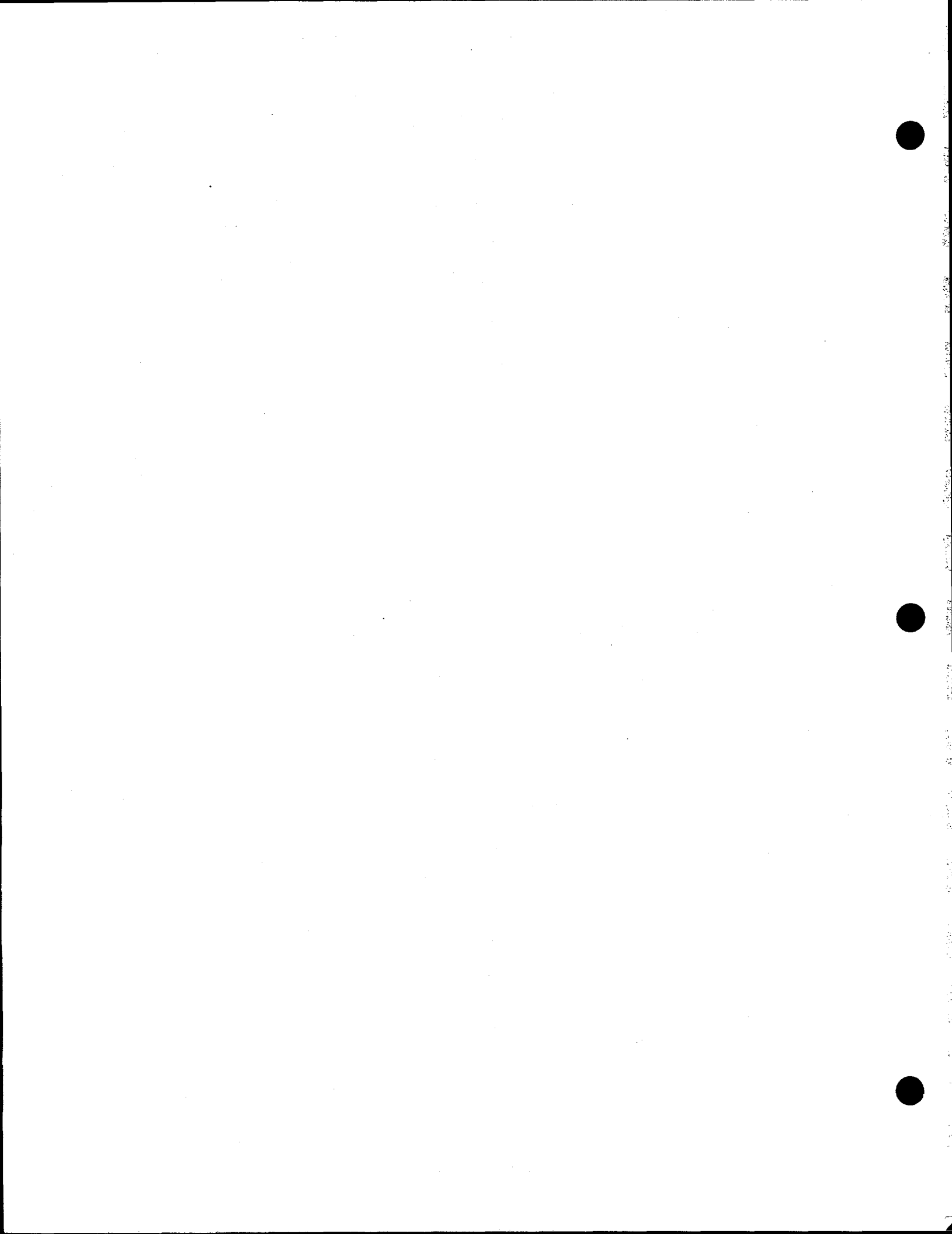


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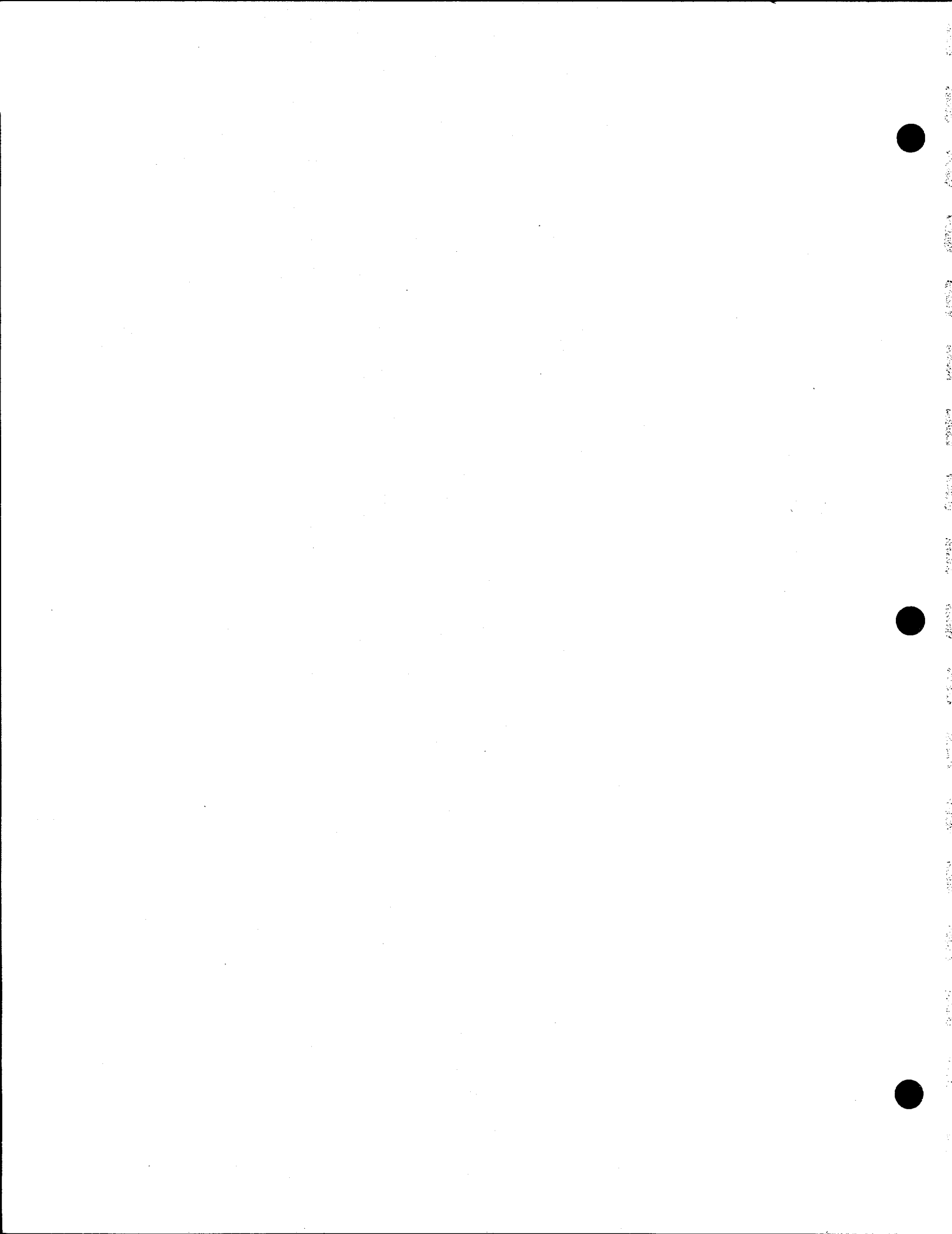
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## Introduction

Environmental monitoring and surveillance are conducted on the Oak Ridge Reservation and its environs throughout the year. Environmental monitoring ensures that (1) the reservation is a safe place to work, (2) activities on the reservation do not adversely affect the neighboring communities, and (3) compliance is made with federal and state regulations.

This document is a compilation of the monitoring and surveillance data for calendar year 1993. It is a tool for analysts in the fields of environmental monitoring and environmental restoration. The summary information found in the annual site environmental report was drawn from the contents of this document.

Table 1.1. Administrative units on the Oak Ridge Reservation

Administering body	Area	
	Hectares	Acres
Oak Ridge Y-12 Plant	1,769	4,370
Oak Ridge National Laboratory	9,879	24,400
Oak Ridge K-25 Site	1,954	4,825
Oak Ridge Institute for Science and Education	274	680
Johnson Controls World Services, Inc.	93	230
Total	13,969	34,505

**Table 2.1. RCRA and CERCLA corrective action processes**

RCRA	CERCLA	Purpose
RCRA Facility Assessment	Preliminary Assessment/Site Investigation	Identify releases needing further investigations
RCRA Facility Investigation	Remedial Investigation	Characterize nature, extent, and rate of contaminant releases
Corrective Measures Study	Feasibility Study	Evaluate and select remedy
Corrective Measures Implementation	Remedial Design/Remedial Action	Design and implementation of chosen remedy

**Table 2.2. NEPA activities during 1993**

Types of NEPA documentation	Y-12 Plant	ORNL	K-25 Site
Categorical exclusion (CX) recommendation	11	28	29
CX granted	11	27	16
Approved under general CX documents	332	97	71
Environmental assessment	8	10	2
Special environmental analysis	2	0	0
Environmental impact statement	0	1	0

**Table 2.3. Oak Ridge Reservation recycling activities**

Material	1991 (tons)	1992 (tons)	1993 (tons)
Aluminum cans	15.7	24.8	28.7
Cardboard	85.5	315.4	428.5
Paper	302.4	552.8	786.6

**Table 2.4. Summary of environmental audits and assessments conducted at the Y-12 Plant, 1993**

Date	Reviewer	Subject	Findings
12/31-1/7/93	DOE-ORO	DOE air pollution control program—airborne effluent emission controls	0
1/13-2/4/93	DOE-ORO	Building 9201-1 parking area and weir tank	2
1/19-29/93	DOE-ORO	Best management practices plan implementation	2
1/26-2/6/93	DOE-ORO/Energy Systems Environmental Compliance	Review of NESHAP for radionuclides	0
2/18/93	DOE-ORO	Underground storage tank overfill protection	0
3/10/93	City of Oak Ridge	Sanitary sewer monitoring program	1
5/2/93	DOE-ORO	Herbicide use on East Fork Poplar Creek	0
5/5/93	EPA	NPDES Compliance, Evaluation, and Inspection	3
6/3/93	DOE-ORO	Y-12 Plant drain tie-in procedure	0
6/14/93	DOE-ORO	Groundwater well sampling	0
6/14-19/93	TDEC	Annual RCRA inspection and groundwater compliance evaluation inspection	0
6/18-7/2/93	DOE-ORO	Groundwater well installation	0
6/24-30/93	DOE-ORO	Laboratory and field quality control	0
6/24/93	DOE-ORO	Storm water monitoring program	0
7/7-9/93	TDEC	Air compliance	0
7/19-8/93	DOE-ORO	Environmental appraisal	77
7/27/93	DOE-ORO	NPDES discharge-monitoring report preparation	0
8/5/93	TDEC	Landfill V	4
9/23-24/93	EPA	Rad-NESHAP	0
10/1/93	DOE-ORO	Groundwater well plugging and abandonment	0
12/1/93	DOE-ORO	Radiological monitoring for NPDES permit compliance	2
12/1-3/93	Defense Nuclear Facilities Safety Board	Review of liquid discharges and air emissions at the Y-12 Plant	0
12/1-8/93	DOE-ORO	Groundwater Monitoring Program	0

**Table 2.5. Summary of environmental audits and assessments conducted at ORNL, 1993**

Date	Reviewer	Subject	Findings
2/11/93	DOE	DOE inspector general audited records management for Water Quality Control Group and RCRA records	0
5/5/93	EPA Region IV	NPDES Compliance Evaluation Inspection	2
5/17-18/93	TDEC/DOE/Energy Systems/ORNL	Hosted two-day permit renewal work session	0
6/6-7/93	TDEC	Inspection of ORNL air emission sources	0
6/14-16/93	TDEC	Inspection of treatment, storage, and disposal and generator areas, training, and record keeping	0
		Reviewed Pollution Prevention Program reporting and planning requirements for state of Tennessee	0
7/2/93	TDEC and DOE-ORO	Surveillance of visible emissions from the ORNL Steam Plant	0
8/9/93	Tennessee Department of Agriculture	Inspection of pesticide storage and use	0
8/9-10/93	TDEC	Visit by RCRA Groundwater group to observe the well-sampling activities at SWSA-6	0
8/12/93	EPA Region IV	Visit by EPA Region IV regarding NPDES issues	0
10/5/93	DOE-ORO	Conduct of Operations—Liquid Waste Solidification Project Readiness Review	0
10/7/93	DOE-ORO	Conduct of Operations—Partial Assessment of 3608 Nonradiological Wastewater Treatment Plant	0
10/8/93, 10/19/93, and 11/8-12/93	DOE Special Issue Review	Pollution prevention implementation across ORNL	0
11/9/93	DOE	Isotopes Shutdown Program involvement with decontamination and decommissioning activities associated with shutdown of Isotopes Program	0

**Table 2.6. Summary of environmental audits and assessments conducted at the Oak Ridge K-25 Site, 1993**

Date	Reviewer	Subject	Findings
5/6/93	EPA Region IV, TDEC, DOE-ORO	NPDES compliance evaluation	0
6/14-17/93	TDEC	RCRA compliance audit	0
7/6-15/93	DOE-HQ	Quality assurance assessment of Oak Ridge facilities	0
7/26/93	TDEC	Air compliance	0
9/23-24/93	EPA-HQ, EPA Region IV, TDEC-Tennessee Oversight Agreement	Rad-NESHAP	0

**Table 2.7. Summary of Tiger Team corrective actions**

Date of review	Plant	Environmental findings	Status
6/89 2/10-21/92 (follow-up visit)	Y-12	62	47 have been closed; 11 are complete and awaiting verification of closure; 4 remain open
10/22-11/30/90	ORNL	69	47 have been closed; 37 of these have been verified as closed by DOE; 22 remain open
11/12-12/18/91	K-25	102	38 have been closed; 0 of these have been verified as closed by DOE; 64 remain open



Table 2.8 Summary of permits

	Y-12 Plant	ORNL	K-25 Site
<i>Resource Conservation and Recovery Act</i>			
Part B	0	2	4
Part B applications in process	6 <sup>a</sup>	3	0
Post-closure	1	1	0
Permit-by-rule units	10	173 <sup>b</sup>	92
Solid waste landfills	6 <sup>c</sup>	0	0
Annual petroleum UST facility certificate	2	1	1
<i>Clean Water Act</i>			
NPDES	1 <sup>d</sup>	1 <sup>e</sup>	1
Storm water	1 <sup>f</sup>	1 <sup>f</sup>	1 <sup>e</sup>
Aquatic resource alteration	2	2	2
General storm water construction	3 <sup>g</sup>	0	0
<i>Clean Air Act</i>			
Operating air	94	37	54
Construction	38	0	4
Prevention of significant deterioration	0	0	0
<i>Sanitary Sewer</i>			
Sanitary sewer	1	0	0
<i>Toxic Substances Control Act</i>			
TSCA Incinerator	0	0	1
R&D for alternative disposal methods	1	2	0

<sup>a</sup>Six applications have been submitted, representing 20 active units.

<sup>b</sup>Tanks regulated by Permit-by-Rule.

<sup>c</sup>Three landfills are operational, one (Spoil Area 1) is inactive, and one (Landfill VII) is under construction.

<sup>d</sup>In renewal process.

<sup>e</sup>TDEC has incorporated storm water into individual NPDES permit application.

<sup>f</sup>TDEC is expected to incorporate storm water into the NPDES permit applications.

<sup>g</sup>Notice of intent that accesses a general NPDES permit. Notices of intent were filed for construction at landfills V, VI, VII, and the Walk-In Pits.

Table 3.1 Underground storage tanks (USTs) at the Y-12 Plant

Location	Tank identification number	Installation date	Out-of-service date	Capacity (gallons)	Contents	Status	Preliminary investigation(s)	Environmental assessment ( ) date to regulatory agency	Corrective action
<i>Petroleum USTs</i>									
9722-6	2312-U	1987	In use	550	Diesel	To be closed by 12/94	NA	NA	NA
9722-5	2313-U	1987	In use	550	Diesel	To be closed by 12/94	NA	NA	NA
9999-7	2316-U	1986	In use	550	Diesel	To be closed by 12/94	NA	NA	NA
9999-5	2320-U	1986	In use	550	Diesel	To be closed by 12/94	NA	NA	NA
9722-4	2333-U	1988	In use	550	Diesel	To be closed by 12/94	NA	NA	NA
9713	2334-U	1987	In use	6,000	Gasoline	Full compliance	Site check	NA	NA
9714	2335-U	1987	In use	10,000	Diesel	Full compliance	Site check	NA	NA
9754-3	2396-U	1993	In use	10,000	Diesel	Full compliance	NA	NA	NA
9754-3	2397-U	1993	In use	20,000	Gasoline	Full compliance	NA	NA	NA
9712	0084-U	1958	1988	500	Used oil	Removed 6/88	CERCLA	TBD	TBD
9204-2	0134-U	1966	1982	117	Gasoline	Removed 8/88	ISCR, FPRR	SIR (3/92)	EAR/CAP (8/92), CAP approval (5/93), CR (4/94)
9754-2	0439-U	1978	1989	20,000	Gasoline	Removed 9/89	IAR, ISCR, FPRR	SIR/CAP (3/91)	CAP (7/92), CAP approval (5/93), BMR (3/94), SSSR (4/94)
9754-2	0440-U	1978	1989	10,000	Diesel	Removed 9/89	IAR, ISCR, FPRR	SIR/CAP (3/91)	CAP (7/92), CAP approval (5/93), BMR (3/94), SSSR (4/94)
9754	2073-U	1944	1979	1,000	Gasoline	Removed 10/93	SI	SIR/CAP (3/91)	CAP (7/92), CAP approval (5/93), BMR (3/94), SSSR (4/94)
9754	2074-U	1944	1979	1,300	Gasoline	Removed 10/93	SI	SIR/CAP (3/91)	CAP (7/92), CAP approval (5/93), BMR (3/94), SSSR (4/94)
9754	2075-U	1944	1979	1,000	Diesel	Removed 10/93	SI	SIR/CAP (3/91)	CAP (7/92), CAP approval (5/93), BMR (3/94), SSSR (4/94)
9754-1	1219-U	1964	1988	12,000	Diesel	Removed 12/89	EA	SIR (3/91)	CAP (5/92), SRS (2/94), SRS approval (3/94)
9754-1	1222-U	1968	1988	12,000	Gasoline	Removed 12/89	EA	SIR (3/91)	CAP (5/92), SRS (2/94), SRS approval (3/94)
9754-1	2068-U	1968	1980	1,000	Gasoline	Removed 2/90	EA/FPRR	SIR (3/91)	CAP (5/92), SRS (2/94), SRS approval (3/94)

Table 3.1 (continued)

Location	Tank identification number	Installation date	Out-of-service date	Capacity (gallons)	Contents	Status	Preliminary investigation(s)	Environmental assessment ( ) date to regulatory agency	Corrective action
9754-1	2082-U	1981	1988	8,000	Gasoline	Removed 12/89	EA	SIR (3/91)	CAP (5/92), SRS (2/94), SRS approval (3/94)
PRW	2310-U	1975	1989	200	Gasoline	Removed 11/89	ISCR	SIR/CAP (7/91)	EAR/CAP (3/93), CAP approval (12/93), OE (4/94)
9201-1	2331-U	1973	1988	560	Gasoline	Removed 12/88	ISCR, FPRR	SIR (3/92)	EAR/CAP (7/92), CAP approval (12/93), BMR (3/94), SRS (4/94)
9401-3	0713-U	1955	1988	10,500	No. 2 fuel oil	Removed 11/88	NI	NA	NA
9754	0836-U	1944	1989	10,000	Used oil	Removed 10/89	RCRA	RCRA	RCRA
9204-3	0928-U	1966	1989	200	Gasoline	Removed 5/89	RIR, closure approved (8/92)	NA	NA
9995	2078-U	1965	1979	110	Gasoline	Inert filled 1979	CERCLA	TBD	TBD
9995	2079-U	1965	1979	55	Gasoline	Inert filled 1979	CERCLA	TBD	TBD
9996	2080-U	1971	1987	560	Gasoline	Removed 12/88	RIR	NA	NA
9212	2081-U	1958	1970	280	Gasoline	Removed 4/91	ISCR	NA	OE/CR (12/91)
9201-5	2099-U	1971	1989	560	Gasoline	Removed 7/89	IAR, RIR, closure approved (3/90)	NA	NA
9929-1	2117-U	1971	1983	550	No. 2 fuel oil	Removed 10/88	NI	NA	NA
9204-4	2130-U	1960	1992	550	Gasoline	Removed 12/92	RIR	NA	NA
9999	2293-U	1954	1974	58	Gasoline	Removed 1974	NI	NA	NA
9999	2294-U	1954	1974	58	Gasoline	Removed 1974	NI	NA	NA
9998	2305-U	1956	1990	55	Diesel	Removed 10/90	RIR	NA	NA
PRE	2315-U	1960	1988	64	Gasoline	Removed 11/89	ISCR	EAR/CAP (2/91)	OE/CR (12/92)
9769	2330-U	1949	1988	5,000	No. 2 fuel oil	Inert filled 1988	NI	NA	NA
0962	2336-U	1981	1991	550	Gasoline	Removed 5/91	RIR	NA	NA
Buff. Min.	2337-U	1972	1990	250	Gasoline	Removed 3/90	IAR, ISCR SIR, SIR (1/92)	NA	NA
9720-13	2338-U	1970	1984	200	Used oil	Removed 7/90	RIR	TBD	TBD
9219	2395-U	1964	1977	2,000	No. 2 fuel oil	Removed 6/93	TBD	TBD	TBD

Table 4.1 (continued)

Location	Tank identification number	Installation date	Out-of-service date	Capacity (gallons)	Contents	Status	Preliminary investigation(s)	Environmental assessment ( ) date to regulatory agency	Corrective action
SYDD	2063-U	1959	1989	130	Oil/solvent	Removed 7/89	IAR, ISCR/FPRR	NA	NA
SYDD	2328-U	1959	1989	475	Oil/solvent	Removed 7/89	IAR, ISCR/FPRR	NA	NA
SYDD	2329-U	1959	1989	475	Oil/solvent	Removed 7/89	IAR, ISCR/FPRR	NA	NA
<i>Hazardous Substance USTs</i>									
9767-13	2102-U	1987	1992	7,500	Methanol solid	Removed 1/93	CR	NA	NA
9418-3	2072-U	1943	1960	45,000	Uranium oxide solid	Exempt	CR	NA	NA
Chst. Ridge	2129-U	1984	In use	240,000	Uranium oxide	Exempt	NA	NA	NA

Notes

- BMR = baseline monitoring report
- CAP = corrective action plan
- CAR = corrective action report
- CERCLA = conducted under CERCLA
- CR = closure report
- EA = environmental assessment
- EAR = Environmental Assessment Report
- FPRR = free product removal report
- IAR = initial abatement report
- ISCR = initial site characterization report
- NA = Not applicable
- NI = Not investigated
- OE = overexcavation
- RCRA = conducted under Resource Conservation and Recovery Act, Subtitle C
- RIR = Release Investigation Report
- TBD = to be determined
- SIR = site investigation report
- SRS = site ranking system
- SSSR = site-specific standard request
- SYDD = Salvage Yard Drum Deheader

**Table 4.1. Y-12 Plant airborne uranium  
emission estimates, 1993**

Source of emissions	Quantity emitted	
	(Ci) <sup>a</sup>	(kg)
<i>Enriched uranium</i>		
Process exhaust (monitored)	0.029	0.4
Process and laboratory exhaust (unmonitored)	0.004	0.1
Room exhaust (from health physics data)	0.017	0.3
<i>Depleted uranium</i>		
Process exhaust (monitored)	0.002	2.8
Process and laboratory exhaust (unmonitored)	0.002	4.2
Room exhaust (from health physics data)	0.001	1.2
<b>Total</b>	<b>0.055</b>	<b>9.0</b>

<sup>a</sup>1 Ci = 3.7E+10 Bq.

Table 4.2. Major sources of radiological airborne emissions (in curies)\* at ORNL, 1993

Isotope	Group			
	2026	3020	3039	7911
<sup>241</sup> Am	4.05E-06	1.18E-07	1.64E-07	2.71E-07
<sup>41</sup> Ar				1.80E+03
<sup>140</sup> Ba	9.20E-05			3.93E-04
<sup>7</sup> Be			3.77E-04	
<sup>244</sup> Cm	6.76E-05	1.37E-06	7.67E-08	3.60E-06
<sup>60</sup> Co	3.18E-07		2.20E-06	
<sup>134</sup> Cs	2.67E-07		2.30E-07	2.59E-08
<sup>137</sup> Cs	3.53E-04	3.40E-06	1.43E-04	1.26E-05
<sup>138</sup> Cs				7.1E+01
<sup>152</sup> Eu	2.71E-07		1.22E-06	1.61E-07
<sup>154</sup> Eu	2.35E-06	1.39E-07		
<sup>155</sup> Eu	4.93E-06	2.51E-07		
Gross alpha		1.55E-06	1.48E-06	
Gross beta		4.52E-06	3.33E-04	2.16E-06
<sup>3</sup> H			4.28E+01	3.69E+01
<sup>129</sup> I				2.52E-04
<sup>130</sup> I				5.50E-05
<sup>131</sup> I	1.60E-04		1.75E-05	5.30E-02
<sup>132</sup> I				9.03E-01
<sup>133</sup> I			1.93E-05	2.02E-01
<sup>155</sup> I	1.18E-04	1.03E-04	3.44E-04	4.70E-01
<sup>188</sup> Ir				
<sup>191</sup> Os	1.80E-06		1.68E-01	2.93E-07
<sup>212</sup> Pb	4.82E-02	3.38E-02	1.83E-01	9.90E-02
<sup>238</sup> Pu	2.46E-06	5.22E-08	5.31E-08	1.93E-07
<sup>239</sup> Pu	6.94E-06	1.82E-07	2.77E-07	5.59E-07
<sup>188</sup> Re			3.78E-01	
<sup>228</sup> Th	1.31E-06	2.81E-08	6.39E-08	1.44E-07
<sup>230</sup> Th	7.00E-09	5.08E-09	2.69E-08	1.75E-08
<sup>232</sup> Th	3.40E-09	4.86E-09	1.42E-08	9.95E-09
Total Sr	1.65E-05	8.13E-07	6.58E-06	1.98E-05
<sup>234</sup> U	7.17E-06	2.25E-07	3.50E-07	8.00E-07
<sup>235</sup> U	3.07E-07	9.54E-09	6.25E-08	7.67E-08
<sup>238</sup> U	1.73E-07	1.36E-08	3.56E-08	2.02E-08
<sup>188</sup> W			4.30E-03	
<sup>135</sup> Xe				5.0E+01
<sup>138</sup> Xe				7.1E+01

\*1 Ci = 3.7E+10 Bq.

Table 4.3. Minor sources of radiological airborne emissions (in curies)\* at ORNL, 1993

Isotope	Group													
	2000	2523	3018	3074	3544	7025	7512	7567	7569	7600	7830	7852	7860	7877
<sup>241</sup> Am		2.71E-10	5.70E-11	1.50E-13			3.70E-09	8.78E-10	8.78E-10		3.51E-09	6.50E-12	6.50E-12	
<sup>137</sup> Ba													4.70E-09	
<sup>7</sup> Be			9.20E-09	1.40E-11	9.64E-07			8.15E-08	8.15E-08		3.26E-07			
<sup>241</sup> Cm			1.00E-10											
<sup>244</sup> Cm				6.20E-12	7.62E-10			1.04E-08	1.04E-08		4.17E-08	6.71E-11	6.70E-11	
<sup>60</sup> Co				1.20E-13			1.26E-07	6.40E-10	6.40E-10		2.56E-09	2.48E-11	2.50E-11	
<sup>137</sup> Cs		8.59E-09	6.50E-10	3.00E-11	1.09E-06			3.63E-08	3.63E-08		1.45E-07	4.66E-09	4.70E-09	
<sup>152</sup> Eu				3.80E-13								2.08E-11	2.10E-11	
<sup>154</sup> Eu				2.80E-13								1.28E-11	1.30E-11	
<sup>3</sup> H	6.56E+01					9.35E+01		1.95E-01	1.95E-01		7.80E-01			
<sup>129</sup> I								1.45E-07	1.45E-07		5.80E-07			
<sup>131</sup> I		1.74E-07						7.50E-06	7.50E-06		3.00E-05			
<sup>134</sup> I								8.50E-05	8.50E-05		3.40E-04			
<sup>135</sup> I								4.25E-05	4.25E-05		1.70E-04			2.06E-09
<sup>137</sup> I					1.34E-07			1.26E-04	1.26E-04		5.03E-04			5.50E-09
<sup>40</sup> K				3.10E-12										
<sup>190</sup> Os								3.20E-07	3.20E-07		1.28E-06			
<sup>210</sup> Pb					9.13E-08		1.38E-04	1.72E-03	1.72E-03		6.86E-03			
<sup>238</sup> Pu				3.90E-14				4.08E-10	4.08E-10		1.63E-09	3.23E-12	3.20E-12	
<sup>239</sup> Pu			3.10E-01	2.60E-14				9.75E-10	9.75E-10		3.90E-09	1.69E-12	1.70E-12	
<sup>232</sup> Th			1.80E-11	8.80E-14	3.15E-10			3.98E-10	3.98E-10		1.59E-09	1.59E-12	1.60E-12	
<sup>230</sup> Th		2.11E-10	4.20E-11	7.00E-14	2.19E-10			7.83E-11	7.83E-11		3.13E-10	1.72E-13	1.70E-13	
<sup>232</sup> Th		2.56E-10	1.20E-10	8.00E-14				7.98E-11	7.98E-11		3.19E-10	7.15E-14	7.10E-14	
Total Sr														
<sup>234</sup> U	3.25E-09	6.94E-09	1.90E-10	5.20E-13	1.82E-08		1.87E-07	5.53E-09	5.53E-09		2.21E-08	8.83E-10	8.80E-10	
<sup>235</sup> U		1.51E-09	3.20E-11	3.60E-14	1.23E-10		6.17E-08	2.46E-09	2.46E-09		9.85E-09	4.74E-12	4.70E-12	
<sup>238</sup> U	1.67E-09	1.18E-09	4.70E-11	2.10E-13	4.76E-09		7.41E-09	3.08E-10	3.08E-10	2.73E-05	1.23E-09	2.56E-13	2.60E-13	

\*1 Ci = 3.7E+10 Bq.

Table 4.4. Data sources for airborne radioactive emissions from ORNL, 1993

Isotope	Particulate filter	Probe wash	Charcoal cartridge	Silica gel	Real-time monitor	Grab sampler
<sup>3</sup> H				X		
<sup>7</sup> Be	X					
<sup>60</sup> Co	X					
<sup>82</sup> Br			X			
<sup>90</sup> Sr	X	X				
<sup>129</sup> I			X			
<sup>131</sup> I	X	X	X			
<sup>132</sup> I			X			
<sup>133</sup> I			X			
<sup>134</sup> I			X			
<sup>135</sup> I			X			
<sup>134</sup> Cs	X	X				
<sup>137</sup> Cs	X	X				
<sup>138</sup> Cs					X	X
<sup>140</sup> Ba	X	X	X			
<sup>154</sup> Eu	X	X				
<sup>155</sup> Eu	X	X				
<sup>191</sup> Os	X	X	X			
<sup>194</sup> Os	X	X	X			
<sup>212</sup> Pb			X			
<sup>228</sup> Th	X	X				
<sup>230</sup> Th	X	X				
<sup>232</sup> Th	X					
<sup>234</sup> U	X	X				
<sup>235</sup> U	X	X				
<sup>238</sup> U	X	X				
<sup>238</sup> Pu	X	X				
<sup>239</sup> Pu	X	X				
<sup>241</sup> Am	X	X				
<sup>244</sup> Cm	X	X				
<sup>41</sup> Ar					X	X
<sup>135</sup> Xe					X	X
<sup>135m</sup> Xe					X	
<sup>138</sup> Xe					X	X



Table 4.5. K-25 Site radionuclide air emission totals  
(curies),<sup>a</sup> 1993

Radionuclide	TSCA Incinerator	Minor sources
<sup>234</sup> U	3.8E-03	2.1E-04
<sup>235</sup> U	1.7E-04	9.4E-06
<sup>238</sup> U	4.0E-03	2.1E-04
<sup>99</sup> Tc	1.1E-01	1.0E-02
<sup>237</sup> Np	5.6E-04	5.8E-06
<sup>137</sup> Cs	5.0E-03	9.5E-08
<sup>234m</sup> Pa	2.2E-01	1.5E-04
<sup>238</sup> Pu	2.5E-04	4.2E-06
<sup>239</sup> Pu	-5.8E-05	7.5E-07
<sup>228</sup> Th	3.8E-04	3.7E-06
<sup>230</sup> Th	4.9E-05	9.9E-06
<sup>232</sup> Th	1.1E-04	2.3E-06
<sup>234</sup> Th	1.8E-02	1.1E-04
<sup>109</sup> Cd	7.6E-03	0.0
<sup>139</sup> Ce	1.5E-07	0.0
<sup>141</sup> Ce	2.0E-04	0.0
<sup>57</sup> Co	1.2E-04	0.0
<sup>60</sup> Co	4.4E-03	0.0
<sup>40</sup> K	4.0E-02	1.7E-06
<sup>106</sup> Ru	4.5E-03	-8.6E-07
<sup>201</sup> Tl	1.1E-06	0.0
<sup>88</sup> Y	3.6E-05	0.0
Total	4.2E-01	1.1E-02

<sup>a</sup>1 Ci = 3.7E+10 Bq.

Table 4.6. ORNL nonradiological airborne emissions, 1993

Chemical	Quantity released		Major release source	Basis of estimate
	lb	kg		
<i>SARA 313 chemicals<sup>a</sup></i>				
Nitric acid	43	20	Tank emissions	Engineering calculations
Sulfuric acid	0	0	Tank emissions	Engineering calculations
<i>Other large-inventory chemicals<sup>b</sup></i>				
Freon 11	15,600	7,090	Refrigerant	Best engineering judgment
Freon 12	3,073	1,397	Refrigerant	Operating records
Freon 22	3,545	1,611	Refrigerant	Operating records
Freon 113	4,700	2,136	Refrigerant, laboratory uses	Inventory records
<i>Steam plant emissions (all calculated emissions)<sup>c</sup></i>				
Particulates	10,863	4,937	Stack emission	Engineering calculations based on emission factors
SO <sub>x</sub>	1,251,625	568,863	Stack emission	Engineering calculations based on emission factors
Carbon monoxide	88,075	40,030	Stack emission	Engineering calculations based on emission factors
Volatile organic compounds	2,180	991	Stack emission	Engineering calculations based on emission factors
NO <sub>x</sub>	444,099	201,843	Stack emission	Engineering calculations based on emission factors

<sup>a</sup>Superfund Amendments and Reauthorization Act, Title III, Section 313.

<sup>b</sup>Fugitive emissions.

<sup>c</sup>Point-source emissions.

**Table 4.7. Potential emissions of criteria pollutants from the K-25 Site, 1992 and 1993**

Pollutant	Potential to emit (tons/year)	
	1992	1993
Particulate matter	172	180
Volatile organic compounds	262	166
Sulfur dioxide	429	429
Nitrogen oxides	226	226
Carbon monoxide	157	157
Miscellaneous	291	291
Total	1537	1449

**Table 4.8. Estimated K-25 Site emissions of ozone-depleting substances, 1993**

Ozone-depleting substance	Estimated emissions (lb/year)
CFC-12	295
HCFC-22	2,175
CFC-113	<50
CFC-114	28,500
Halon-1301	72

**Table 4.9. Estimated air emissions from the K-1501 Steam Plant at the K-25 Site, 1993**

Pollutant	Emissions (tons/year)	
	Estimated	Allowable
Particulate matter	1.63	18
Sulfur dioxide	3.97	390
Nitrogen oxides	19.03	205
Organics	1.14	8
Carbon monoxide	20.35	138

**Table 4.10. Estimated air emissions from the TSCA Incinerator at the K-25 Site, 1993**

Pollutant	Emissions (tons/year)		Percentage of allowable
	Estimated	Allowable	
Lead	0.00025	0.57	0.04
Beryllium	0.000008	0.00037	2.33
Mercury	0.0011	0.088	1.28
Fluorine	0.00086	2.83	0.03
Chlorine	0.054	16.12	0.33
Sulfur	0.53	38.54	1.38
Particulate	0.010	13.14	0.08

**Table 4.11. Summary of Y-12 Plant radiological monitoring plan sample requirements**

Outfall No.	Location	Sample frequency	Sample type	1993 Sum of DCG percentage
<i>Y-12 Plant wastewater treatment facilities</i>				
501	Central Pollution Control Facility	1/week	Composite during batch operation	4.72
502	West End Treatment Facility	1/week	24-hour composite	2.28
503	Steam Plant Wastewater Treatment Facility	1/week	24-hour composite	1.46
504	Plating Rinsewater Treatment Facility	1/week	24-hour composite	5.27
512	Groundwater Treatment Facility	1/week	24-hour composite	7.90
<i>Other Y-12 Plant point and area source discharges</i>				
142	Isotope Separation Process	1/month <sup>a</sup>	24-hour composite	3.29
301	Kerr Hollow Quarry	1/month	24-hour composite	1.09
302	Rogers Quarry	1/month	24-hour composite	1.04
<i>Y-12 Plant instream locations</i>				
304	Bear Creek, Plant Exit (west)	1/week	7-day composite	4.74
Station 17	East Fork Poplar Creek, Plant Exit (east)	1/week	7-day composite	3.29
Station 8	East Fork Poplar Creek, Plant Site	1/week	7-day composite	4.19

<sup>a</sup>Only two samples were collected in 1993; there was no flow for 10 months of the year.

Table 4.12. Release of uranium from the Y-12 Plant to the off-site environment as a liquid effluent, 1989-93

Year	Quantity released	
	(Ci) <sup>a</sup>	(kg)
<i>Station 17</i>		
1989	0.20	316
1990	0.135	197
1991	0.162	235
1992	0.087	130
1993	0.081	134
<i>Outfall 304</i>		
1989	0.138	224
1990	0.131	204
1991	0.082	159
1992	0.060	110
1993	0.094	167

<sup>a</sup>1 Ci = 3.7E+10 Bq.

Table 4.13. Radionuclide concentrations at K-25 Site surface water effluent discharge points

Isotope	No. of samples	Concentration (pCi/L) <sup>a</sup>				DCG	Percentage of DCG	Sum of fractions of DCGs
		Max	Min	Median	Average			
<i>K-1203 Sewage Treatment Plant</i>								
<sup>234</sup> U	12	2.82E+01	4.54E+00	1.55E+01	1.63E+01	5.00E+02	3.27+00	<i>b</i>
<sup>235</sup> U	12	4.80E+01	-1.24E+01	8.60E+00	1.02E+01	6.00E+02	1.70+00 <sup>c</sup>	<i>b</i>
<sup>238</sup> U	12	3.54E+00	0.00E+00	1.35E+00	1.74E+00	6.00E+02	2.91E-01	<i>b</i>
<sup>137</sup> Cs	12	7.30E+00	-2.46E+01	3.92E-01	-2.64E+00	3.00E+03	-8.81E-02 <sup>c</sup>	<i>b</i>
<sup>99</sup> Tc	12	5.10E+02	-3.24E+02	-5.71E+00	3.66E+01	1.00E+05	3.66E-02	<i>b</i>
<sup>237</sup> Np	12	5.85E+00	-3.49E-01	1.10E+00	1.57E+00	3.00E+01	5.24E+00	<i>b</i>
<sup>238</sup> Pu	12	1.78E+00	-7.30E-01	0.00E+00	4.43E-01	4.00E+01	1.11E+00	<i>b</i>
<sup>239</sup> Pu	12	1.05E+00	-3.56E+00	0.00E+00	-2.14E-01	3.00E+01	-7.13E-01	<i>b</i>
<sup>228</sup> Th	12	2.50E+03	0.00E+00	0.00E+00	2.91E+02	4.00E+02	7.27E+01 <sup>c</sup>	<i>b</i>
<sup>234</sup> Th	12	3.35E+02	-1.08E+03	0.00E+00	-1.99E+02	1.00E+04	-1.99E+00 <sup>c</sup>	<i>b</i>
<sup>234m</sup> Pa	12	1.21E+04	0.00E+00	0.00E+00	1.87E+03	7.00E+04	2.67E+00	<i>b</i>
<sup>106</sup> Ru	12	1.21E+02	0.00E+00	0.00E+00	1.01E+01	6.00E+03	1.68E-01	<i>b</i>
<sup>143</sup> Ce	12	3.22E+03	0.00E+00	0.00E+00	3.50E+02	3.00E+04	1.17E+00	<i>b</i>
<sup>40</sup> K	12	4.76E+02	0.00E+00	0.00E+00	3.97E+01	7.00E+03	5.67E-01 <sup>c</sup>	<i>b</i>
Gross alpha	12	2.54E+01	5.39E+00	1.40E+01	1.43E+01	<i>b</i>	<i>b</i>	<i>b</i>
Gross beta	12	1.71E+01	4.67E+00	1.00E+01	1.04E+01	<i>b</i>	<i>b</i>	<i>b</i>
All listed isotopes		<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	8.61E-01 <sup>c</sup>

Table 4.13 (continued)

Isotope	No. of samples	Concentration (pCi/L) <sup>a</sup>				DCG	Percentage of DCG	Sum of fractions of DCGs
		Max	Min	Median	Average			
<i>K-1407-J treated effluents from Central Neutralization Facility and TSCA Incinerator</i>								
<sup>234</sup> U	12	5.24E+01	8.05E+00	2.38E+01	2.63E+01	5.00E+02	5.27E+00	<i>b</i>
<sup>235</sup> U	12	4.85E+01	-1.77E+01	2.22E+01	1.52E+01	6.00E+02	2.54E+00 <sup>c</sup>	<i>b</i>
<sup>236</sup> U	12	1.17E+01	0.00E+00	3.94E+00	4.07E+00	5.00E+02	8.14E-01	<i>b</i>
<sup>238</sup> U	12	1.70E+02	5.84E+00	2.78E+01	3.76E+01	6.00E+02	6.27E+00	<i>b</i>
<sup>137</sup> Cs	12	2.88E+01	-4.30E+01	5.41E+00	1.49E+00	3.00E+03	4.96E-02 <sup>c</sup>	<i>b</i>
<sup>99</sup> Tc	12	5.05E+02	-2.30E+02	-6.20E+00	3.96E+01	1.00E+05	3.96E-02	<i>b</i>
<sup>237</sup> Np	12	1.33E+01	-5.51E-01	1.29E+00	3.03E+00	3.00E+01	1.01E+01	<i>b</i>
<sup>238</sup> Pu	12	1.45E+00	-2.19E+00	3.41E-01	1.19E-02	4.00E+01	2.98E-02	<i>b</i>
<sup>239</sup> Pu	12	7.49E-01	-2.54E+00	0.00E+00	-2.94E-01	3.00E+01	-9.81E-01	<i>b</i>
<sup>228</sup> Th	12	0.00E+00	-1.01E+00	0.00E+00	-8.42E-02	4.00E+02	-2.10E-02	<i>b</i>
<sup>230</sup> Th	12	2.53E+00	0.00E+00	0.00E+00	2.11E-01	3.00E+02	7.03E-02	<i>b</i>
<sup>232</sup> Th	12	0.00E+00	-5.07E-01	0.00E+00	-4.23E-02	5.00E+01	-8.45E-02	<i>b</i>
<sup>234</sup> Th	12	1.02E+03	-2.52E+02	0.00E+00	2.82E+02	1.00E+04	2.82E+00 <sup>c</sup>	<i>b</i>
<sup>234m</sup> Pa	12	3.26E+03	-5.54E+03	0.00E+00	-9.83E+02	7.00E+04	-1.40E+00 <sup>c</sup>	<i>b</i>
<sup>106</sup> Ru	12	1.98E+02	0.00E+00	0.00E+00	1.65E+01	6.00E+03	2.75E-01	<i>b</i>
Gross alpha	12	1.19E+02	9.81E+00	3.49E+01	4.45E+01	<i>b</i>	<i>b</i>	<i>b</i>
Gross beta	12	1.37E+02	5.45E+00	4.44E+01	5.38E+01	<i>b</i>	<i>b</i>	<i>b</i>
All listed isotopes		<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	2.58E-01 <sup>c</sup>
<i>K-1515-C filter backwash from the Sanitary Water Treatment Facility</i>								
<sup>234</sup> U	12	8.63E+00	0.00E+00	7.38E-01	1.64E+00	5.00E+02	3.28E-01	<i>b</i>
<sup>235</sup> U	12	5.61E+01	-1.50E+01	1.27E+01	1.58E+01	6.00E+02	2.63E+00 <sup>c</sup>	<i>b</i>
<sup>238</sup> U	12	2.25E+00	0.00E+00	1.07E+00	8.83E-01	6.00E+02	1.47E-01	<i>b</i>
<sup>137</sup> Cs	12	1.80E+01	-2.11E+01	7.18E+00	5.01E+00	3.00E+03	1.67E-01 <sup>c</sup>	<i>b</i>
<sup>99</sup> Tc	12	3.73E+02	-2.68E+02	-5.52E+01	-1.34E+01	1.00E+05	-1.34E-02	<i>b</i>
<sup>237</sup> Np	12	1.17E+00	-1.10E+00	0.00E+00	-3.22E-02	3.00E+01	-1.07E-01	<i>b</i>
<sup>238</sup> Pu	12	2.99E+00	-2.09E+00	1.05E-01	5.61E-02	4.00E+01	1.40E-01	<i>b</i>
<sup>239</sup> Pu	12	7.49E-01	-3.44E+00	0.00E+00	-4.46E-01	3.00E+01	-1.49E+00	<i>b</i>
<sup>228</sup> Th	12	1.62E+03	0.00E+00	0.00E+00	1.35E+02	4.00E+02	3.38E+01	<i>b</i>
<sup>234</sup> Th	12	1.53E+03	-8.63E+02	0.00E+00	1.90E+02	1.00E+04	1.90E+00 <sup>c</sup>	<i>b</i>
<sup>234m</sup> Pa	12	8.30E+03	0.00E+00	0.00E+00	1.42E+03	7.00E+04	2.02E+00 <sup>c</sup>	<i>b</i>
<sup>106</sup> Ru	12	7.24E+02	0.00E+00	0.00E+00	7.28E+01	6.00E+03	1.21E+00	<i>b</i>
<sup>143</sup> Ce	12	1.22E+03	0.00E+00	0.00E+00	1.02E+02	3.00E+04	3.39E-01	<i>b</i>
Gross alpha	12	4.86E+00	-2.10E+00	-7.81E-01	-4.46E-01	<i>b</i>	<i>b</i>	<i>b</i>
Gross beta	12	5.70E+00	-4.21E+00	1.52E+00	1.42E+00	<i>b</i>	<i>b</i>	<i>b</i>
All listed isotopes		<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	4.11E-01 <sup>c</sup>

<sup>a</sup>1 pCi/L = 3.7E-2 Bq/L.<sup>b</sup>Not applicable.<sup>c</sup>This calculated value includes sampling results that are at or below the detection limits and/or below background activities.

Table 4.14. Radionuclides released to off-site surface waters from the K-25 Site, 1993

Effluent discharge points are K-1205, K-1407-J, and K-1515-C

Isotope	Amount (Ci) <sup>a</sup>	Isotope	Amount (Ci) <sup>a</sup>
<sup>137</sup> Cs	1.24E-03	<sup>236</sup> U	5.76E-04
<sup>237</sup> Np	1.20E-03	<sup>238</sup> U	6.05E-03
<sup>238</sup> Pu	1.62E-04	<sup>228</sup> Th	2.03E-01
<sup>239</sup> Pu	-2.14E-04	<sup>230</sup> Th	2.39E-05
<sup>234m</sup> Pa	1.14E+00	<sup>232</sup> Th	-4.79E-06
<sup>106</sup> Ru	3.76E-02	<sup>234</sup> Th	3.60E-02
<sup>99</sup> Tc	3.01E-02	<sup>40</sup> K	1.89E-02
<sup>234</sup> U	7.69E-03	<sup>143</sup> Ce	2.01E-01
<sup>235</sup> U	1.44E-02		

<sup>a</sup>1 Ci = 3.7E+10 Bq.

Table 4.15. Summary of Y-12 Plant NPDES excursions, 1993

Date	Location	Excursion	Explanation	Corrective action
1/7/93	Outfall 503 (Steam Plant Wastewater Treatment Facility)	Sample analysis exceeded holding time	A provisional result was obtained and reported on the January 1993 discharge monitoring report for total suspended solids.	Evidence of this noncompliance was not discovered until August 1993 while investigations were being conducted into the events leading to missed holding times. The lab has since improved internal computerized warnings to increase the efficiency of processing samples that have holding times.
1/13/93	Outfall 10	Unauthorized discharge	About 10 gal of sewage and potable water were flushed to East Fork Poplar Creek when a manhole overflowed during cleaning of a blocked sewer line. This overflow went into a storm drain.	The water was turned off immediately when the manhole started overflowing. Sandbags will be placed around nearby storm drains prior to future sewer-line flushing.
1/19/93	Outfall 21	Unauthorized discharge	Small amounts of foam were observed discharging from Outfall 21, and about 100 dead fish were discovered in the tributary between Outfall 21 and East Fork Poplar Creek. Samples taken during the incident indicated the presence of disinfectants and surfactants in the water discharged through Outfall 21.	The exact location of the sink responsible for the soapy discharge was not determined. A major effort is under way to reroute sinks and drains illicitly tied to the storm sewer system in buildings 9207 and 9208 to the sanitary sewer. Once the rerouting is completed, incidents of this nature are expected to cease.
2/3/93	Outfall 302 (Rogers Quarry)	Lost sample	Samples were salvaged in the lab before analyses were completed on total suspended solids and sulfate.	The lab has since improved internal computerized warnings to increase the efficiency of processing samples that have holding times.
2/17/93	Outfall 503 (Steam Plant Wastewater Treatment Facility)	Sample concentration (1.1 mg/L iron) exceeded permit limit	The permit limit is 1.0 mg/L for iron.	The facility was evaluated by a wastewater treatment consultant to improve the iron-removal efficiency of the current operation.
3/3/93	Outfall 503 (Steam Plant Wastewater Treatment Facility)	Improper preservation of sample	The composite sample collected at Outfall 503, the Steam Plant Wastewater Treatment Facility, was improperly preserved prior to its being analyzed for metals.	This noncompliance occurred because two bottles containing two different preservatives were stored together, looked the same, and were labeled similarly. Technicians relocated the bottles to prevent confusion, and the lab color-coded the preservative labels to make them more distinctive.
4/16/93	Outfall 109	Visible foam	A trace amount of foam was observed discharging to East Fork Poplar Creek. Investigations were immediately conducted in some of the buildings tied to Outfall 109, and dye tests were performed at the photo lab and at Medical. No source of the origin of the soapy solution was identified.	Projects are under way to modify or reroute sink drains.
5/20/93	Outfall 512 (Groundwater Treatment Facility)	Sample concentration (72 mg/L of oil and grease) exceeded permit limit	A pump located near the final holding tank failed and released oil into the treated effluent at the Groundwater Treatment Facility.	The facility was taken off line until the pump was replaced. Normal operations were resumed once the new pump was installed on June 4.
6/22/93	Outfall 503 (Steam Plant Wastewater Treatment Facility)	Sample analysis exceeded holding time	The holding time for total suspended solids is 7 days. One of the composite samples from 503 was not analyzed until the eighth day, resulting in a noncompliance.	The computerized laboratory tracking system for holding times of composite samples has been modified to be more efficient at monitoring holding times.



Table 4.15 (continued)

Date	Location	Excursion	Explanation	Corrective action
6/29/93	Outfall 503	Sample concentration (1.3 mg/L iron) exceeded permit limit	Investigations indicated that corrosion of the sulfuric acid tank and piping may contribute some iron during the treatment process. It is unknown if this was the source of elevated iron at the treatment facility.	The corroded tank and piping were taken out of service and replaced with a system of polyethylene tanks.
8/25/93	Outfall 302 (Rogers Quarry)	Sample analyses exceeded holding time	The 7-day holding time for the total suspended solids portion of the chemical analysis for Outfall 302 was exceeded. Incorrect analyses were requested at the laboratory. The mistake was realized and a correction was made manually, which resulted in the omission of the request for total suspended solids. Analysis was eventually run for this sample, but the data were reported as provisional because the sample had exceeded the 7-day holding time.	Two unlikely errors in record keeping happened to the same sample, resulting in an omission of the request for analysis of total suspended solids, which happened to carry a 7-day holding time. Sampling personnel have been instructed to double-check sample entry information once it has been entered into the computer. Any changes in lab requests must be verified by the appropriate personnel. Finally, laboratory and sampling personnel have improved communication by meeting weekly.
8/26/93	Outfall 21	Visible oil sheen	An oil sheen was observed entering the oil/water separator on East Fork Poplar Creek. An investigation found that the oil sheen was being emitted from Outfall 21. Lab analyses from samples taken at the outfall indicate that the active ingredient of the substance is the same ingredient in many cleaning agents.	The oil skimmer located upstream of Lake Reavity collected a large portion of the visible sheen, and additional booms were set up near the vicinity of Outfall 21. The oil sheen was contained on site, and none of the sheen was observed downstream of the plant. The source of the sheen was not determined.
9/27/93	Outfall 21	Visible oil sheen	A platform lift with a leaking hydraulic line was stationed in a temporary dike in the Biology area near Building 9207. The equipment failure had occurred on the previous Friday (9/26), and the vehicle was moved to the diked area to contain the leaking oil while the equipment was waiting to be repaired. Heavy rain on September 26 flooded the temporary dike around the lift, causing residue from the oil leak to enter a storm drain.	Spill response personnel contained the spill, and booms were placed at the outfall to contain the sheen. The storm line leading to the outfall was cleaned. Garage personnel were dispatched to replace the hydraulic hose, and the equipment was repaired that morning.
12/17/93	Outfall 135	Unauthorized discharge	A tank and dike failure resulted in an estimated 1000 gal of sodium hypochlorite solution being released from the leaking dike to the nearby storm sewer. It is believed that a portion of this solution reached East Fork Poplar Creek through Outfall 135, resulting in an unauthorized discharge.	The storm sewer system south of the leaking dike was plugged once the release was discovered to limit the total volume of sodium hypochlorite solution released to East Fork Poplar Creek. The solution remaining in the dike was pumped into tankers to be transferred to the K-25 Site for treatment and disposal. The north storm basin was plugged as an extra precaution, and the dike was cleaned to remove traces of the spill to prevent subsequent contamination of rainwater collected in the area.

Table 4.16. Y-12 Plant NPDES compliance monitoring requirements and record, 1993

Discharge point	Effluent parameter	Effluent limits				Percentage of compliance	No. of samples	
		Daily av (kg/d)	Daily max (kg/d)	Daily av (mg/L)	Daily max (mg/L)			
301 (Kerr Hollow Quarry)	Lithium				5.0	100	20	
	pH, standard units			<i>a</i>	8.5	100	20	
	Total suspended solids			30.0	50.0	100	20	
	Temperature, °C				30.5	100	20	
	Zirconium				3.0	100	20	
302 (Rogers Quarry)	Oil and grease			10.0	15.0	100	52	
	pH, standard units			<i>a</i>	8.5	100	52	
	Settleable solids, mL/L				0.5	100	52	
	Total suspended solids			30.0	50.0 <sup>b</sup>	98 <sup>c</sup>	52	
	Temperature, °C				30.5	100	52	
304 (Bear Creek)	Oil and grease			10.0	15.0	100	52	
	pH, standard units			<i>a</i>	8.5	100	52	
307 (West Borrow Area) <sup>d</sup>	Temperature, °C					100	2	
	pH, standard units					100	2	
	Oil and grease					100	2	
	Total suspended solids					100	2	
308 (East Borrow Area) <sup>e</sup>	Temperature, °C					100	4	
	pH, standard units					100	4	
	Oil and grease					100	4	
	Total suspended solids					100	4	
501 [Central Pollution Control Facility (CPCF-1)]	Cadmium, total	0.07	0.19	0.26	0.69	100	52	
	Chromium total	0.5	0.75	1.71	2.77	100	52	
	Copper, total	0.6	0.9	2.07	3.38	100	52	
	Cyanide, total	0.2	0.33	0.65	1.20	100	52	
	Lead, total	0.12	0.19	0.43	0.69	100	52	
	Nickel, total	0.65	1.1	2.38	3.98	100	52	
	Oil and grease	7.1	14.2	26.0	52.0	100	52	
	pH, standard units			<i>a</i>	9.0	100	52	
	Silver, total	0.07	0.12	0.24	0.43	100	52	
	Temperature, °C				30.5	100	52	
	Total suspended solids	8.5	16.4	31.0	60.0	100	52	
	Total toxic organics		0.6		2.13	100	52	
	Zinc, total	0.4	0.7	1.48	2.61	100	52	
	502 [West End Treatment Facility (WETF)]	Cadmium, total	0.07	0.019	0.26	0.69	100	46
		Chromium, total	0.5	0.75	1.71	2.77	100	46
Copper, total		0.6	0.92	2.07	3.38	100	46	
Cyanide, total		0.2	0.33	0.65	1.20	100	47	
Lead, total		0.12	0.19	0.43	0.69	100	46	
Nickel, total		0.65	1.10	2.38	3.98	100	46	
Oil and grease		7.1	14.2	26.0	52.0	100	47	
pH, standard units				<i>a</i>	9.0	100	47	
Silver, total		0.07	0.12	0.24	0.43	100	46	
Temperature, °C					30.5	100	47	
Total suspended solids		8.5	16.4	31.0	60.0	100	46	
Total toxic organics			0.6		2.13	100	13	
Zinc, total		0.4	0.7	1.48	2.61	100	46	

Table 4.16 (continued)

Discharge point	Effluent parameter	Effluent limits				Percentage of compliance	No. of samples
		Daily av (kg/d)	Daily max (kg/d)	Daily av (mg/L)	Daily max (mg/L)		
503 (Steam Plant Wastewater Treatment Facility)	Chromium, total	0.38	0.38	0.20	0.20	99 <sup>c</sup>	156
	Copper, total	1.89	1.89	1.0	1.0	99 <sup>c</sup>	156
	Iron, total	1.89	1.89	1.0	1.0	98	156
	Zinc, total	1.89	1.89	1.0	1.0	99 <sup>c</sup>	156
	Oil and grease	28.4	37.9	15.0	20.0	100	155
	Total suspended solids	57.0	189.0	30.0	100.0	98 <sup>c</sup>	156
	Temperature, °C				30.5	100	155
	pH, standard units			<i>a</i>	9.0	100	155
Category I outfalls (precipitation runoff and small amounts of groundwater)	pH, standard units			<i>a</i>	8.5	100	27
Category II outfalls (cooling waters, condensate, precipitation runoff, and building, roof, and foundation drains)	pH, standard units			<i>a</i>	8.5	100	91
	Temperature, °C					100	91
Category III outfalls (process wastewaters)	pH, standard units			<i>a</i>	8.5	100	39
Category IV outfalls (untreated process wastewaters)	pH, standard units			<i>a</i>	8.5	100	92
504 (Plating Rinsewater Treatment Facility)	Cadmium, total	0.07	0.019	0.26	0.69	100	3
	Chromium, total	0.50	0.75	1.71	2.77	100	3
	Copper, total	0.60	0.92	2.07	3.38	100	3
	Cyanide, total	0.2	0.33	0.65	1.20	100	3
	Lead, total	0.12	0.19	0.43	0.69	100	3
	Nickel, total	0.65	1.10	2.38	3.98	100	3
	Oil and grease	7.1	14.2	26.0	52.0	100	3
	pH, standard units			<i>a</i>	9.0	100	3
	Silver, total	0.07	0.12	0.24	0.43	100	3
	Temperature, °C				30.5	100	3
	Total suspended solids	8.5	16.4	31.0	60.0	100	3
	Total toxic organics		0.6		2.13	100	3
	Zinc, total	0.4	0.7	1.48	2.61	100	3
	501/504 (combined discharge from Central Pollution Control Facility and Plating Rinsewater Treatment Facility)	Cadmium, total	0.07	0.019	0.26	0.69	100
Chromium, total		0.50	0.75	1.71	2.77	100	0
Copper, total		0.60	0.92	2.07	3.38	100	0
Cyanide, total		0.2	0.33	0.65	1.20	100	0
Lead, total		0.12	0.19	0.43	0.69	100	0
Nickel, total		0.65	1.10	2.38	3.98	100	0
Oil and grease		7.1	14.2	26.0	52.0	100	0
pH, standard units				<i>a</i>	9.0	100	0
Silver, total		0.07	0.12	0.24	0.43	100	0
Temperature, °C					30.5	100	0
Total suspended solids		8.5	16.4	31.0	60.0	100	0
Total toxic organics			0.6		2.13	100	0
Zinc, total		0.4	0.7	1.48	2.61	100	0

Table 4.16 (continued)

Discharge point	Effluent parameter	Effluent limits				Percentage of compliance	No. of samples
		Daily av (kg/d)	Daily max (kg/d)	Daily av (mg/L)	Daily max (mg/L)		
623 (Steam Plant fly ash sluce water)	pH, standard units			<i>a</i>	8.5	100	25
1506 (9204-3 sump pump oil)	Temperature, °C				30.5	100	47
	Oil and grease			10.0	15.0	100	47
	pH, standard units			<i>a</i>	8.5	100	47
508 (Experimental Mobile Wastewater Treatment Facility)	Mercury, total			0.002	0.004	<i>g</i>	<i>a</i>
	pH, standard units			<i>a</i>	9.0	<i>g</i>	
	Total suspended solids			30.0	45.0	<i>g</i>	
510 (Waste Coolant Processing Facility)	Biochemical oxygen demand	1.33	2.65			<i>g</i>	
	Oil and grease			15.0	20.0	<i>g</i>	
	pH, standard units			<i>a</i>	9.0	<i>g</i>	
	Temperature, °C				30.5	<i>g</i>	
	Total suspended solids			30.0	50.0	<i>g</i>	
512 (Groundwater Treatment Facility)	Oil and grease			<i>a</i>	15	99	168
	Iron, total			<i>a</i>	1.0	100	168
	pH, standard units			<i>a</i>	9.0	100	continuous
	PCBs					100	168
Miscellaneous discharges (cooling tower blowdown)	Chromium, total				1.0	100	56
	Copper, total			0.5	1.0	100	56
	Free available chlorine			0.2	0.5	100	56
	pH, standard units			<i>a</i>	8.5	100	56
	Temperature, °C			35	38	100	56
	Zinc, total			0.5	1.0	100	56
Miscellaneous discharges (demineralizers)	pH, standard units			<i>a</i>	8.5	<i>g</i>	
	Total suspended solids			30	50	<i>g</i>	

<sup>a</sup>Not applicable.

<sup>b</sup>Limit not applicable during periods of increased surface runoff resulting from precipitation.

<sup>c</sup>One analysis was not performed according to appropriate protocol; i.e., improper presentation, holding-time violation, or lost sample.

<sup>d</sup>Application submitted to add this outfall to the current permit. No limits have been set.

<sup>e</sup>Analytical holding times were exceeded twice (administrative error).

<sup>f</sup>Temperature shall be controlled such that the stream temperature standards delineated in the General Water Quality Criteria for the Definition and Control of Pollution in the Waters of Tennessee, as amended, are not violated as a result of this discharge.

<sup>g</sup>No discharge.

**Table 4.17. Y-12 Plant Category I outfalls**

Outfall No.	Discharge status
1	Active (to be eliminated)
3	Active
6	Active
7	Active
9	Active
11	Active
12	Eliminated
15	Active
17	Active
18	Active
19	Active
31	Manually operated potable water blowdown
32	Active
41	Active
44	Active
45	Active
57	Active
62	Active
86	Active
101	Eliminated
102	No flow (to be eliminated)
108	No flow (to be eliminated)
127	Eliminated
134	Active
136	Eliminated
138	Active
140	Eliminated
145	Eliminated
146	Eliminated
149	Eliminated
151	Eliminated
152	Eliminated
153	Eliminated
155	Eliminated
156	Active
159	Active
161	Eliminated because of construction; modified sampling point established that combines previous OF 161 and OF 232 effluent
164	Eliminated
170	Active
177	Eliminated
178	Active
179	Eliminated
180	Active
182	Active
183	Active
184	Active

Table 4.17 (continued)

Outfall No.	Discharge status
186	Active
193	Active
194	Active
195	Active
196	Active
197	Active
198	Active
199	Eliminated
200	Eliminated
202	Active
205	Active
206	Active
207	Active
208	Eliminated because of construction; modified sampling point established
209	Eliminated
215	Eliminated because of construction; modified sampling point established
221	Active
223	Active
224	Active
228	Eliminated
229	Eliminated
230	Eliminated
231	Eliminated
232	Eliminated because of construction; modified sampling point established that combines previous OF 161 and OF 232 effluent
233	Active
234	Active
235	Active
236	Active
237	Active
247	Eliminated
248	Eliminated

**Table 4.18. Y-12 Plant Category II outfalls**

Outfall No.	Discharge status
13	Manually operated potable water line flushing
16	Active
20	Active
23	Active
24	Eliminated
25	Eliminated
26	Eliminated
27	No flow (to be eliminated)
28	Eliminated
29	Eliminated
30	Eliminated
35	No flow (to be eliminated)
40	Eliminated
43	Eliminated
46	Active
53	No flow (to be eliminated)
54	Active
58	Active
59	Eliminated
60	Eliminated
66	Active
68	Active
69	Eliminated
73	Active
74	Eliminated
75	Eliminated
76	Eliminated
77	Active
78	Eliminated
79	Eliminated
80	Eliminated
81	Eliminated
84	Eliminated
87	Active
92	Eliminated
93	Eliminated
94	Eliminated
95	Eliminated
96	Eliminated
98	Active
100	Eliminated
111	No flow (to be eliminated)
112	Eliminated
115	Eliminated
117	Active
118	Eliminated
119	Eliminated
120	Eliminated

Table 4.18 (continued)

Outfall No.	Discharge status
123	Eliminated
124	Eliminated
131	Eliminated
133	Active
137	Eliminated
144	Outfall inaccessible (security)
171	Eliminated
172	Alternate sampling point established for Building 9720-5 roof drain
173	Eliminated
174	Eliminated
175	Eliminated
185	Active
188	Eliminated
201	Active
203	Active
204	Active
210	No flow (to be eliminated)
212	Eliminated
213	Active
214	Eliminated
216	Eliminated
217	No flow (to be eliminated)
218	Eliminated
219	Eliminated
220	Eliminated
226	Eliminated
238	Eliminated
239	Eliminated
240	Active
241	Eliminated
243	Eliminated
244	Eliminated
245	Eliminated
246	Eliminated



**Table 4.19. Y-12 Plant Category III  
outfalls**

Outfall No.	Discharge status
2	Active
71	Active
135	Active
147	Active
150	Active
157	Active
160	Active
162	Eliminated
163	Active
166	Eliminated
168	Eliminated
169	Active
181	Active
191	Eliminated
192	Active

**Table 4.20. Y-12 Plant Category IV outfalls**

Outfall No.	Location/Building	Description	Permit status
401	9204-4	Dye penetrant	Treated at on-site treatment facility
402	9204-2	Steam condensate	Actively discharging
403	9818	Overhead, steam condensate, cooling water	Treated at on-site treatment facility
404	9201-5N	X-ray	Routed to the sanitary sewer
405	Sanitary landfill 2	Leachate pond	Actively discharging
406	9201-1	Plasma torch wastewater	Treated at on-site treatment facility
407	9201-4	ECM sink rinses, Room 11	Eliminated
408	9202	Catch basin	Actively discharging
409	9201-5	Dye penetrant shower rinse	Treated at on-site treatment facility
410	9201-5	Dye penetrant sink rinse	Routed to the sanitary sewer
411	9204-2E	X-ray	Routed to the sanitary sewer
412	9204-4	X-ray, Room 001B, east X-omat	Routed to the sanitary sewer
413	9204-4	X-ray, Room 001B, west X-omat	Routed to the sanitary sewer
414	9981	X-ray	Routed to the sanitary sewer
415	9201-5	X-ray	Eliminated
416	9204-4	X-ray, hand developer	Routed to the sanitary sewer
417	9201-4	ECM sink rinses, Room 21	Eliminated
418	9201-3	X-ray	Routed to the sanitary sewer
419	9737	Planting shop rinsewater	Eliminated
420	9980	X-ray	Routed to the sanitary sewer
421	9737	Plating shop rinsewater	Eliminated
422	9737	Plating shop rinsewater	Eliminated

**Table 4.21. Y-12 Plant 300-series NPDES outfalls—perimeter outfalls**

Outfall No.	Description	Permit status
301	Kerr Hollow Quarry	Undergoing RCRA Closure: periodically discharges
302	Rogers Quarry	Actively discharging
303	New Hope Pond	Closed under RCRA
304	Bear Creek at Highway 95	Actively discharging
305	Oil Retention Pond 1	Closed under RCRA
306	Oil Retention Pond 2	Closed under RCRA

**Table 4.22. Y-12 Plant 500-series NPDES outfalls—Wastewater Treatment Facilities**

Outfall No.	Description	Permit status
501	Central Pollution Control Facility	Actively discharging
502	West End Treatment Facility	Actively discharging
503	Steam Plant Wastewater Treatment Facility	Actively discharging
504	Plating Rinsewater Treatment Facility	Actively discharging
505	ORNL Biology Wastewater Treatment Facility	Never constructed
506	9204-3 ORNL Oil/Water Separator	Eliminated; discharge collected
507	S-3 Treatment Facility	No longer in operation
508	Mobile Wastewater Treatment Unit	No longer in operation
510	Waste Coolant Processing Facility	Pretreatment facility for OFs 501 & 502
512	Groundwater Treatment Facility	Actively discharging

**Table 4.23. Y-12 Plant outfalls not specifically enumerated on the current NPDES permit<sup>a</sup>**

Outfall No.	Discharge status
4	Active
8	Active
10	Active
14	Active
21	Active
22	No flow (alternate sampling at OF 21)
33	Active
34	Active
36	No flow (to be eliminated)
39	No flow (to be eliminated)
42	Active
47	Active
48	Active
49	Active
50	Eliminated
51	Active
52	Eliminated
55	Active
56	Eliminated
63	Active
64	Active
65	Eliminated
67	Active
72	Eliminated
82	Eliminated
83	Active
85	Eliminated
88	Active
89	Eliminated
90	Eliminated
91	Eliminated
97	No flow (to be eliminated)
99	Active
103	Eliminated
104	Eliminated
105	Eliminated
106	Eliminated
107	Eliminated
109	Active
110	Active
113	Active
114	Active
116	Eliminated
121	No flow (to be eliminated)
122	Active
125	Active
126	Active

Table 4.23 (continued)

Outfall No.	Discharge status
128	Eliminated
132	No flow (to be eliminated)
142	Active
211	No flow (to be eliminated)
307 <sup>b</sup> (West Borrow Area)	
308 <sup>b</sup> (East Borrow Area)	
309 <sup>b</sup> (Y-12 Plant Industrial Waste Landfill) IV	

<sup>a</sup>These outfalls were not specifically enumerated on the current NPDES permit. Sampling is being performed quarterly for flow, temperature, pH, biological oxygen demand, chemical oxygen demand, total organic carbon, total suspended solids, and ammonia as nitrogen. These sample results will be attached to the monthly DMR for the month in which the samples were taken.

<sup>b</sup>These outfalls are monitored once per calendar quarter for flow, pH, ammonia, total suspended solids, total organic carbon, chemical oxygen demand, biological oxygen demand, color, and oil and grease. Because of the inaccessibility of these outfalls, they are sometimes sampled while discharge is not taking place. These samples should represent discharge that has or will occur in that quarter.

**Table 4.24. Miscellaneous Y-12 Plant source discharges<sup>a</sup>**

Outfall No.	Location
602	Cooling Tower 9409-2
604	Cooling Tower 9409-4
606	Cooling Tower 9409-6
610	Cooling Tower 9409-10
612	Cooling Tower 9409-12
613	Cooling Tower 9409-13
615	Cooling Tower 9409-15
616	Cooling Tower 9409-16
617	Cooling Tower 9409-17
618	Cooling Tower 9409-18/31
619	Cooling Tower 9409-19
620	Cooling Tower 9409-20
622	Cooling Tower 9409-22
624	Cooling Tower 9409-24
626	Cooling Tower 9409-26
628	Cooling Tower 9409-28/29
630	Cooling Tower 9409-30
632	Cooling Tower 9409-32
634	Cooling Tower 9409-23

<sup>a</sup>Sources are recirculating cooling water, cooling tower blowdown, and cleaning wastes originating at space cooling facilities. Flows from these facilities are calculated using operational sample results to determine the blowdown for that time period. Tower blowdown is valved directly from the return line. Samples are taken at the tower water return line; therefore, results may be reported when there was no blowdown flow.

**Table 4.25. Permit status of miscellaneous Y-12 Plant source discharges**

Outfall No.	Location	Permit status
702	Building 9201-2 demineralizer	Eliminated
703	Building 9731 demineralizer	Eliminated
704	Building 9204-1 vapor blaster	Routed to the sanitary sewer

Table 4.26. Y-12 Plant Discharge Point 142 (a)  
(Summed DCG percentage = 3.29.)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG
		Max	+/-	Min	+/-	Median	+/-		
Alpha activity (pCi/L)	2	11	6.9	-0.40	0.22	5.3	b	5.7	b
Americium-241 (pCi/L)	2	0.53	0.49	0.31	0.50	0.42	b	0.11	1.40
Beta activity (pCi/L)	2	7.1	5.2	-3.0	0.68	2.1	b	5.1	b
Neptunium-237 (pCi/L)	2	0.07	0.08	0.052	0.10	0.06	b	0.01	0.2
Plutonium-238 (pCi/L)	2	0.04	0.08	-0.81	0.39	-0.4	b	0.4	0.0
Plutonium-239/240 (pCi/L)	2	0.08	0.12	-0.81	0.12	-0.4	b	0.4	0.0
Radium-226 (pCi/L)	2	-0.14	0.028	-1.6	0.31	-0.87	b	0.73	0.00
Radium-228 (pCi/L)	2	-0.17	0.017	-1.8	0.20	-0.99	b	0.82	0.00
Strontium-90 (pCi/L)	2	3.1	2.0	-4.1	2.5	-0.50	b	3.6	0.00
Technetium-99 (pCi/mL)	2	0.026	0	0.01	0.01	0.02	b	0.01	0.02
Thorium, total (mg/L)	2	<0.003	b	<0.003	b	<0.003	b	b	b
Thorium-228 (pCi/L)	2	0.25	0.28	0.13	0.38	0.19	b	0.060	0.048
Thorium-230 (pCi/L)	2	0.24	0.21	0.13	0.18	0.19	b	0.055	0.062
Thorium-232 (pCi/L)	2	0.13	0.18	0.05	0.12	0.09	b	0.04	0.2
Thorium-234 (pCi/L)	2	0.99	0.38	0.16	0.18	0.58	b	0.42	0.0058
Tritium (pCi/L)	2	130	170	34	180	82	b	48	0.0041
Uranium, total (mg/L)	2	0.001	b	0.001	b	0.001	b	b	b
Uranium-234 (pCi/L)	2	8.6	1.9	0.80	0.39	4.7	b	3.9	0.94
Uranium-235 (pCi/L)	2	0.22	0.18	0.14	0.16	0.18	b	0.040	0.030
Uranium-235 (%)	1	1.9	3.4	0.39	3.4	0	b	b	b
Uranium-236 (pCi/L)	0	0	0	0	0	0	b	b	0
Uranium-238 (pCi/L)	2	0.99	0.38	0.16	0.18	0.58	b	0.42	0.10

(a) There was no flow for 10 months of the year. Average flows for the 2 months that were sampled was 1902 gpd.

(b) Not applicable.

Table 4.27. Y-12 Plant Station 8, radiological data summary (a)  
(Summed DCG percentage = 4.19)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG
		Max	+/-	Min	+/-	Median	+/-		
Alpha activity (pCi/L)	50	45	13	-1.6	17	14	b	1.6	b
Americium-241 (pCi/L)	50	0.88	0.68	-0.25	0.27	0.060	b	0.032	0.20
Beta activity (pCi/L)	50	23	7.5	-7.1	14	11	b	1.0	b
Neptunium-237 (pCi/L)	50	26	2.4	-0.22	0.15	0.082	b	0.52	0.27
Plutonium-238 (pCi/L)	50	0.40	0.55	-0.32	0.42	0	b	0.020	0
Plutonium-239/240 (pCi/L)	50	1.2	0.59	-0.30	0.31	0	b	0.030	0
Radium-226 (pCi/L)	49	1.3	0.30	-2.4	0.60	0.020	b	0.090	0.020
Radium-228 (pCi/L)	49	2.8	0.27	-1.8	2.5	-0.29	b	0.13	0.00
Strontium-90 (pCi/L)	50	16	12	-11	12	-0.50	b	0.74	0.00
Technetium-99 (pCi/mL)	50	0.46	0.01	-0.068	0.01	0.017	b	0.010	0.017
Thorium, total (mg/L)	49	0.027	b	<0.003	b	<0.003	b	0.001	b
Thorium-228 (pCi/L)	50	2.8	2.4	-0.49	0.63	0.37	b	0.086	0.093
Thorium-230 (pCi/L)	50	3.6	2.3	-0.34	0.58	0.30	b	0.092	0.10
Thorium-232 (pCi/L)	50	0.66	0.94	-0.075	0.15	0.078	b	0.019	0.16
Thorium-234 (pCi/L)	50	31	4.8	2.1	0.75	8.5	b	0.94	0.85
Tritium (pCi/L)	50	790	190	-240	190	360	b	28	0.018
Uranium, total (mg/L)	50	0.079	b	0.008	b	0.02	b	0.003	b
Uranium-234 (pCi/L)	50	15	3.6	1.5	0.63	5.0	b	0.36	1.0
Uranium-235 (%)	50	1.1	b	0.26	b	0.43	b	0.021	b
Uranium-235 (pCi/L)	50	1.0	0.44	-0.04	0.07	0.3	b	0.03	0.05
Uranium-236 (pCi/L)	47	0.88	0.48	-0.043	0.16	0.13	0.15	0.027	0.026
Uranium-238 (pCi/L)	50	31	4.8	2.1	0.75	8.5	b	0.94	1.4

(a)Flow not available.

(b)Not applicable.



Table 4.28. Y-12 Plant Instream Monitoring Site, Upstream Drum Room  
(Summed DCG percentage = 2.92)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG
		Max	+/-	Min	+/-	Median	+/-		
Alpha activity (pCi/L)	51	76	16	-7.2	10	9.8	7.4	1.8	a
Americium-241 (pCi/L)	51	0.66	0.70	-0.26	0.45	0.050	0.38	0.026	0.17
Beta activity (pCi/L)	51	260	37	0	0	8.7	-6.0	5.1	a
Neptunium-237 (pCi/L)	51	0.93	0.45	-0.33	0.20	0.10	0.12	0.028	0.34
Plutonium-238 (pCi/L)	48	0.45	0.40	-0.34	0.24	-0.010	a	0.023	0.00
Plutonium-239/240 (pCi/L)	48	0.51	0.32	-0.16	0.18	0	a	0.015	0
Radium-226 (pCi/L)	51	1.9	0.29	-0.52	0.12	0.23	0.05	0.063	0.23
Radium-228 (pCi/L)	51	2.7	0.28	-2.8	0.34	-0.020	0.06	0.14	0.00
Strontium-90 (pCi/L)	51	6.7	1.7	-6.1	2.1	0	0.06	0.40	0.023
Technetium-99 (pCi/mL)	51	0.048	0.01	-0.04	0.01	0.02	a	0.003	0.02
Thorium, total (mg/L)	46	0.012	a	0.002	a	<0.003	a	0.0002	a
Thorium-228 (pCi/L)	51	1.4	0.87	-0.53	0.35	0.23	0.56	0.053	0.058
Thorium-230 (pCi/L)	51	3.9	3.9	-0.075	0.28	0.29	0.27	0.086	0.097
Thorium-232 (pCi/L)	51	0.66	0.56	-0.17	0.20	0.060	0.11	0.020	0.12
Thorium-234 (pCi/L)	51	34	5.0	2.0	0.85	5	1.2	1	0.1
Tritium (pCi/L)	51	1100	210	-300	200	380	190	32	0.02
Uranium, total (mg/L)	51	0.071	a	0.006	a	0.02	a	0.002	a
Uranium-234 (pCi/L)	51	100	14	1.9	0.63	3.6	0.92	2	0.7
Uranium-235 (pCi/L)	51	1.7	0.51	-0.08	0.11	0.2	0.22	0.04	0.04
Uranium-235 (%)	51	0.64	a	0.23	a	0.42	a	0.014	a
Uranium-236 (pCi/L)	46	0.33	0.23	-0.13	0.18	0.10	a	0.014	0.020
Uranium-238 (pCi/L)	51	34	5.0	2.0	0.85	5	1.2	1	1

(a)Not applicable.

Table 4.29. Y-12 Plant Discharge Point 301, Kerr Hollow Quarry

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Flow(c), gpm	20	427.8	0.0222	93.5	d	d
pH, standard units	20	8.1	7.0	d	6.5/8.5(e)	0
Temperature, °C	20	20.7	7.3	11	30.5	0
Mercury	20	0.0003	<0.0002	<0.0002	d	d
Total suspended solids	20	10	<5	<5	50	0
Selenium	20	<0.1	<0.002	<0.01	d	d
Arsenic	20	<0.04	<0.04	<0.04	d	d
Cadmium	20	<0.004	<0.004	<0.004	d	d
Chromium	20	<0.006	<0.006	<0.006	d	d
Copper	20	0.012	<0.006	<0.007	d	d
Iron	20	0.13	<0.06	<0.07	d	d
Lead	20	<0.02	<0.02	<0.02	d	d
Lithium	20	0.25	0.03	0.11	5	0
Nickel	20	<0.008	<0.008	<0.008	d	d
Potassium	20	1.6	1.0	1.2	d	d
Sodium	20	0.62	0.58	0.60	d	d
Zinc	20	0.04	<0.01	<0.02	d	d
Zirconium	20	<0.004	<0.004	<0.004	3	0

(a)Units in mg/L unless otherwise indicated.

(b)NPDES permit limits.

(c)Flow during operations and/or discharging.

(d)Not applicable.

(e)Minimum value/maximum value.

Table 4.30. Y-12 Plant Discharge Point 301, radiological data summary  
(Summed DCG percentage = 1.09)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG
		Max	+/-	Min	+/-	Median	+/-		
Alpha activity (pCi/L)	12	12	13	-0.46	4.4	7.8	a	1.3	a
Americium-241 (pCi/L)	12	2.1	0.77	-0.48	0.64	0.020	a	0.19	0.065
Beta activity (pCi/L)	12	7.6	7.0	-8.2	9.5	2.6	a	1.2	a
Neptunium-237 (pCi/L)	12	0.22	0.18	-0.10	0.31	0.03	a	0.03	0.08
Plutonium-238 (pCi/L)	12	0.30	0.25	-0.16	0.20	0	a	0.04	0
Plutonium-239/240 (pCi/L)	12	0.11	0.12	-0.14	0.14	-0.0036	a	0.020	0.00
Radium-226 (pCi/L)	12	2.4	0.41	-1.4	0.27	-0.075	a	0.26	0.00
Radium-228 (pCi/L)	12	1.4	0.13	-2.0	2.2	-0.53	a	0.30	0.00
Strontium-90 (pCi/L)	12	4.9	2.3	-6.1	2.6	0.055	a	0.98	0.0055
Technetium-99 (pCi/mL)	12	0.032	0.01	-0.05	0.01	0.007	a	0.006	0.007
Thorium, total (mg/L)	12	0.008	a	<0.003	a	<0.003	a	0.0004	a
Thorium-228 (pCi/L)	12	1.6	0.95	-0.22	1.2	0.25	a	0.16	0.063
Thorium-230 (pCi/L)	12	1.2	0.63	0.02	0.13	0.4	a	0.1	0.1
Thorium-232 (pCi/L)	12	0.16	0.16	-0.43	0.36	0.013	a	0.045	0.026
Thorium-234 (pCi/L)	12	3.4	1.1	0.49	0.34	1.2	a	0.22	0.012
Tritium (pCi/L)	12	330	160	-260	170	-13	a	44	0.00
Uranium, total (mg/L)	12	0.007	a	0.002	a	0.003	a	0.001	a
Uranium-234 (pCi/L)	12	6.1	1.6	1.5	0.60	2.6	a	0.43	0.51
Uranium-235 (%)	12	1.5	a	1.0	a	1.2	a	0.047	a
Uranium-235 (pCi/L)	12	0.25	0.32	0.015	0.12	0.13	a	0.022	0.021
Uranium-236 (pCi/L)	11	0.24	0.25	-0.091	0.11	0.020	0.11	0.025	0.0040
Uranium-238 (pCi/L)	12	3.4	1.1	0.49	0.34	1.2	a	0.22	0.20

(a)Not applicable.

**Table 4.31. CY 1993 NPDES Permit Number TN 0002968**  
**Y-12 Plant Discharge Point 302, Rogers Quarry (McCoy Branch)**

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Total suspended solids	51	5	<5.0	<5.0	50	0
Chemical oxygen demand (COD)	52	50	<5.0	<5.0	c	c
Sulfate	51	33	<10	<19	c	c
Oil and grease	52	3.2	<1.4	<2.1	15	0
Settleable solids, ml/L	52	<0.1	<0.1	<0.1	0.5	0
Selenium	52	0.1	<0.002	<0.043	0.020	0
Mercury	52	0.0006	<0.0002	<0.0002	0.00015	52(d)
Arsenic	52	<0.04	<0.04	<0.04	c	c
Cadmium	52	<0.004	<0.004	<0.004	0.004	0
Chromium	52	<0.01	<0.01	<0.01	0.016	0
Copper	52	<0.01	<0.01	<0.01	0.018	0
Iron	52	0.08	<0.06	<0.06	c	c
Nickel	52	<0.008	<0.008	<0.008	1.400	0
Zinc	52	0.07	<0.01	<0.01	0.117	0
Lead	52	<0.02	<0.02	<0.02	0.082	0
pH, standard units	52	8.2	7.3	c	6.5/8.5(e)	0/0
Temperature, C	52	21.0	7.7	11.4	30.5	0
Turbidity, NTU	52	4.9	0.09	0.67	c	c
Flow, Mgd(f)	357	1.390	0.078	0.293	c	c

(a)Units in mg/L unless otherwise indicated.

(b)NPDES permit limits and/or Tennessee Water Quality criteria.

(c)Not applicable

(d)The analytical detection limit for this parameter is higher than the reference value.

(e)Minimum value/maximum value.

(f)Flow during operation and/or discharging.

**Table 4.32. CY 1993 radiological data summary**  
**Y-12 Plant Discharge Point 302, Rogers Quarry (McCoy Branch)**  
**(Summed DCG percentage = 1.04)**

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG	Total curies
		Max	+/-	Min	+/-	Med	+/-			
Alpha activity (pCi/L)	15	11	13	-2.5	1.5	0.87	0.56	0.90	a	
Americium-241 (pCi/L)	15	0.86	0.53	-0.44	0.28	0.054	0.11	0.070	0.18	3.2 E-5
Beta activity (pCi/L)	15	11	2.1	-6.7	6.7	-0.33	0.07	1.5	a	
Neptunium-237 (pCi/L)	15	0.80	0.40	-0.08	0.095	0.06	0.08	0.07	0.20	5.4 E-5
Plutonium-238 (pCi/L)	12	0.69	0.97	-0.08	0.20	0.041	0	0.08	0.1	5.8 E-5
Plutonium-239/240 (pCi/L)	12	0.11	0.16	-0.13	0.96	0.0095	0	0.018	0.032	4.7 E-6
Radium-226 (pCi/L)	15	0.41	0.09	-1.5	0.38	-0.064	0.014	0.15	0.00	-2.2 E-4
Radium-228 (pCi/L)	15	1.9	0.19	-2.2	0.27	-0.8	0.08	0.30	0.00	-2.1 E-4
Strontium-90 (pCi/L)	15	3.6	2.2	-4.6	2.0	0.68	2.1	0.64	0.068	-5.6 E-5
Technetium-99 (pCi/mL)	15	0.046	0.01	-0.05	0.01	0.007	0	0.006	0.007	3.3 E-3
Thorium-234 (pCi/L)	12	0.69	0.36	-0.036	0.18	0.21	0	0.060	0.002	9.9 E-5
Thorium, total (mg/L)	15	0.007	a	<0.003	a	<0.003	a	0.0003	a	
Thorium-228 (pCi/L)	15	1.3	0.51	-0.1	0.44	0.5	0.42	0.11	0.125	2.1 E-4
Thorium-230 (pCi/L)	15	0.99	0.75	0.044	0.09	0.3	0.23	0.07	0.09	1.4 E-4
Thorium-232 (pCi/L)	15	0.71	0.62	0.02	0.13	0.062	0.15	0.044	0.124	4.4 E-5
Tritium (pCi/L)	15	420	180	-210	170	200	170	38	0.01	6.7 E-2
Uranium, total (mg/L)	15	0.029	a	<0.001	a	<0.001	a	0.002	a	
Uranium-234 (pCi/L)	15	0.66	0.33	0.19	0.19	0.33	0.25	0.030	0.070	1.5 E-4
Uranium-235 (pCi/L)	15	0.15	0.18	-0.023	0.047	0	0	0.014	0	1.2 E-5
Uranium-235 (%)	1	0.35	a	0.35	a	0.35	a	a	a	
Uranium-236 (pCi/L)	11	0.055	0.11	-0.064	0.092	0	a	0.010	0	1.8 E-7
Uranium-238 (pCi/L)	12	0.69	0.36	-0.036	0.18	0.21	a	0.060	0.040	9.9 E-5
Gamma, total (pCi/L)	3	59	16	-3.3	16	18	16	18	a	

(a)Not applicable.

Table 4.33. Y-12 Plant Discharge Point 304, Bear Creek

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Oil and grease	52	4.0	<2	<2	15	0
Biochemical oxygen demand	52	9.6	<5	<5	c	c
Chemical oxygen demand	52	38	<5	<10	c	c
Total dissolved solids	52	460	<5	<210	c	c
Total suspended solids	52	18	<5	<6	c	c
Nitrate as N	52	15	0.28	4.2	c	c
Conductivity, mhos/cm	52	380	115	250	c	c
Dissolved oxygen	52	13	7.2	9.4	3	0
Turbidity, NTU	52	84.0	0.36	5.9	c	c
pH, standards units	52	8.1	7.1	c	6.5/8.5(d)	0
Flow, Mgd(e)	365	145	0.151	4.47	c	c

(a)Units in mg/L unless otherwise indicated.

(b)NPDES Permit limits.

(c)Not applicable.

(d)Minimum value/maximum value.

(e)Flow during operations and/or discharging.

Table 4.34. Y-12 Plant Discharge Point 304, radiological data summary  
(Summed DCG percentage = 4.74)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG	Total curies
		Max	+/-	Min	+/-	Median	+/-			
Alpha activity (pCi/L)	52	43	13	-2.3	7.2	16	a	1.2	a	
Americium-241 (pCi/L)	52	0.71	0.71	-1.2	0.58	0.060	a	0.042	0.20	3.1 E-4
Beta activity (pCi/L)	52	51	12	0.50	5.0	13	a	1.5	a	
Neptunium-237 (pCi/L)	52	1.1	0.54	-0.31	0.28	0.15	a	0.026	0.50	1.0 E-3
Plutonium-238 (pCi/L)	52	2.0	2.2	-0.29	0.36	-0.0015	a	0.042	0.00	2.1 E-4
Plutonium-239/240 (pCi/L)	52	2.0	2.2	-0.31	0.24	0.015	a	0.041	0.050	3.6 E-4
Radium-226 (pCi/L)	51	2.7	0.27	-1.9	0.43	0.050	0.27	0.10	0.050	4.7 E-4
Radium-228 (pCi/L)	51	2.2	0.22	-2.0	1.5	0.020	0.040	0.11	0.020	-2.9 E-4
Strontium-90 (pCi/L)	52	19	32	-16	12	0.77	a	0.59	0.077	4.0 E-3
Technetium-99 (pCi/mL)	52	0.15	0.01	-0.067	0.01	0.020	a	0.0048	0.02	1.5 E-1
Thorium, total (mg/L)	51	0.007	a	<0.003	a	<0.003	a	0.0001	a	
Thorium-228 (pCi/L)	52	2.6	1.2	-0.34	0.47	0.43	a	0.082	0.11	3.5 E-3
Thorium-230 (pCi/L)	52	2.9	2.2	-0.17	0.35	0.31	a	0.061	0.10	2.5 E-3
Thorium-232 (pCi/L)	52	0.38	0.35	-0.065	0.13	0.088	a	0.014	0.18	5.9 E-4
Thorium-234 (pCi/L)	52	22	3.7	1.1	0.47	8.8	a	0.62	0.88	6.0 E-2
Tritium (pCi/L)	52	570	280	-380	180	170	a	28	0.0085	9.2 E-1
Uranium, total (mg/L)	52	0.064	a	<0.001	a	<0.02	a	0.002	a	
Uranium-234 (pCi/L)	52	11	2.3	0.56	0.31	5.0	a	0.32	1.0	3.1 E-2
Uranium-235 (%)	51	0.71	a	0.29	a	0.38	a	0.0086	a	
Uranium-235 (pCi/L)	52	0.85	0.45	-0.03	0.06	0.3	a	0.02	0.04	2.1 E-3
Uranium-236 (pCi/L)	48	0.43	0.28	-0.10	0.14	0.11	a	0.017	0.022	7.6 E-4
Uranium-238 (pCi/L)	52	22	3.7	1.1	0.47	8.8	a	0.62	1.5	6.0 E-2

(a)Not applicable.

Table 4.35. Y-12 Plant Discharge Point 307, West Borrow Area

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Flow, gpd	2	57142	45649	51396	c	c
pH, standard units	2	7.9	7.6	c	6/9(d)	0
Temperature, C	2	22.8	9.3	16	30.5	c
Nitrogen (as ammonia)	2	<0.2	<0.2	<0.2	c	c
Biochemical oxygen demand	2	<5	<5	<5	c	c
Chemical oxygen demand	2	5.6	5.0	5.3	c	c
Color, ACU	2	125	10	68	c	c
Oil and grease	2	<2	<2.0	<2	c	c
Total organic carbon	2	8.0	4.1	6.1	c	c
Total suspended solids	2	35	<5	<20	c	c

(a)Units in mg/L unless otherwise noted.

(b)Tennessee Water Quality criteria

(c)Not applicable

(d)Minimum value/maximum value.

Table 4.36. Y-12 Plant Discharge Point 308, East Borrow Area

Parameter	Number of samples	Concentration (a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Flow, gpd	4	152380	2282.4	64166	c	c
pH, standard units	4	8.2	7.9	e	6/9(d)	0
Temperature, C	4	24.5	9.2	18	30.5	c
Nitrogen (as ammonia)	4	<0.2	<0.2	<0.2	c	c
Biochemical oxygen demand	4	<5	<5.0	<5	c	c
Chemical oxygen demand	4	<20	5.7	10	c	c
Color, ACU	4	125	5	60	c	c
Oil and grease	4	<2	<2.0	<2	c	c
Total organic carbon	4	8.9	4.6	6.2	c	c
Total suspended solids	4	40	<5.0	<18	c	c

(a)Units in mg/L unless otherwise noted.

(b)Tennessee Water Quality criteria

(c)Not applicable

(d)Minimum value/maximum value.



Table 4.37. Y-12 Plant Discharge Point 309, Sanitary Landfill IV Sedimentation Basin

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Flow, gpd	2	22824	1521	12173	c	c
pH, standard units	2	7.9	7.7	c	6/9(d)	0
Temperature, C	2	9.7	8.6	9.2	30.5	c
Nitrogen (as ammonia)	2	<0.2	<0.2	<0.2	c	c
Biochemical oxygen demand	2	<5	<5.0	<5	c	c
Chemical oxygen demand	2	<20	<5	<13	c	c
Color, ACU	2	400	7	200	c	c
Oil and grease	2	<2	<2.0	<2	c	c
Total organic carbon	2	10.0	5.9	8.0	c	c
Total suspended solids	2	24	<5	<15	c	c

(a)Units in mg/L unless otherwise noted.

(b)Tennessee Water Quality criteria

(c)Not applicable

(d)Minimum value/maximum value.

**Table 4.38. CY 1993 NPDES Permit Number TN 0002968**  
**Y-12 Plant Discharge Point 501, Central Pollution Control Facility**

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Flow(c), gpd	52	14481	2050	10175	<i>d</i>	<i>d</i>
pH, standard units	52	8.7	7.0	<i>d</i>	6.0/9.0(e)	0
Temperature, C	52	30.4	8.4	22.0	30.5	0
Cyanide	52	0.02	<0.002	<0.010	1.2	0
Oil and grease	52	9.8	<2.0	<2.4	52	0
Phenols	52	0.020	<0.001	<0.004	<i>d</i>	<i>d</i>
Total toxic organics	52	<0.010	<0.010	<0.010	2.13	0
Chloride	52	890	15	170	<i>d</i>	<i>d</i>
Color	52	40.0	<5.0	<9.7	<i>d</i>	<i>d</i>
Fluoride	52	8.5	0.48	1.2	<i>d</i>	<i>d</i>
Mercury	52	<0.0002	<0.0002	<0.0002	<i>d</i>	<i>d</i>
Nitrate	52	200	<0.10	<13	<i>d</i>	<i>d</i>
Total suspended solids	52	23	<5.0	<6.0	60	0
Sulfate	52	6900	1400	2488	<i>d</i>	<i>d</i>
Sufactants, (MBAS)	52	0.06	<0.05	<0.05	<i>d</i>	<i>d</i>
Aluminum	52	0.7	<0.2	<0.3	<i>d</i>	<i>d</i>
Beryllium	52	<0.006	<0.006	<0.002	<i>d</i>	<i>d</i>
Cadmium	52	0.02	<0.001	<0.002	0.69	0
Chromium	52	<0.09	<0.03	<0.03	2.77	0
Copper	52	<0.09	<0.03	<0.03	3.38	0
Iron	52	3.26	<0.3	<0.9	<i>d</i>	<i>d</i>
Lead	52	0.1	<0.005	<0.08	0.69	0
Nickel	52	0.94	<0.01	<0.3	3.98	0
Phosphorus	52	0.81	<0.10	<0.24	<i>d</i>	<i>d</i>
Silver	52	<0.09	<0.03	<0.03	0.43	0
Sodium	52	1880	31.7	350	<i>d</i>	<i>d</i>
Zinc	52	0.20	<0.05	<0.06	2.61	0

(a)Units in mg/L unless otherwise noted.

(b)NPDES permit limits.

(c)Flow during operations and/or discharging.

(d)Not applicable

(e)Minimum value/maximum value.

**Table 4.39. CY 1993 radiological data summary**  
**Y-12 Plant Discharge Point 501, Central Pollution Control Facility**  
**(Summed DCG percentage = 4.72)**

Parameter	Number of samples	Concentration										Standard error	Percentage of DCG	Total curies		
		Max	+/-	Min	+/-	Med	+/-									
Alpha activity (pCi/L)	37	170	170	-190	300	32	51	9.8	a							
Americium-241 (pCi/L)	37	1.6	1.2	-0.38	0.42	0.060	0.23	0.060	0.20							2.6 E-7
Beta activity (pCi/L)	37	2800	320.0	2.2	6.7	-6.7	0	100	a							
Neptunium-237 (pCi/L)	37	1.50	0.84	-0.11	0.24	0.11	0.14	0.050	0.37							3.7 E-7
Plutonium-238 (pCi/L)	36	0.37	0.47	-0.13	0.19	0	a	0.020	0							6.6 E-8
Plutonium-239/240 (pCi/L)	36	0.29	0.34	-0.1	0.14	0.01	a	0.01	0.05							3.2 E-8
Radium-226 (pCi/L)	37	3.5	0.47	-14	0.37	0.61	0.49	0.14	0.61							1.6 E-6
Radium-228 (pCi/L)	37	2.6	2.1	-2.3	1.4	-0.020	0.82	0.20	0.00							-1.5 E-7
Strontium-90 (pCi/L)	37	33	17	-23	12	2.9	10	2.2	0.29							6.6 E-6
Technetium-99 (pCi/mL)	37	2.838	0	0.01	0.01	0.1	0	0.1	0.10							9.2 E-4
Thorium-234 (pCi/L)	37	47	8.1	-0.02	0.24	8	2	2	0.08							2.2 E-5
Thorium, total (mg/L)	37	0.016	a	<0.0003	a	<0.003	a	0.0004	a							
Thorium-228 (pCi/L)	37	21	60	-0.92	1.1	0.39	0.47	0.64	0.098							3.4 E-6
Thorium-230 (pCi/L)	37	3.5	2.5	0	0	0.41	0.28	0.10	0.14							1.1 E-6
Thorium-232 (pCi/L)	37	18	3.7	-27	46	0.060	0.14	0.90	0.12							-1.2 E-6
Tritium (pCi/L)	37	4700	340	-390	190	110	230	140	0.0055							7.1 E-4
Uranium, total (mg/L)	37	0.137	a	<0.001	a	<0.02	a	0.006	a							
Uranium-234 (pCi/L)	37	79	13	0.15	0.23	8.0	1.5	3.4	1.6							2.8 E-5
Uranium-235 (pCi/L)	37	4.8	1.4	-0.08	0.16	0.5	0.70	0.2	0.08							1.4 E-6
Uranium-235 (%)	31	3.8	a	0.5	a	0.7	a	0.1	a							
Uranium-236 (pCi/L)	35	4.9	1.4	-0.03	0.06	0.4	0.3	0.2	0.08							1.7 E-6
Uranium-238 (pCi/L)	37	47	8.1	-0.02	0.24	8	2	2	1							2.2 E-5

(a)Not applicable.

Table 4.40. Y-12 Plant Discharge Point 502, West End Treatment Facility

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Flow(c), gpd	47	24874	1247	15923	d	d
pH, standard units	47	8.3	6.6	d	6.0/9.0(e)	0
Temperature, °C	47	27.5	18.1	21.5	30.5	0
Residual chlorine	47	0.08	0.01	0.03	d	d
Cyanide	47	<0.01	<0.002	<0.01	1.2	0
Oil and grease	47	8.0	<2	<3	52	0
Total toxic organics	13	<0.01	<0.01	<0.01	2.13	0
Chloride	46	590	230	519	d	d
Fluoride	46	42	2.8	19	d	d
Mercury	46	0.0045	<0.0002	<0.003	d	d
Nitrate	46	110	<0.1	<15.0	d	d
Total suspended solids	46	16	<5	<7	60	0
Sulfate	46	11000	4100	8191	d	d
Aluminum	46	<0.6	<0.2	<0.2	d	d
Arsenic	46	<0.6	<0.2	<0.2	d	d
Barium	46	0.153	<0.004	<0.037	d	d
Beryllium	46	<0.006	<0.002	<0.002	d	d
Calcium	46	131	20.3	59.7	d	d
Cadmium	46	<0.06	<0.02	<0.02	0.69	0
Chromium	46	<0.09	<0.03	<0.03	2.77	0
Cobalt	46	0.03	<0.01	<0.01	d	d
Copper	46	0.09	<0.03	<0.04	3.38	0
Iron	46	<0.9	<0.3	<0.3	d	d
Lead	46	<0.3	<0.1	<0.1	0.69	0
Magnesium	46	20.4	10.1	17.0	d	d
Manganese	46	0.269	0.011	0.076	d	d
Molybdenum	46	0.50	<0.03	<0.21	d	d
Nickel	46	1.52	<0.04	<0.27	3.98	0
Phosphorus	46	12	<0.1	<6	d	d
Potassium	46	144	112	130	d	d
Silver	46	<0.09	<0.03	<0.03	0.43	0
Sodium	46	5660	3090	4270	d	d
Zinc	46	0.55	0.09	<0.18	2.61	0

- (a)Units in mg/L unless otherwise indicated.
- (b)NPDES permit limits.
- (c)Flow during operations and/or discharging.
- (d)Not applicable
- (e)Minimum value/maximum value.

Table 4.41. Y-12 Plant Discharge Point 502, radiological data summary  
(Summed DCG percentage = 2.28)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG	Total curies
		Max	+/-	Min	+/-	Median	+/-			
Alpha activity (pCi/L)	14	150	120	-230	230	27	a	28	a	
Americium-241 (pCi/L)	14	0.24	0.28	-0.57	0.49	0.034	a	0.051	0.11	-3.1 E-8
Beta activity (pCi/L)	14	260	180	-320	560	120	a	38	a	
Neptunium-237 (pCi/L)	14	2.2	1.2	-0.32	0.73	0.094	a	0.16	0.31	6.8 E-7
Plutonium-238 (pCi/L)	14	0.72	0.90	-0.19	0.30	0.0080	a	0.061	0.020	-1.4 E-8
Plutonium-239/240 (pCi/L)	14	0.21	0.28	-0.14	0.19	0.0055	a	0.021	0.018	4.8 E-8
Radium-226 (pCi/L)	14	2.5	0.91	0.17	0.59	0.58	a	0.18	0.58	2.9 E-6
Radium-228 (pCi/L)	14	1.1	0.11	-2.0	1.4	-0.37	a	0.24	0.00	-1.0 E-6
Strontium-90 (pCi/L)	14	21	9.9	-35	18	-2.5	a	4.0	0.00	4.3 E-4
Technetium-99 (pCi/mL)	14	0.26	0.02	0.04	0.01	0.2	a	0.01	0.2	4.3 E-4
Thorium, total (mg/L)	14	0.015	a	<0.003	a	<0.003	a	0.001	a	
Thorium-228 (pCi/L)	14	2.9	3.8	0.037	0.59	0.44	a	0.21	0.11	2.3 E-6
Thorium-230 (pCi/L)	14	2.6	1.2	-0.11	1.7	0.22	a	0.19	0.073	1.4 E-6
Thorium-232 (pCi/L)	14	0.45	1.0	-0.036	0.073	0.095	a	0.035	0.19	3.5 E-7
Thorium-234 (pCi/L)	14	26	4.9	0.24	0.22	2.8	a	2.1	0.028	2.3 E-5
Tritium (pCi/L)	14	950	220	-49	210	380	a	75	0.019	1.2 E-3
Uranium, total (mg/L)	14	0.065	a	<0.001	a	<0.007	a	0.005	a	
Uranium-234 (pCi/L)	14	17	3.4	0.11	0.18	1.6	a	1.4	0.32	1.5 E-5
Uranium-235 (%)	13	0.56	a	0.19	a	0.42	a	0.023	a	
Uranium-235 (pCi/L)	14	1.5	0.68	0	0	0.16	a	0.11	0.026	1.1 E-6
Uranium-236 (pCi/L)	14	1.1	0.52	-0.06	0.09	0.04	a	0.09	0.01	7.7 E-7
Uranium-238 (pCi/L)	14	26	4.9	0.24	0.22	2.8	a	2.1	0.47	2.3 E-5

(a)Not applicable.

**Table 4.42. CY 1993 NPDES Permit Number TN 0002986**  
**Y-12 Plant Discharge Point 503, Steam Plant Wastewater**  
**Treatment Facility**

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Flow(c), gpd	365	274900	0	103486	d	d
pH, standard units	155	8.5	6.4	d	6.0/9.0(e)	0
Temperature	155	30.3	12.5	21.5	30.5	0
Oil and grease	155	5.7	2.0	2.2	20	0
Phenols	155	0.014	<0.0010	<0.0036	d	d
Chloride	156	800	0.76	300.62	d	d
Fluoride	156	5.0	0.97	2.97	d	d
Mercury	156	0.0003	<0.0002	<0.0002	d	d
Total suspended solids	156	19	<5.0	<6.3	100	0
Selenium	156	0.5	<0.002	<0.194	d	d
Sulfate	156	2300	500	1439	d	d
Sulfide	156	<1.0	<1.0	<1.0	d	d
Aluminum	156	3.0	<0.2	<0.5	d	d
Arsenic	156	<0.6	<0.2	<0.2	d	d
Barium	156	0.170	0.040	0.092	d	d
Beryllium	156	<0.006	<0.002	<0.002	d	d
Boron	156	0.22	<0.03	<0.07	d	d
Cadmium	156	<0.06	<0.02	<0.02	d	d
Calcium	156	861	214	550	d	d
Cerium	156	<0.3	<0.08	<0.08	d	d
Chromium	156	<0.09	<0.03	<0.03	0.2	0
Cobalt	156	<0.03	<0.01	<0.01	d	d
Copper	156	<0.09	<0.03	<0.03	1.0	0
Gallium	156	<0.3	<0.09	<0.09	d	d
Iron	156	1.37	<0.3	<0.38	1.0	2
Lead	156	<0.3	<0.1	<0.1	d	d
Lithium	156	6.55	<0.08	<0.33	d	d
Magnesium	156	40.0	<0.2	5.9	d	d
Manganese	156	0.04	<0.009	<0.011	d	d
Molybdenum	156	<0.09	<0.03	<0.03	d	d
Nickel	156	<0.20	<0.04	<0.04	d	d
Niobium	156	<0.20	<0.05	<0.05	d	d
Phosphorus	156	2.22	<0.04	<0.14	d	d
Potassium	156	13	<3	<8	d	d
Scandium	1	<0.002	<0.002	<0.002	d	d
Silver	156	<0.09	<0.03	<0.03	d	d
Sodium	156	1000	132	281	d	d
Strontium	156	0.920	0.270	0.572	d	d
Thorium	156	0.20	<0.05	<0.05	d	d
Titanium	156	<0.20	<0.06	<0.06	d	d
Vanadium	156	<0.06	<0.02	<0.02	d	d
Zinc	156	0.39	<0.05	<0.05	1.0	0
Zirconium	156	0.06	<0.02	<0.02	d	d

(a)Units in mg/L unless otherwise noted.

(b)NPDES permit limits.

(c)Flow during operations and/or discharging.

(d)Not applicable

(e)Minimum value/maximum value.

Table 4.43. CY 1993 radiological data summary  
 Y-12 Plant Discharge Point 503, Steam Plant Wastewater  
 Treatment Facility

Parameter	Number of samples	Concentration							Standard error	Percentage of DCG	Total curies
		Max	+/-	Min	+/-	Med	+/-				
Alpha activity (pCi/L)	52	77	35	-26	30	1.8	0	2.9	a		
Americium-241 (pCi/L)	52	0.72	0.45	-0.34	0.49	0.070	0	0.030	0.22	1.5 E-4	
Beta activity (pCi/L)	52	47	0	-26	0	5.8	14	1.4	a		
Neptunium-237 (pCi/L)	52	0.54	0.33	-0.70	1	0.030	a	0.030	0.23	1.1 E-5	
Plutonium-238 (pCi/L)	48	0.61	0.71	-3.5	4.0	-0.013	0	0.10	0.00	-3.3 E-6	
Plutonium-239/240 (pCi/L)	48	0.2	0.21	-0.34	0.48	0	0	0.016	a	2.6 E-7	
Radium-226 (pCi/L)	52	1.5	0.27	-1.1	0.28	0.11	0	0.090	0.11	2.0 E-5	
Radium-228 (pCi/L)	52	2.4	0.23	-2.5	1.6	-0.19	0	0.10	0.00	-9.1 E-6	
Strontium-90 (pCi/L)	52	44	8.7	-23	8.4	1.2	0	1.9	0.12	2.9 E-4	
Technetium-99 (pCi/mL)	52	0.19	0.02	-0.05	0.01	0.010	0.01	0.002	0.00001	1.9 E-3	
Thorium-234 (pCi/L)	52	0.37	0.27	-0.15	0.29	0.10	0.10	0.020	0.00070	1.3 E-5	
Thorium, total (mg/L)	52	0.018	a	<0.003	a	<0.003	a	0.0002	a		
Thorium-228 (pCi/L)	52	9.3	10	-0.74	1.5	0.45	0.33	0.22	0.11	1.2 E-4	
Thorium-230 (pCi/L)	52	3.8	2.6	0.03	0.26	0.55	0	0.10	0.18	9.3 E-5	
Thorium-232 (pCi/L)	52	0.93	0.6	-0.49	0.41	0.061	0	0.026	0.12	1.5 E-5	
Tritium (pCi/L)	52	1400	240	-540	190	240	180	47	0.012	3.5 E-2	
Uranium, total (mg/L)	52	<0.001	a	<0.001	a	<0.001	a	a	a		
Uranium-234 (pCi/L)	52	2.8	0.94	-0.2	0.54	0.10	0	0.06	0.02	2.6 E-5	
Uranium-235 (pCi/L)	52	13	0.25	-0.098	0.71	0	0	0.012	a	8.4 E-6	
Uranium-235 (%)	0	a	a	a	a	a	a	a	a		
Uranium-236 (pCi/L)	48	0.42	0.08	-0.08	0.11	0	0	0.01	a	1.6 E-6	
Uranium-238 (pCi/L)	52	0.37	0.27	-0.31	0.32	0.066	0	0.020	0.010	1.1 E-5	
Gamma, total (pCi/L)	4	40	17	4	16	32	0	8	a		

(a) Not applicable.

Table 4.44. Y-12 Discharge Point 504, Plating Rinsewater Facilities

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Flow(c), gpd	3	15588	6890	12051	d	d
pH, standard units	3	8.3	7.5	d	6.0/9.0(e)	0
Temperature, C	3	27.5	22.0	24.2	30.5	0
Cyanide	3	0.01	<0.003	<0.005	1.2	0
Oil and grease	3	<2.0	<2.0	<2.0	52.0	0
Total toxic organics	3	<0.010	<0.010	<0.010	2.13	0
Chloride	3	1100	8.7	370	d	d
Fluoride	3	13	0.70	4.9	d	d
Mercury	3	<0.0002	<0.0002	<0.0002	d	d
Nitrate	3	18	0.13	6.1	d	d
Total suspended solids	3	<5	<5	<5	60.0	0
Sulfate	3	920	120	403	d	d
Aluminum	3	0.4	0.2	0.3	d	d
Beryllium	3	<0.002	<0.002	<0.002	d	d
Cadmium	3	0.02	<0.001	<0.01	0.69	0
Chromium	3	<0.03	<0.03	<0.03	2.77	0
Copper	3	<0.03	<0.03	<0.03	3.38	0
Iron	3	3.6	0.7	3	d	d
Lead	3	<0.1	<0.005	<0.07	0.69	0
Nickel	3	0.78	0.5	0.6	3.98	0
Phosphorus	3	0.3	<0.22	<0.3	d	d
Potassium	3	111	30	70	d	d
Silver	3	<0.03	<0.03	<0.03	0.43	0
Sodium	3	860	9.6	290	d	d
Zinc	3	0.07	0.06	0.06	2.61	d

(a)Units in mg/L unless otherwise noted.

(b)NPDES permit limits.

(c)Flow during operations and/or discharging.

(d)Not applicable

(e)Minimum value/maximum value.



Table 4.45. CY 1993 radiological data summary  
 Y-12 Plant Discharge Point 504, Plating Rinsewater Treatment Facilities  
 (Summed DCG percentage = 5.27)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG	Total curies
		Max	+/-	Min	+/-	Med	+/-			
Alpha activity (pCi/L)	3	150	55	8.6	3.9	31	12	44	a	
Americium-241 (pCi/L)	3	0.21	0.42	-0.051	0.073	0.060	0.27	0.080	0.20	1.0 E-8
Beta activity (pCi/L)	3	67	7.0	26	9.5	39	5.6	12	a	
Neptunium-237 (pCi/L)	3	0.19	0.21	0.043	11	0.11	0.13	0.040	0.37	1.6 E-8
Plutonium-238 (pCi/L)	2	0.21	0.30	-0.032	0.16	0.089	a	0.12	0.22	1.2 E-8
Plutonium-239/240 (pCi/L)	2	-0.045	0.13	-0.073	0.15	-0.059	a	0.014	0.00	-8.1 E-9
Radium-226 (pCi/L)	3	0.16	0.37	-1.8	0.50	-0.12	0.026	0.61	0.00	-8.0 E-8
Radium-228 (pCi/L)	3	1.7	0.15	-0.9	0.09	0.02	0.05	0.7	0.02	4.0 E-8
Strontium-90 (pCi/L)	3	2.4	11	-14	11	-9.1	9.7	4.9	0.00	-9.4 E-7
Technetium-99 (pCi/mL)	3	0.13	0	0.032	0.01	0.080	0.01	0.028	0.080	1.1 E-5
Thorium-234 (pCi/L)	3	11	2.4	2.5	0.72	9.6	1.8	2.63	0.096	6.2 E-7
Thorium, total (mg/L)	3	<0.003	a	<0.003	a	<0.003	a	a	a	
Thorium-228 (pCi/L)	3	0.87	0.63	-0.06	0.44	0.15	0.53	0.28	0.038	6.2 E-8
Thorium-230 (pCi/L)	3	0.35	0.29	0.091	0.13	0.29	0.34	0.078	0.097	2.0 E-8
Thorium-232 (pCi/L)	3	0.14	0	-0.07	0.13	0.06	0.12	0.06	0.1	4.4 E-7
Tritium (pCi/L)	3	-38	230	-450	0	-74	160	132	0.00	6.2 E-7
Uranium, total (mg/L)	3	0.031	a	0.009	a	0.03	a	0.007	a	
Uranium-234 (pCi/L)	3	22	3.5	2.8	0.80	12	2.6	5.5	2.4	1.7 E-6
Uranium-235 (pCi/L)	3	1.2	0.52	0.21	0.19	0.65	0.40	0.286	0.11	9.4 E-8
Uranium-235 (%)	3	1.3	a	0.5	a	0.72	a	a	a	
Uranium-236 (pCi/L)	2	1.1	0.45	0.34	0.25	0.72	a	0.38	0.14	
Uranium-238 (pCi/L)	3	11	2.4	2.5	0.72	9.6	1.8	2.6	1.6	9.2 E-7

(a)Not applicable.

**Table 4.46. CY 1993 NPDES Permit Number TN 0002968**  
**Y-12 Plant Discharge Point 506, Building 9204-3 Sump Pump**

Parameter	Number of samples	Concentration			Reference value(a)	Number of values exceeding reference
		Max	Min	Av		
Flow, gpm (b)	46	50	50	50	c	c
pH, standard units	47	7.9	6.5	c	6.5/8.5(d)	0/0
Temperature, C	47	29.9	17.4	23.4	30.5	0
Oil and grease, mg/L	47	8.1	<2.0	<2.7	15	0
PCB	47	<0.0005	<0.0005	<0.0005	c	0

(a)NPDES permit limits.

(b)Flow during operation and/or discharging.

(c)Not applicable.

(d)Minimum value/maximum value.

**Table 4.47. CY 1993 NPDES Permit Number TN 0002968**  
**Discharge Point 512, Y-12 Plant, Groundwater Treatment Facility**

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Flow(c), gpd	172	40110	2260	16464	<i>d</i>	<i>d</i>
pH, standard units	172	7.1	8.3	<i>d</i>	6.0/9.0(e)	0
Temperature, C	168	29.9	16.6	22.6	30.5	<i>d</i>
Oil and grease	168	72	<2.0	<2.7	15	1
Aluminum	168	0.3	<0.2	<0.2	<i>d</i>	<i>d</i>
Arsenic	168	0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Barium	168	0.235	0.055	0.101	<i>d</i>	<i>d</i>
Beryllium	168	<0.002	<0.002	<0.002	<i>d</i>	<i>d</i>
Boron	168	77.9	26.0	54.3	<i>d</i>	<i>d</i>
Cadmium	168	<0.02	<0.02	<0.02	<i>d</i>	<i>d</i>
Calcium	168	103	75.6	90.7	<i>d</i>	<i>d</i>
Cerium	168	<0.08	<0.08	<0.08	<i>d</i>	<i>d</i>
Chromium	168	<0.03	<0.03	<0.03	<i>d</i>	<i>d</i>
Cobalt	168	<0.01	<0.01	<0.01	<i>d</i>	<i>d</i>
Copper	168	0.35	<0.03	<0.04	<i>d</i>	<i>d</i>
Gallium	168	<0.09	<0.09	<0.09	<i>d</i>	<i>d</i>
Iron	168	0.3	<0.3	<0.3	1.0	0
Lead	168	<0.1	<0.1	<0.1	<i>d</i>	<i>d</i>
Lithium	168	18.4	7.9	13.6	<i>d</i>	<i>d</i>
Magnesium	168	21.9	13.5	18.9	<i>d</i>	<i>d</i>
Manganese	168	4.64	<0.009	<0.515	<i>d</i>	<i>d</i>
Molybdenum	168	0.04	<0.03	<0.03	<i>d</i>	<i>d</i>
Nickel	168	0.09	<0.04	<0.04	<i>d</i>	<i>d</i>
Niobium	168	<0.05	<0.05	<0.05	<i>d</i>	<i>d</i>
Phosphorus	168	0.5	<0.2	<0.3	<i>d</i>	<i>d</i>
Potassium	168	13	6	10	<i>d</i>	<i>d</i>
Silver	168	<0.03	<0.03	<0.03	<i>d</i>	<i>d</i>
Sodium	168	25.8	8.6	20.4	<i>d</i>	<i>d</i>
Strontium	168	0.400	0.273	0.315	<i>d</i>	<i>d</i>
Thorium	168	<0.05	<0.05	<0.05	<i>d</i>	<i>d</i>
Titanium	168	<0.06	<0.06	<0.06	<i>d</i>	<i>d</i>
Vanadium	168	<0.02	<0.02	<0.02	<i>d</i>	<i>d</i>
Zinc	168	0.20	<0.05	<0.05	<i>d</i>	<i>d</i>
Zirconium	168	<0.02	<0.02	<0.02	<i>d</i>	<i>d</i>
PCB	168	<0.0005	<0.0005	<0.0005	0.001	0
Methylene chloride	168	<0.010	<0.010	<0.010	<i>d</i>	<i>d</i>
Tetrachoroethylene	168	<0.010	<0.010	<0.010	<i>d</i>	<i>d</i>
Trichorethylene	168	<0.010	<0.010	<0.010	<i>d</i>	<i>d</i>

(a)Units in mg/L unless otherwise noted.

(b)NPDES permit limits.

(c)Flow during operations and/or discharging.

(d)Not applicable

(e)Minimum value/maximum value.

**Table 4.46. CY 1993 radiological data summary**  
 Y-12 Plant Discharge Point 512, Groundwater Treatment Facility

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG	Total curies
		Max	+/-	Min	+/-	Med	+/-			
Alpha activity (pCi/L)	49	510	51	5.4	0	37	0	17.1	a	
Americium-241 (pCi/L)	49	0.66	0.54	-0.73	0.41	0.090	0	0.040	0.30	8.2 E-7
Beta activity (pCi/L)	49	140	14.0	-10	0	23	8.1	4.2	a	
Neptunium-237 (pCi/L)	49	0.66	0.69	-0.62	0	0.070	0.18	0.020	0.23	9.6 E-7
Plutonium-238 (pCi/L)	45	0.47	0.32	-0.35	0.50	-0.020	0	0.020	0.00	-2.8 E-7
Plutonium-239/240 (pCi/L)	45	0.36	0.43	-0.27	0.54	0.028	0	0.018	0.093	4.4 E-7
Radium-226 (pCi/L)	49	1.3	0.27	-1.4	0.26	0.15	0.30	0.090	0.15	1.1 E-6
Radium-228 (pCi/L)	49	1.8	0.19	-2.3	0.27	-0.23	0	0.20	0.00	4.4 E-7
Strontium-90 (pCi/L)	49	71	14	-35	11.0	0.60	0.40	2.6	0.058	4.7 E-5
Technetium-99 (pCi/mL)	49	0.201	0	-0.07	0.01	0.02	0	0.008	0.02	3.7 E-4
Thorium-234 (pCi/L)	49	370	73	0.04	0.08	30	6	11	0.3	1.2 E-4
Thorium, total (mg/L)	49	0.01	a	<0.003	a	<0.003	a	0.0002	a	
Thorium-228 (pCi/L)	49	4.5	3.1	-0.32	0.34	0.58	0.40	0.14	0.15	8.3 E-6
Thorium-230 (pCi/L)	49	3.3	2.2	-0.08	0.88	0.41	0	0.1	0.1	1.4 E-6
Thorium-232 (pCi/L)	49	1.6	1.5	-0.6	0.12	0.07	0	0.05	0.1	1.1 E-6
Tritium (pCi/L)	49	5291	334	2100	0	4300	310	66	0.22	4.5 E-2
Uranium, total (mg/L)	49	1.01	a	0.043	a	0.078	a	0.039	a	
Uranium-234 (pCi/L)	49	57	12	0.04	0.08	6	2	2	1	1.2 E-4
Uranium-235 (pCi/L)	49	6.5	0.6	-0.03	0.06	0.7	0.5	0.2	0.1	1.2 E-5
Uranium-235 (%)	49	0.39	a	0.16	a	0.23	a	0.0040	a	
Uranium-236 (pCi/L)	45	2.2	0.96	-0.02	0.05	0.3	0.4	0.1	0.10	2.9 E-6
Uranium-238 (pCi/L)	49	370	73	0.04	0.08	30	6	11	5	6.3 E-4
Gamma, total (pCi/L)	4	89	17	39	16	49	a	11	a	

(a)Not applicable.

Table 4.49. CY 1993 NPDES Permit Number TN 0002968

Y-12 Plant Discharge Point 623, Fiyash Sluice

Parameter	Number of samples	Concentration			Reference value(a)	Number of values exceeding reference
		Max	Min	Av		
pH, standard units	25	8.4	7.5	b	6.5/8.5(c)	0
Flow, gpd(d)	59	440,000	5,000	69,780	b	b

(a)NPDES permit limits.

(b)Not applicable.

(c)Minimum value/maximum value.

(d)Flow during operation and/or discharging.

Table 4.50. 1993 Y-12 Plant annual nonradiological data summary for Station 17

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Acrolein	203	<0.010	<0.010	<0.010	c	c
Silver	203	<0.006	<0.006	<0.006	0.004(d)	203(d)
Aluminum	203	2.22	<0.04	<0.38	c	c
Arsenic	203	0.04	<0.04	<0.04	0.36(e)	0
Tetrachlorethane	203	<0.010	<0.010	<0.010	c	c
Boron	203	0.309	<0.006	<0.108	c	c
Barium	203	0.0762	<0.0008	<0.0550	c	c
Bromodichloromethane	203	<0.010	<0.010	<0.010	c	c
Beryllium	203	<0.0004	<0.0004	<0.0004	0.0013	0
Benzene	203	<0.010	<0.010	<0.010	0.71	0
Bromoform	203	<0.010	<0.010	<0.010	4.7	0
Chlorobenzene	203	<0.010	<0.010	<0.010	c	c
Carbon tetrachloride	203	<0.01	<0.010	<0.010	0.044	0
1,2 Dichloropropene	203	<0.010	<0.010	<0.010	c	c
Cerium	203	<0.02	<0.02	<0.02	c	c
Chloroethane	203	<0.010	0.010	<0.010	c	c
Chloroethylvinyl ether	203	<0.010	<0.010	<0.010	c	c
Bromomethane	203	<0.010	<0.010	<0.010	c	c
Chloromethane	203	<0.010	<0.010	<0.010	c	c
Chloroform	203	<0.01	<0.010	<0.010	4.7	0
Cobalt	203	<0.002	<0.002	<0.002	c	c
Dibromochloromethane	203	<0.010	<0.010	<0.010	4.7	0
Ethylbenzene	203	<0.010	<0.010	<0.010	29	0
Iron	203	3.0	<0.06	<0.51	c	c
Trichlorofluoromethane	203	<0.010	<0.010	<0.010	c	c
Gallium	203	<0.02	<0.02	<0.02	c	c
Methylene chloride	203	<0.01	<0.010	<0.010	16	0
Methanol	203	<0.010	<0.010	<0.010	c	c
Manganese	203	0.328	<0.002	<0.094	c	c
Niobium	203	<0.01	<0.01	<0.01	c	c
Tetrachoroethylene	203	<0.01	<0.010	<0.010	0.88	0
Strontium	203	0.195	<0.001	<0.130	c	c
Trichloroethene	203	<0.010	<0.010	<0.010	0.807	0
Dichloroethene	203	<0.010	<0.010	<0.010	0.032	0
1,3 Dichloropropene	203	<0.010	<0.010	<0.010	c	c
Thorium	203	0.01	<0.01	<0.01	c	c
Titanium	203	0.03	<0.01	<0.02	c	c
Thallium	203	0.03	<0.03	<0.03	c	c
Vanadium	203	0.004	<0.004	<0.004	c	c
Vinyl chloride	203	<0.010	<0.010	<0.010	c	c
Acrylonitrile	203	<0.01	0.010	0.010	c	c
Zirconium	203	0.004	<0.004	<0.004	c	c
Mercury	203	0.0093	<0.0002	<0.0016	0.00015	203(d)

Table 4.50 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Nitrate	203	7.8	<0.008	<3.122	c	c
Total phosphorus	202	7.2	0.19	1.34	c	c
Copper	203	0.017	<0.006	<0.008	0.018	0
Zinc	203	0.16	<0.01	<0.07	0.117	0
Chromium	203	0.028	<0.006	<0.006	0.016(f)	1
Toluene	203	<0.010	<0.010	<0.010	300	0
1 Trichloroethane	203	<0.010	<0.010	<0.010	170	0
2 Trichloroethane	203	<0.010	<0.010	<0.010	0.45	0
Molybdenum	203	0.01	<0.006	<0.006	c	c
Lithium	203	0.19	<0.02	<0.06	c	c
Selenium	196	<0.1	<0.002	<0.03	0.02	0
Cadmium	203	0.004	<0.0005	<0.004	0.004	0
Lead	202	0.02	<0.002	<0.016	0.082	0
Nickel	203	0.012	<0.008	<0.008	1.4	0
Calcium	203	84.3	<0.2	<57.7	c	c
Magnesium	203	18.2	<0.04	<11.0	c	c
Sodium	203	47.7	<0.04	<17.81	c	c
Potassium	203	4.0	<0.6	<2.2	c	c
Sulfate	203	160	27	71	c	c
Chloride	203	42	9.1	18.7	c	c
Fluoride	203	2.9	0.01	0.84	c	c
Total suspended solids	203	82	<5	<17	c	c
Total dissolved solids	203	500	10	304	c	c
Alkalinity	201	190	56	107	c	c
Total organic carbons	202	37	2.6	19.1	c	c
Residual chlorine, total	200	0.08	-0.010	0.014	c	c
Cadmium (AA)	94	0.0082	<0.0005	<0.0019	0.004	1
Flow, MGD (g)	242	105.4	0	4.7	c	c
Temperature, F	245	84.8	51.0	68.3	86.9	0
pH, standard units	246	8.7	7.4	c	6/9(h)	0
Dissolved oxygen	231	10.5	5.2	8.2	c	c
Conductivity, mhos/cm	245	70.6	31.8	50.1	c	c

(a)Units are in mg/L unless otherwise noted.

(b)Tennessee Water Quality Criteria minimum limits.

(c)Not applicable.

(d)The analytical detection level for this parameter is higher than the reference value.

(e)This limit applies to arsenic III only. The data represent all forms of arsenic.

(f)This limit applies to hexavalent chromium only. The data represent total chromium.

(g)Flow during operation and/or discharging.

(h)Minimum value/maximum value.

**Table 4.51. 1993 Y-12 Plant annual radiological data summary for Station 17**  
(EFPC 23.4 km, near junction of Bear Creek and Scarborough Road)

Parameter	Number of samples	Concentration							Standard error	Percentage of DCG	Total curies
		Max	+/-	Min	+/-	Med	+/-				
Flow, MGD (a)	242	105.4	b	0	b	3.5 (c)	b	b	b	b	
Alpha activity (pCi/L)	47	35	5	-2.2	0	9.8	7.5	1.1	b	b	
Americium-241 (pCi/L)	46	0.84	0.79	-0.82	0.57	0.090	0	0.040	0.29	6.7 E-4	
Beta activity (pCi/L)	47	43	14.0	-4.1	0	9	5.6	1.0	b	b	
Neptunium-237 (pCi/L)	47	1.6	0.60	-0.25	0	0.11	0.22	0.040	0.37	1.1 E-3	
Plutonium-238 (pCi/L)	47	0.3	0.42	-0.35	0.23	0.011	0	0.02	0.028	5.9 E-5	
Plutonium-239/240 (pCi/L)	47	0.31	0	-0.27	0.54	0	0	0.012	0	8.4 E-5	
Radium-226 (pCi/L)	47	2.7	0.45	-1.14	0.44	0.17	0.23	0.11	0.17	1.6 E-3	
Radium-228 (pCi/L)	47	4.5	0	-1.8	0	0.11	0.015	0.10	0.11	2.2 E-3	
Strontium-90 (pCi/L)	47	6.4	2.6	-5.9	0.0	0	0.38	0.10	0	1.2 E-4	
Technetium-99 (pCi/mL)	47	0.16	0.01	-0.064	0.01	0.010	0.010	0.0050	0.02	9.7 E-2	
Thorium-234 (pCi/L)	47	19	0	2.6	0	6.2	1.3	0.48	0.062	3.2 E-2	
Thorium, total (mg/L)	47	0.009	b	<0.003	b	<0.003	b	0.0002	b	b	
Thorium-228 (pCi/L)	47	3.3	0	-0.51	0.63	0.33	0	0.080	0.083	3.2 E-3	
Thorium-230 (pCi/L)	47	3.0	2.1	-0.01	0.21	0.3	0.24	0.08	0.1	3.2 E-3	
Thorium-232 (pCi/L)	47	0.77	0.39	-0.081	0.16	0.049	b	0.022	0.098	5.3 E-4	
Tritium (pCi/L)	46	660	0	-380	190	350	b	31	0.020	2.1 E0	
Uranium, total (mg/L)	47	0.051	b	<0.009	b	<0.02	b	0.001	b	b	
Uranium-234 (pCi/L)	47	13	0	1.9	0.38	4.5	0	0.21	0.90	3.2 E-2	
Uranium-235 (pCi/L)	47	0.89	0.74	-0.01	0.17	0.23	0.50	0.027	0.040	1.8 E-3	
Uranium-235 (%)	47	1.8	b	0.31	b	0.51	b	0.038	b	b	
Uranium-236 (pCi/L)	40	0.25	0.23	-0.03	0.06	0.1	b	0.01	0.02	7.7 E-4	
Uranium-238 (pCi/L)	47	19	3.5	2.7	0.71	6.2	1.3	0.48	1.0	4.6 E-2	

(a) Flow during operation and/or discharging.

(b) Not applicable.

(c) Average flow, not median.



Table 4.52. Y-12 Plant annual summary for Upper Bear Creek nonradiological data km 11.97

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Arsenic	52	<0.2	<0.005	<0.1	0.360	0
Cadmium	52	<0.02	<0.0005	<0.010	0.004	33(c,d)
Chromium	52	0.03	<0.001	<0.01	0.016	21(d,e)
Cyanide	52	<0.2	<0.002	<0.01	0.022	1(d)
Lead	52	<0.1	<0.004	<0.04	0.082	19(c,d)
Mercury	52	0.0003	<0.0002	<0.0002	0.00015	52(d)
Nitrate (as N)	52	230	17	91	f	f
Dissolved oxygen	52	15.2	6.7	9.8	3(g)	0
Phenols	52	<0.005	<0.001	<0.003	f	f
Total dissolved solids	52	2600	530	1200	f	f
Total suspended solids	52	410	<5	<16	f	f
Selenium	52	<0.5	<0.002	<0.2	0.02	22(d)
Thallium	52	<0.2	<0.001	<0.1	f	f
pH, standard units	52	8.3	7.4	f	6/9(h)	0
Aluminum	52	0.7	<0.04	<0.3	f	f
Barium	52	0.6	0.112	0.3	f	f
Beryllium	52	<0.002	<0.0004	<0.001	0.0013	20(d)
Boron	52	0.2	0.026	0.1	f	f
Calcium	52	334	68.1	195	f	f
Cerium	52	<0.1	<0.02	<0.04	f	f
Cobalt	52	0.01	<0.002	<0.01	f	f
Copper	52	<0.03	<0.006	<0.02	0.018	20(c,d)
Gallium	52	<0.1	<0.02	<0.05	f	f
Iron	52	0.9	<0.06	<0.3	f	f
Lithium	52	<0.1	<0.02	<0.04	f	f
Magnesium	52	50.2	9.58	26.3	f	f
Manganese	52	2.3	0.02	0.8	f	f
Molybdenum	52	<0.03	<0.006	<0.02	f	f
Nickel	52	0.1	<0.008	<0.03	1.4	0
Niobium	52	<0.1	<0.01	<0.03	f	f
Phosphorus	17	0.3	<0.05	<0.1	f	f
Potassium	51	7.5	<2.3	<4.4	f	f
Silver	52	<0.030	<0.006	<0.015	0.004	52(c,d)
Sodium	52	154	22.5	49.8	f	f
Strontium	52	1.1	0.219	0.57	f	f
Thorium	52	<0.05	<0.01	<0.03	f	f
Titanium	52	<0.1	<0.02	<0.04	f	f
Vanadium	52	<0.02	<0.004	<0.01	f	f
Zinc	52	<0.05	<0.01	<0.03	0.117	0
Zirconium	52	<0.02	<0.004	<0.01	f	f
PCB, total	52	<0.0005	<0.0005	<0.0005	0.000001	52(d)
Volatile organics, total	52	<0.01	<0.01	<0.01	544	0

(a)All units in mg/L unless otherwise indicated.

(b)Tennessee Water Quality criteria.

(c)Reference value represents the dissolved form of this metal only. The actual data are representative of all forms.

(d)The analytical detection limit for this parameter is higher than the reference value.

(e)This limit applies to hexavalent Chromium only. The data represent total chromium.

(f)Not applicable.

(g)Minimum value.

(h) Minimum value/maximum value.

Table 4.53. Y-12 Plant annual summary for upper Bear Creek radiological data km 11.97  
(Summed DCG percentage = 4.57)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG
		Max	+/-	Min	+/-	Median	+/-		
Alpha Activity (pCi/L)	52	210	18	4.6	8.9	110	a	6.9	a
Americium-241 (pCi/L)	52	0.43	1.1	-0.49	0.47	0.070	a	0.026	0.23
Beta activity(pCi/L)	52	610	68	14	7.6	190	a	16	a
Neptunium-237 (pCi/L)	52	3.1	0.67	0.14	0.12	1.2	a	0.093	3.8
Plutonium-238 (pCi/L)	52	0.28	0.35	-0.31	0	0.029	a	0.015	0.07
Plutonium-239/240 (pCi/L)	52	0.29	0.25	-0.17	0.16	-0.0016	a	0.011	0.00
Technetium-99 (pCi/mL)	52	1.3	0.03	0.098	a	0.47	a	0.0005	0.47
Uranium, total (mg/L)	52	0.63	a	0.32	a	0.37	a	0.006	a
Uranium-235 (%)	52	0.45	a	0.007	a	0.2	a	0.01	a

(a)Not applicable.

Table 4.54. Y-12 Plant annual summary for upper Bear Creek nonradiological data km 12.4

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Arsenic	50	<0.2	<0.005	<0.1	0.360	0
Cadmium	50	<0.02	<0.0003	<0.01	0.004	19(c,d)
Chromium	50	0.03	<0.001	<0.01	0.016	21(d,e)
Cyanide	50	0.02	<0.002	<0.01	0.022	0
Lead	50	0.1	<0.004	<0.04	0.082	19(c,d)
Mercury	50	0.0004	<0.0002	<0.0002	0.00015	50(d)
Nitrate (as N)	50	35	4.2	18	f	f
Dissolved oxygen	50	12.3	4.9	7.3	3(g)	0
Phenols	50	0.005	<0.001	<0.003	f	f
Total dissolved solids	50	1400	510	960	f	f
Total suspended solids	50	290	<5	<13	f	f
Selenium	50	0.5	<0.002	<0.2	0.02	22(d)
Thallium	50	<0.2	<0.001	<0.1	f	f
pH, standard units	50	7.9	7.1	f	6/9(h)	0
Aluminum	50	1.8	<0.04	<0.3	f	f
Barium	50	0.12	0.058	0.092	f	f
Beryllium	50	<0.002	<0.0004	<0.001	0.0013	20(d)
Boron	50	0.11	0.027	0.073	f	f
Calcium	50	200	95.8	160	f	f
Cerium	50	<0.08	<0.02	<0.04	f	f
Cobalt	50	<0.01	<0.002	<0.01	f	f
Copper	50	<0.03	<0.006	<0.02	0.018	20(c,d)
Gallium	50	<0.09	<0.02	<0.05	f	f
Iron	50	3.2	<0.06	<0.4	f	f
Lithium	50	0.08	<0.02	<0.04	f	f
Magnesium	50	27	11.9	21	f	f
Manganese	50	0.109	0.01	0.02	f	f
Molybdenum	50	<0.03	<0.006	<0.02	f	f
Nickel	50	<0.04	<0.008	<0.02	1.4	f
Niobium	50	0.05	<0.01	<0.03	f	f
Phosphorus	18	0.3	<0.05	<0.1	f	f
Potassium	50	6	3	5	f	f
Silver	50	<0.03	<0.006	<0.02	0.004	50(c,d)
Sodium	50	351	51.5	110	f	f
Strontium	50	0.503	0.27	0.42	f	f
Thorium	50	<0.05	<0.01	<0.03	f	f
Titanium	50	<0.06	<0.02	<0.04	f	f
Vanadium	50	<0.02	<0.004	<0.01	f	f
Zinc	50	0.05	<0.01	<0.03	0.117	0
Zirconium	50	<0.02	<0.004	<0.01	f	f
PCB, total	50	<0.0060	<0.0005	<0.0006	0.000001	50(d)
Volatile Organics, total	50	<0.01	<0.01	<0.01	544	0

(a)All units are mg/L unless otherwise indicated.

(b)Tennessee Water Quality criteria.

(c)Reference value represents the dissolved form of this metal only. The actual data are representative of all forms.

(d)The analytical detection limit for this parameter is higher than the reference value.

(e)This limit applies to hexavalent Chromium only. The data represent total Chromium.

(f)Not applicable.

(g)Minimum value.

(h)Minimum value/maximum value.

Table 4.55. Y-12 Plant annual radiological summary for upper Bear Creek radiological data km 12.4  
(Summed DCG percentage = 2.64)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG
		Max	+/-	Min	+/-	Median	+/-		
Alpha Activity (pCi/L)	50	550	86	110	23	260	a	13	a
Americium-241 (pCi/L)	50	0.83	0.42	-0.81	0.65	0.052	a	0.035	0.17
Beta activity(pCi/L)	50	280	44	40	9.4	110	a	7.0	a
Neptunium-237 (pCi/L)	50	1.9	0.59	0.0033	0.17	0.73	a	0.048	2.42
Plutonium-238 (pCi/L)	50	0.44	0.39	-0.34	0.50	0.018	a	0.018	0.045
Plutonium-239/240 (pCi/L)	50	0.18	0.18	-0.17	0.14	0	a	0.0095	0
Technetium-99 (pCi/mL)	50	0.61	0.01	0.011	0.01	0.081	a	0.012	0.081
Uranium, total (mg/L)	50	0.91	a	0.272	a	0.58	a	0.020	a
Uranium-235 (%)	50	0.58	a	0.26	a	0.33	a	0.0075	a

(a)Not applicable.

Table 4.56. Surface water analytical results of polychlorinated biphenyls monitoring plan for the Oak Ridge Y-12 Plant, CY 1993

Site number	Location	Date sampled	PCB concentration (mg/L)
PCB-1	Outfall 301, Kerr Hollow Quarry	2/3/93	<0.0005
		5/11/93	<0.0005
		9/15/93	<0.0005
		12/8/93	<0.0005
PCB-2	Outfall 302, Rogers Quarry	2/3/93	<0.0005
		5/11/93	<0.0005
		9/15/93	<0.0005
		12/8/93	<0.0005
PCB-3	Outfall 303, New Hope Pond	a	
PCB-5	New Hope Pond Inlet	b	
PCB-6	Upstream of Outfall 135	2/3/93	<0.0005
		5/11/93	<0.0005
		9/15/93	<0.0005
		12/8/93	<0.0005
PCB-7	Outfall 304, Bear Creek	2/3/93	<0.0005
		5/11/93	<0.0005
		9/15/93	<0.0005
		12/8/93	<0.0005

(a) This outlet was closed in April 1989.

(b) This inlet was closed in November 1988.

Table 4.57. CY 1993 NPDES Permit Number TN 0002968

## Y-12 Plant Cooling Towers

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge point 602</i>						
Temperature, C	4	26.5	21.2	23.7	30.5	0
pH, standard units	4	8.1	7.9	c	6.5/8.5(d)	0
Free chlorine	4	0.10	0.01	0.04	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	<0.03	<0.03	<0.03	1	0
Zinc	4	<0.05	<0.05	<0.05	1	0
Flow, gpd(e)	4	31846	7263	21162	c	c
<i>Discharge point 604</i>						
Temperature, C	4	25.1	14.1	20.4	30.5	0
pH, standard units	4	8.0	7.9	c	6.5/8.5(d)	0
Free chlorine	4	0.08	0.01	0.04	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	<0.03	<0.03	<0.03	1	0
Zinc	4	0.26	0.19	0.22	1	0
Flow, gpd(e)	4	41725	22889	33683	c	c
<i>Discharge point 606 (out of service)</i>						
Temperature, C	f					
pH, standard units	f					
Free chlorine	f					
Chromium	f					
Copper	f					
Zinc	f					
Flow, gpd(e)	f					
<i>Discharge point 610</i>						
Temperature, C	4	27.8	24.2	25.9	30.5	0
pH, standard units	4	7.9	7.3	c	6.5/8.5(d)	0
Free chlorine	4	0.08	0.02	0.05	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	<0.03	<0.03	<0.03	1	0
Zinc	4	0.09	<0.05	<0.06	1	0
Flow, gpd(e)	4	97031	20427	43496	c	c
<i>Discharge point 612</i>						
Temperature, C	1	22.0	22.0	22.0	30.5	0
pH, standard units	1	8.2	8.2	c	6.5/8.5(d)	0
Free chlorine	1	0.02	0.02	0.02	0.5	0
Chromium	1	<0.03	<0.03	<0.03	1	0
Copper	1	<0.03	<0.03	<0.03	1	0
Zinc	1	<0.05	<0.05	<0.05	1	0
Flow, gpd(e)					c	c

Table 4.57 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge point 613</i>						
Temperature, C	4	28.1	24.8	26.3	30.5	0
pH, standard units	4	8.4	7.5	c	6.5/8.5(d)	0
Free chlorine	4	0.02	0.01	0.02	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	<0.03	<0.03	<0.03	1	0
Zinc	4	<0.05	<0.05	<0.05	1	0
Flow, gpd(e)	4	57500	35458	47554	c	c
<i>Discharge point 615</i>						
Temperature, C	4	24.2	21.8	23.2	30.5	0
pH, standard units	4	8.3	8.0	c	6.5/8.5(d)	0
Free chlorine	4	0.03	0.01	0.02	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	0.06	<0.03	<0.04	1	0
Zinc	4	0.65	0.27	0.43	1	0
Flow, gpd(e)	4	3677	1386	2502	c	c
<i>Discharge point 616 (torn down)</i>						
Temperature, C	f					
pH, standard units	f					
Free chlorine	f					
Chromium	f					
Copper	f					
Zinc	f					
Flow, gpd(e)	f					
<i>Discharge point 617</i>						
Temperature, C	4	25.8	18.5	20.9	30.5	0
pH, standard units	4	8.1	7.5	c	6.5/8.5(d)	0
Free chlorine	4	0.04	0.01	0.03	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	0.06	<0.03	<0.04	1	0
Zinc	4	0.71	0.07	0.24	1	0
Flow, gpd(e)	4	36068	18670	28765	c	c
<i>Discharge point 618</i>						
Temperature, C	4	26.3	23.1	24.8	30.5	0
pH, standard units	4	8.4	7.7	c	6.5/8.5(d)	0
Free chlorine	4	0.08	0.01	0.05	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	<0.03	<0.03	<0.03	1	0
Zinc	4	0.08	<0.05	<0.06	1	0
Flow, gpd(e)	4	14671	8558	12030	c	c

Table 4.57 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge point 619</i>						
Temperature, C	3	27.5	20.9	23.3	30.5	0
pH, standard units	3	8.3	7.8	c	6.5/8.5(d)	0
Free chlorine	3	0.05	0.02	0.04	0.5	0
Chromium	3	<0.03	<0.01	<0.02	1	0
Copper	3	<0.03	<0.03	<0.03	1	0
Zinc	3	0.13	0.07	0.11	1	0
Flow, gpd(e)	3	17520	4500	11850	c	c
<i>Discharge point 620</i>						
Temperature, C	4	28.1	22.8	25.0	30.5	0
pH, standard units	4	8.2	8.0	c	6.5/8.5(d)	0
Free chlorine	4	0.03	0.01	0.02	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	<0.03	<0.03	<0.03	1	0
Zinc	4	0.91	0.10	0.34	1	0
Flow, gpd(e)	4	6900	900	2866	c	c
<i>Discharge point 622</i>						
Temperature, C	4	30.1	25.8	28.6	30.5	0
pH, standard units	4	8.3	7.5	c	6.5/8.5(d)	0
Free chlorine	4	0.04	0.01	0.03	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	<0.03	<0.03	<0.03	1	0
Zinc	4	<0.05	<0.05	<0.05	1	0
Flow, gpd(e)	4	82800	27000	51600	c	c
<i>Discharge point 624 (combined with 622)</i>						
Temperature, C	f					
pH, standard units	f					
Free chlorine	f					
Chromium	f					
Copper	f					
Zinc	f					
Flow, gpd(e)	f					
<i>Discharge point 626</i>						
Temperature, C	4	22.7	14.5	19.9	30.5	0
pH, standard units	4	8.3	7.8	c	6.5/8.5(d)	0
Free chlorine	4	0.06	0.02	0.04	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	<0.03	<0.03	<0.03	1	0
Zinc	4	0.06	<0.05	<0.05	1	0
Flow, gpd(e)	4	3593	862	1909	c	c



Table 4.57 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge point 628</i>						
Temperature, C	3	28.5	16.4	24.1	30.5	0
pH, standard units	3	8.0	7.7	c	6.5/8.5(d)	0
Free chlorine	3	0.06	0.01	0.04	0.5	0
Chromium	3	<0.01	<0.01	<0.01	1	0
Copper	3	<0.03	<0.03	<0.03	1	0
Zinc	3	0.14	<0.05	<0.09	1	0
Flow, gpd(e)	3	46000	14113	27878	c	c
<i>Discharge point 630</i>						
Temperature, C	2	24.0	22.6	23.3	30.5	0
pH, standard units	2	7.9	7.5	c	6.5/8.5(d)	0
Free chlorine	2	0.02	0.02	0.02	0.5	0
Chromium	2	<0.03	<0.01	<0.02	1	0
Copper	2	0.06	<0.03	<0.05	1	0
Zinc	2	0.26	0.08	0.17	1	0
Flow, gpd(e)	2	6571	4200	5386	c	c
<i>Discharge point 632</i>						
Temperature, C	3	25.9	24.2	24.9	30.5	0
pH, standard units	3	8.4	8.2	c	6.5/8.5(d)	0
Free chlorine	3	0.08	0.04	0.06	0.5	0
Chromium	3	<0.01	<0.01	<0.01	1	0
Copper	3	<0.03	<0.03	<0.03	1	0
Zinc	3	0.08	<0.05	<0.06	1	0
Flow, gpd(e)	3	14785	7137	9686	c	c
<i>Discharge point 633 (out of service)</i>						
Temperature, C	f					
pH, standard units	f					
Free chlorine	f					
Chromium	f					
Copper	f					
Zinc	f					
Flow, gpd(e)	f					
<i>Discharge point 634</i>						
Temperature, C	4	27.8	24.4	25.8	30.5	0
pH, standard units	4	8.3	8.0	c	6.5/8.5(d)	0
Free chlorine	4	0.04	0.01	0.02	0.5	0
Chromium	4	<0.03	<0.01	<0.02	1	0
Copper	4	<0.03	<0.03	<0.03	1	0
Zinc	4	0.14	0.10	0.12	1	0
Flow, gpd(e)	4	40480	6325	22770	c	c

(a)Units in mg/L unless otherwise indicated

(b)NPDES permit limits.

(c)Not applicable.

(d)Minimum value/maximum value.

(e)Flow during operation and/or discharging.

(f)No flow.

Table 4.58. Y-12 Plant Category I Outfalls

Outfall	Number of samples	pH (standard units)			Min ref. value(a)	No. of values exceeding reference	Max ref. value (a)	No. of values exceeding reference	Flow (gpd)(b)		
		Max	Min	Av					Max	Min	Av
001	1	7.5	7.5	c	6.5	0	8.5	0	25800	25800	25800
003	1	7.5	7.5	c	6.5	0	8.5	0	15218	15218	15218
006	1	8.0	8.0	c	6.5	0	8.5	0	8369	8369	8369
007	1	7.9	7.9	c	6.5	0	8.5	0	6960	6960	6960
009	0	d	d	c	6.5	0	8.5	0	d	d	d
011	0	d	d	c	6.5	0	8.5	0	d	d	d
012	0	d	d	c	6.5	0	8.5	0	d	d	d
015	0	d	d	c	6.5	0	8.5	0	d	d	d
017	1	7.5	7.5	c	6.5	0	8.5	0	22827	22827	22827
018	1	8.0	8.0	c	6.5	0	8.5	0	2282	2282	2282
019	1	7.9	7.9	c	6.5	0	8.5	0	380	380	380
031	1	7.7	7.7	c	6.5	0	8.5	0	6400	6400	6400
032	0	d	d	c	6.5	0	8.5	0	d	d	d
041	0	d	d	c	6.5	0	8.5	0	d	d	d
044	1	7.9	7.9	c	6.5	0	8.5	0	6050	6050	6050
045	1	8.1	8.1	c	6.5	0	8.5	0	127	127	127
057	1	8.1	8.1	c	6.5	0	8.5	0	1141	1141	1141
062	0	d	d	c	6.5	0	8.5	0	d	d	d
108	1	8.4	8.4	c	6.5	0	8.5	0	15218	15218	15218
134	0	d	d	c	6.5	0	8.5	0	d	d	d
156	1	8.4	8.4	c	6.5	0	8.5	0	1141	1141	1141
159	1	8.4	8.4	c	6.5	0	8.5	0	13316	13316	13316
178	1	8.2	8.2	c	6.5	0	8.5	0	15218	15218	15218
180	1	8.3	8.3	c	6.5	0	8.5	0	2282	2282	2282
183	1	7.8	7.8	c	6.5	0	8.5	0	3044	3044	3044
186	1	8.1	8.1	c	6.5	0	8.5	0	4504	4504	4504
193	1	8.2	8.2	c	6.5	0	8.5	0	7609	7609	7609
196	1	8.2	8.2	c	6.5	0	8.5	0	1522	1522	1522
197	0	d	d	c	6.5	0	8.5	0	d	d	d
198	1	7.9	7.9	c	6.5	0	8.5	0	18216	18216	18216
202	1	8.2	8.2	c	6.5	0	8.5	0	1141	1141	1141
205	1	7.2	7.2	c	6.5	0	8.5	0	10652	10652	10652
206	1	8.5	8.5	c	6.5	0	8.5	0	9511	9511	9511
223	1	8.4	8.4	c	6.5	0	8.5	0	13316	13316	13316
235	1	8.4	8.4	c	6.5	0	8.5	0	1522	1522	1522
236	1	8.1	8.1	c	6.5	0	8.5	0	17120	17120	17120

(a)NPDES permit limits.

(b)Flow during operations and/or discharging. No reference value for flow rate.

(c)Not applicable.

(d)No flow.

Table 4.59. Y-12 Plant Category II Outfalls

Outfall	Number of samples	pH (standard units)			Min ref. value(a)	No. of values exceeding reference	Max ref. value (a)	No. of values exceeding reference	Temperature (°C)(b)			Flow (gpd)(c)		
		Max	Min	Av					Max	Min	Av	Max	Min	Av
013	1	7.8	7.8	d	6.5	0	8.5	0	15.6	15.6	15.6	2525	2525	2525
016	3	8.1	7.8	d	6.5	0	8.5	0	17.3	9.1	12.8	68700	320	23133
020	4	8.3	7.7	d	6.5	0	8.5	0	26.2	9.3	15.4	76090	47	19365
023	3	8.2	7.7	d	6.5	0	8.5	0	46.9	39.9	43.0	1350	190	597
025	2	8.4	7.5	d	6.5	0	8.5	0	39.5	25.0	32.3	380	210	295
026	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
029	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
035	3	8.5	7.4	d	6.5	0	8.5	0	19.2	15.4	17.4	1522	95	599
043	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
046	4	8.1	7.5	d	6.5	0	8.5	0	40.6	13.5	29.1	30436	180	8014
053	1	8.0	8.0	d	6.5	0	8.5	0	80.0	80.0	80.0	130	130	130
054	4	8.4	7.6	d	6.5	0	8.5	0	24.9	10.5	17.6	7609	129	2515
058	4	7.6	7.3	d	6.5	0	8.5	0	23.5	11.0	15.4	761	95	293
060	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
066	3	7.7	7.5	d	6.5	0	8.5	0	28.9	23.9	26.9	190	95	137
068	4	8.4	7.0	d	6.5	0	8.5	0	31.7	15.3	22.3	190	91	118
073	4	8.3	7.5	d	6.5	0	8.5	0	29.7	20.1	23.6	28100	10652	18781
075	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
076	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
077	1	7.5	7.5	d	6.5	0	8.5	0	16.9	16.9	16.9	34240	34240	34240
078	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
080	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
081	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
087	4	7.4	6.9	d	6.5	0	8.5	0	22.7	12.5	16.2	7609	190	2187
093	1	8.5	8.5	d	6.5	0	8.5	0	7.9	7.9	7.9	80	80	80
094	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
095	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
096	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
098	4	8.4	7.4	d	6.5	0	8.5	0	21.6	9.6	17.4	11413	1902	5802
111	4	8.1	7.3	d	6.5	0	8.5	0	22.4	10.8	18.0	6860	190	2243
112	1	7.7	7.7	d	6.5	0	8.5	0	13.5	13.5	13.5	195	195	195
117	4	8.4	7.8	d	6.5	0	8.5	0	33.0	20.8	26.4	380	90	236
131	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
133	4	8.2	7.3	d	6.5	0	8.5	0	24.9	12.0	19.1	8520	780	3657
137	3	8.0	7.3	d	6.5	0	8.5	0	20.3	9.8	15.9	34240	780	12941
172	1	7.9	7.9	d	6.5	0	8.5	0	11.8	11.8	11.8	761	761	761
185	4	8.1	7.3	d	6.5	0	8.5	0	32.1	19.2	25.3	7609	127	2505

Table 4.59 (continued)

Outfall of samples	Number of samples	pH (standard units)			Min ref. value(a)	No. of values exceeding reference	Max ref. value (a)	No. of values exceeding reference	Temperature (°C)(b)			Flow (gpd)(c)		
		Max	Min	Av					Max	Min	Av	Max	Min	Av
201	4	8.2	7.3	d	6.5	0	8.5	0	24.9	12.4	18.5	8520	1522	5084
203	4	7.8	6.8	d	6.5	0	8.5	0	20.6	8.9	15.3	34240	1522	11477
204	4	8.1	7.5	d	6.5	0	8.5	0	25.3	11.4	18.6	780	360	475
213	4	7.9	7.2	d	6.5	0	8.5	0	23.5	10.3	16.1	3044	95	862
238	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
239	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e
240	4	8.3	7.6	d	6.5	0	8.5	0	19.4	4.2	14.7	7609	380	2948
241	0	e	e	d	6.5	0	8.5	0	e	e	e	e	e	e

(a)NPDES permit limits.

(b)No reference value.

(c)Flow during operations and/or discharging. No reference value for flow rate.

(d)Not applicable.

(e)No flow.

Table 4.60. Y-12 Plant Category III Outfalls

Outfall	Number of samples	pH (standard units)			Min ref. value(a)	No. of values exceeding reference	Max ref. value (a)	No. of values exceeding reference	Temperature (°C)(b)			Ref. value(b)	No. of values exceeding reference	Flow (gpd)(b)		
		Max	Min	Av					Max	Min	Av			Max	Min	Av
002	4	8.3	7.4	c	6.5	0	8.5	0	27.9	10.1	15.3	30.5	0	137960	30436	68871
071	4	8.1	7.5	c	6.5	0	8.5	0	21.4	11.2	15.5	30.5	0	94250	13710	40317
135	4	8.3	7.2	c	6.5	0	8.5	0	31.8	15.2	24.1	30.5	0	499680	432000	465420
147	4	8.1	7.2	c	6.5	0	8.5	0	25.5	14.0	18.7	30.5	0	9891	380	3424
150	4	8.0	7.8	c	6.5	0	8.5	0	27.7	22.8	25.9	30.5	0	777600	497511	630479
157	3	7.7	7.5	c	6.5	0	8.5	0	20.2	15.7	18.1	30.5	0	6087	1141	2917
160	4	8.1	7.9	c	6.5	0	8.5	0	31.1	21.1	25.2	30.5	0	250082	1256	89915
163	4	8.2	8.0	c	6.5	0	8.5	0	27.8	19.2	23.0	30.5	0	272752	2983	160405
169	4	8.4	7.7	c	6.5	0	8.5	0	24.4	14.5	20.7	30.5	0	380426	149112	279279
181	0	d	d	c	6.5	0	8.5	0	d	d	d	30.5	0	d	d	d
192	4	8.1	6.7	c	6.5	0	8.5	0	23.8	15.3	18.7	30.5	0	9131	1141	3139

- (a)NPDES permit limits.
- (b)Flow during operations and/or discharging. No reference value for flow rate.
- (c)Not applicable.
- (d)No flow.

Table 4.61. CY 1993 NPDES Permit Number TN 0002968 Y-12 Plant Category IV Outfalls(a)

Outfall	Number of samples	pH (standard units)			Minimum reference value(b)	Number of values below reference	Maximum reference value	Number of values exceeding reference
		Max	Min	Av				
401	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
402	10	7.8	6.7	<i>d</i>	6.5	0	8.5	0
403	<i>c</i>				6.5	0	8.5	0
404	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
405	30	8.5	7.1	<i>d</i>	6.5	0	8.5	0
406	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
407	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
408	52	8.2	6.8	<i>d</i>	6.5	0	8.5	0
409	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
410	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
411	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
412	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
413	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
414	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
415	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
416	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
417	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
418	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
419	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
420	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
421	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>
422	<i>c</i>				6.5	<i>d</i>	8.5	<i>d</i>

(a)Flow during operation and/or discharging.

(b)NPDES permit limits.

(c)No flow.

(d)Not applicable.

Table 4.62. CY 1993 Y-12 Plant data summary for outfall not specifically enumerated on the NPDES permit

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge Point 4</i>						
Flow(c), gpd	4	15218	1902	8845	<i>d</i>	<i>d</i>
pH, standard units	4	8.1	7.7	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	22.8	10.5	16.1	<i>d</i>	<i>d</i>
Ammonia	4	0.22	<0.2	<0.21	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	13	<5.0	<7.6	<i>d</i>	<i>d</i>
Total organic carbon	4	45	19	33	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 8</i>						
Flow(c), gpd	4	9511	761	3139	<i>d</i>	<i>d</i>
pH, standard units	4	8.1	7.5	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	26.4	14.8	20.1	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	6.6	<5	<5.4	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	6.8	<5	<5.5	<i>d</i>	<i>d</i>
Total organic carbon	4	27	11	17	<i>d</i>	<i>d</i>
Total suspended solids	4	5.0	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 10</i>						
Flow(c), gpd	4	18261	2282	7758	<i>d</i>	<i>d</i>
pH, standard units	4	8.1	7.9	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	25.6	20.0	21.7	<i>d</i>	<i>d</i>
Ammonia	4	0.21	<0.2	<0.20	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	6.5	<5	<5.5	<i>d</i>	<i>d</i>
Total organic carbon	4	18	2.9	9.8	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 14</i>						
Flow(c), gpd	4	15979	2980	8219	<i>d</i>	<i>d</i>
pH, standard units	4	8.3	7.4	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	28.3	14.4	20.7	<i>d</i>	<i>d</i>
Ammonia	4	0.70	<0.2	<0.33	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	9.0	<5	<6.1	<i>d</i>	<i>d</i>
Total organic carbon	4	26	4.5	14.3	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>

Table 4.62 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge Point 21</i>						
Flow(c), gpd	4	152180	57070	118553	<i>d</i>	<i>d</i>
pH, standard units	4	8.1	7.5	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	29.7	16.7	20.3	<i>d</i>	<i>d</i>
Ammonia	4	0.3	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	<5	<5	<5	<i>d</i>	<i>d</i>
Total organic carbon	4	21	4.8	13.5	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 22</i>						
Flow(c), gpd	3	20925	3424	13189	<i>d</i>	<i>d</i>
pH, standard units	3	8.4	7.6	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	3	27.6	12.6	19.2	<i>d</i>	<i>d</i>
Ammonia	3	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	11	<5	<7	<i>d</i>	<i>d</i>
Total organic carbon	3	19	14	16	<i>d</i>	<i>d</i>
Total suspended solids	3	58	<5	<23	<i>d</i>	<i>d</i>
<i>Discharge Point 33</i>						
Flow(c), gpd	4	22840	1522	8183	<i>d</i>	<i>d</i>
pH, standard units	4	8.2	6.8	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	23.5	10.5	16.7	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	<5.0	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	20	<5	<10	<i>d</i>	<i>d</i>
Total organic carbon	4	33	7.3	20.8	<i>d</i>	<i>d</i>
Total suspended solids	4	5.0	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 34</i>						
Flow(c), gpd	4	182611	41088	107500	<i>d</i>	<i>d</i>
pH, standard units	4	8.3	7.4	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	32.4	21.7	25.6	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	9.8	<5	<6.6	<i>d</i>	<i>d</i>
Total organic carbon	4	24	13	18	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>



Table 4.62 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge Point 36</i>						
Flow(c), gpd	4	6100	190	2278	<i>d</i>	<i>d</i>
pH, standard units	4	8.4	7.8	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	24.0	8.7	16.9	<i>d</i>	<i>d</i>
Ammonia	4	0.21	<0.2	<0.20	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	<5.0	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	48	14	32	<i>d</i>	<i>d</i>
Total organic carbon	4	35	15	23	<i>d</i>	<i>d</i>
Total suspended solids	4	10	<5	<6	<i>d</i>	<i>d</i>
<i>Discharge Point 39</i>						
Flow(c), gpd	2	1310	780	1045	<i>d</i>	<i>d</i>
pH, standard units	2	8.3	7.7	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	2	15.4	8.8	12.1	<i>d</i>	<i>d</i>
Ammonia	2	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	2	42	7.0	25	<i>d</i>	<i>d</i>
Total organic carbon	2	19	18	19	<i>d</i>	<i>d</i>
Total suspended solids	2	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 42</i>						
Flow(c), gpd	4	30400	5707	16158	<i>d</i>	<i>d</i>
pH, standard units	4	8.5	7.9	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	30.9	12.5	20.4	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	9.0	<5	<6.3	<i>d</i>	<i>d</i>
Total organic carbon	4	19	12	16	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 47</i>						
Flow(c), gpd	4	74880	7609	35239	<i>d</i>	<i>d</i>
pH, standard units	4	8.2	7.8	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	25.8	22.3	23.5	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Total organic carbon	4	17	<2	<10	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>

Table 4.62 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge Point 48</i>						
Flow(c), gpd	4	8640	2282	5145	<i>d</i>	<i>d</i>
pH, standard units	4	8.4	7.9	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	26.0	19.4	21.5	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	2	19	<5	<12	<i>d</i>	<i>d</i>
Total organic carbon	4	21	14	16	<i>d</i>	<i>d</i>
Total suspended solids	4	25	<5	<15	<i>d</i>	<i>d</i>
<i>Discharge Point 49</i>						
Flow(c), gpd	4	21600	9250	15321	<i>d</i>	<i>d</i>
pH, standard units	4	8.3	7.7	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	26.4	16.7	19.8	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	2	19	<5	<12	<i>d</i>	<i>d</i>
Total organic carbon	4	23	2.8	14.7	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 51</i>						
Flow(c), gpd	4	436159	15920	170070	<i>d</i>	<i>d</i>
pH, standard units	4	7.8	6.6	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	20.0	14.7	16.9	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	2	8.7	<5	<6.9	<i>d</i>	<i>d</i>
Total organic carbon	4	49	35	41	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 55</i>						
Flow(c), gpd	4	114135	82080	101711	<i>d</i>	<i>d</i>
pH, standard units	4	7.7	6.7	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	27.3	18.1	22.3	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Total organic carbon	4	30	3.0	15.5	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>

Table 4.62 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge Point 63</i>						
Flow(c), gpd	4	3424	1522	2093	<i>d</i>	<i>d</i>
pH, standard units	4	8.0	7.7	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	22.5	12.1	17.1	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	17	<5	<11	<i>d</i>	<i>d</i>
Total organic carbon	4	17	3.9	12.7	<i>d</i>	<i>d</i>
Total suspended solids	4	26	<5	<11	<i>d</i>	<i>d</i>
<i>Discharge Point 64</i>						
Flow(c), gpd	4	23920	190	6693	<i>d</i>	<i>d</i>
pH, standard units	4	8.2	7.8	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	23.4	7.3	15.3	<i>d</i>	<i>d</i>
Ammonia	4	0.45	<0.2	<0.26	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	5.9	<5	<5.2	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	38	<5	<16	<i>d</i>	<i>d</i>
Total organic carbon	4	13	6.4	9.9	<i>d</i>	<i>d</i>
Total suspended solids	4	46	<5	<15	<i>d</i>	<i>d</i>
<i>Discharge Point 67</i>						
Flow(c), gpd	4	38040	13316	25645	<i>d</i>	<i>d</i>
pH, standard units	4	8.2	6.9	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	24.8	12.2	16.7	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	2	7.5	<5	<6.3	<i>d</i>	<i>d</i>
Total organic carbon	4	27	4.5	14.3	<i>d</i>	<i>d</i>
Total suspended solids	4	46	<5	<15	<i>d</i>	<i>d</i>
<i>Discharge Point 71</i>						
Flow(c), gpd	3	94250	15218	49185	<i>d</i>	<i>d</i>
pH, standard units	3	8.1	7.5	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	3	26.4	11.2	16.3	<i>d</i>	<i>d</i>
Ammonia	3	0.23	<0.2	<0.21	<i>d</i>	<i>d</i>
Biochemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	2	<5	<5	<5	<i>d</i>	<i>d</i>
Total organic carbon	3	19	3.6	13.2	<i>d</i>	<i>d</i>
Total suspended solids	3	<5	<5	<5	<i>d</i>	<i>d</i>

Table 4.62 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge Point 83</i>						
Flow(c), gpd	3	7510	3044	5547	<i>d</i>	<i>d</i>
pH, standard units	3	8.2	7.4	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	3	15.9	13.4	14.9	<i>d</i>	<i>d</i>
Ammonia	3	0.28	<0.2	<0.23	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5.0	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	20	<5.4	<10.3	<i>d</i>	<i>d</i>
Total organic carbon	3	6.3	5.2	5.7	<i>d</i>	<i>d</i>
Total suspended solids	3	5.0	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 88</i>						
Flow(c), gpd	4	7609	560	3310	<i>d</i>	<i>d</i>
pH, standard units	4	8.1	7.7	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	28.4	13.8	19.4	<i>d</i>	<i>d</i>
Ammonia	4	0.45	<0.2	<0.26	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5.0	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	<5	<5	<5	<i>d</i>	<i>d</i>
Total organic carbon	4	21	4	11	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 99</i>						
Flow(c), gpd	4	5707	1522	3044	<i>d</i>	<i>d</i>
pH, standard units	4	8.1	6.9	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	23.6	14.6	18.3	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5.0	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	20	<5	<10	<i>d</i>	<i>d</i>
Total organic carbon	4	16	6.4	9.2	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 109</i>						
Flow(c), gpd	4	159790	110500	138018	<i>d</i>	<i>d</i>
pH, standard units	4	8.2	7.3	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	23.8	13.7	17.9	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5.0	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	<5	<5	<5	<i>d</i>	<i>d</i>
Total organic carbon	4	21	8.1	14.6	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>

Table 4.62 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge Point 110</i>						
Flow(c), gpd	4	3804	95	1450	<i>d</i>	<i>d</i>
pH, standard units	4	8.4	7.8	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	26.2	8.5	18.7	<i>d</i>	<i>d</i>
Ammonia	4	0.20	<0.2	<0.20	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	<5.0	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	19.0	<5	<10.4	<i>d</i>	<i>d</i>
Total organic carbon	4	15	5.5	8.8	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 113</i>						
Flow(c), gpd	4	8110	4565	6498	<i>d</i>	<i>d</i>
pH, standard units	4	8.4	7.9	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	29.8	15.6	19.5	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5.0	<5	<5.0	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	6.0	<5	<5.3	<i>d</i>	<i>d</i>
Total organic carbon	4	16	7.3	11.9	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 114</i>						
Flow(c), gpd	4	3044	1141	1739	<i>d</i>	<i>d</i>
pH, standard units	4	8.4	7.8	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	27.5	19.5	23.3	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	5.4	<5	<5.1	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	21	17	18	<i>d</i>	<i>d</i>
Total organic carbon	4	16	7.3	11.9	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 122</i>						
Flow(c), gpd	4	6801	761	3032	<i>d</i>	<i>d</i>
pH, standard units	4	7.8	7.5	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	33.5	19.6	26.9	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5.0	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	<5	<5	<5	<i>d</i>	<i>d</i>
Total organic carbon	4	24	5.2	16.8	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>

Table 4.62 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
<i>Discharge Point 125</i>						
Flow(c), gpd	4	366545	136960	252224	<i>d</i>	<i>d</i>
pH, standard units	4	8.0	7.5	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	26.9	17.1	20	<i>d</i>	<i>d</i>
Ammonia	4	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	3	<5.0	<5	<5	<i>d</i>	<i>d</i>
Chemical oxygen demand	3	<5	<5	<5	<i>d</i>	<i>d</i>
Total organic carbon	4	20	2.0	14.0	<i>d</i>	<i>d</i>
Total suspended solids	4	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 135</i>						
Flow(c), gpd	3	499680	432000	460560	<i>d</i>	<i>d</i>
pH, standard units	3	8.3	7.7	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	3	31.8	22.9	26.3	<i>d</i>	<i>d</i>
Ammonia	3	<0.2	<0.2	<0.2	<i>d</i>	<i>d</i>
Biochemical oxygen demand	2	<5.0	<5	<5.0	<i>d</i>	<i>d</i>
Chemical oxygen demand	2	<5.0	<5	<5.0	<i>d</i>	<i>d</i>
Total organic carbon	3	19	4.0	12.0	<i>d</i>	<i>d</i>
Total suspended solids	3	<5	<5	<5	<i>d</i>	<i>d</i>
<i>Discharge Point 142</i>						
Flow(c), gpd	4	2282	320	1316	<i>d</i>	<i>d</i>
pH, standard units	4	8.4	8.1	<i>d</i>	<i>d</i>	<i>d</i>
Temperature, C	4	22.0	13.1	18.1	<i>d</i>	<i>d</i>
Ammonia	4	0.21	<0.2	<0.20	<i>d</i>	<i>d</i>
Biochemical oxygen demand	4	<5.0	<5	<5.0	<i>d</i>	<i>d</i>
Chemical oxygen demand	4	35	13	22	<i>d</i>	<i>d</i>
Total organic carbon	4	13	3.1	8.7	<i>d</i>	<i>d</i>
Total suspended solids	4	64	<5	<24	<i>d</i>	<i>d</i>

(a)Units in mg/L unless otherwise indicated

(b)NPDES permit limits.

(c)Flow during operation and/or discharging.

(d)Not applicable.

**Table 4.63. Surface water analytical results of polychlorinated biphenyls monitoring plan for the Y-12 Plant, 1993**

Site No.	Location	Date sampled	PCB concentration (mg/L)
PCB-1	Outfall 301, Kerr Hollow Quarry	2/3/93	<0.0005
		5/11/93	<0.0005
		9/15/93	<0.0005
		12/8/93	<0.0005
PCB-2	Outfall 302, Rogers Quarry	2/3/93	<0.0005
		5/11/93	<0.0005
		9/15/93	<0.0005
		12/8/93	<0.0005
PCB-3	Outfall 303, New Hope Pond	<i>a</i>	
PCB-5	New Hope Pond Inlet	<i>b</i>	
PCB-6	Upstream of Outfall 135	2/3/93	<0.0005
		5/11/93	<0.0005
		9/15/93	<0.0005
		12/8/93	<0.0005
PCB-7	Outfall 304, Bear Creek	2/3/93	<0.0005
		5/11/93	<0.0005
		9/15/93	<0.0005
		12/8/93	<0.0005

<sup>a</sup>This outlet was closed in April 1989.

<sup>b</sup>This inlet was closed in November 1988.

**Table 4.64. Permit limits for Y-12 Plant sanitary sewer discharge to City of Oak Ridge Publicly Owned Treatment Works (POTW)**

Parameter	City of Oak Ridge sanitary sewer industrial discharge permit limits <sup>a</sup>
pH	6-9 pH units <sup>b</sup>
Cyanide	0.007
Oil and grease	50
Phenols	5
Biochemical oxygen demand	300
Hexavalent chromium (chromium VI)	0.002
Mercury	0.1
Total Kjeldahl nitrogen	90
Total suspended solids (TSS)	300
Arsenic	0.1
Cadmium	0.000024
Copper	0.04
Iron	1.5
Lead	0.0016
Manganese	1
Nickel	0.1
Silver	0.1
Zinc	2

<sup>a</sup>All values in mg/L unless noted otherwise.

<sup>b</sup>Maximum value/minimum value.



Table 4.65. City Flow Monitoring Station (northeast of Y-12 Plant)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
pH, standard units	45	8.6	6.9	c	c	c
Cyanide	45	0.02	<0.002	<0.01	c	c
Oil and Grease	45	83	<2.0	<11	c	c
Phenols	45	0.064	<0.0013	<0.018	c	c
Total Volatile Organics	45	0.034	<0.01	<0.01	c	c
Benzene	45	<0.01	<0.01	<0.01	c	c
Methylene Chloride	45	0.021	<0.001	<0.01	c	c
Tetrachloroethene	45	8	<0.002	2	c	c
Trichloroethylene	45	<0.01	<0.01	<0.01	c	c
Toluene	45	0.01	<0.004	<0.01	c	c
Total Chlorinated Hydrocarbons	45	0.034	<0.01	<0.01	c	c
Ammonia	45	21	4.8	11	c	c
Biochemical Oxygen Demand	45	160	23	55	c	c
Chemical Oxygen Demand	45	600	24	120	c	c
Hexavalent Chromium	45	0.05	<0.01	<0.01	c	c
Trivalent Chromium	45	0.003	-0.044	-0.005	c	c
Mercury	45	0.0083	<0.0002	<0.0008	c	c
Total Kjeldahl Nitrogen	45	42	7.0	16	c	c
Total Suspended Solids	45	140	13	45	c	c
Selenium	45	<0.1	<0.002	<0.05	c	c
Aluminum	45	0.68	0.10	0.20	c	c
Arsenic	45	<0.04	<0.04	<0.04	c	c
Barium	45	0.474	0.0348	0.0567	c	c
Beryllium	45	0.0005	<0.0004	<0.0004	c	c
Boron	45	0.098	0.024	0.045	c	c
Cadmium	45	<0.004	<0.004	<0.004	c	c
Calcium	45	58.8	37.0	42.2	c	c
Cerium	45	<0.02	<0.02	<0.02	c	c
Chromium, total	45	0.016	<0.006	<0.006	c	c
Cobalt	45	0.138	<0.002	<0.006	c	c
Copper	45	0.031	0.009	0.02	c	c
Gallium	45	<0.02	<0.02	0.02	c	c
Iron	45	0.68	0.21	0.37	c	c
Lead	45	0.05	<0.02	<0.02	c	c
Lithium	45	0.16	<0.02	<0.03	c	c
Magnesium	45	11.3	8.85	9.96	c	c
Manganese	45	0.106	0.04	0.07	c	c
Molybdenum	45	0.008	<0.006	<0.006	c	c
Nickel	45	0.009	<0.008	<0.008	c	c
Niobium	45	<0.01	<0.01	<0.01	c	c
Phosphorus	6	3.77	<1.33	<2.38	c	c
Potassium	45	11.3	5.1	7.2	c	c
Silver	45	0.018	<0.006	<0.007	c	c
Sodium	45	49.1	13.0	17.5	c	c

Table 4.65 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Strontium	45	0.168	0.095	0.11	c	c
Thorium	45	<0.01	<0.01	<0.01	c	c
Thallium	45	<0.03	<0.03	<0.03	c	c
Titanium	45	1.64	<0.01	<0.06	c	c
Vanadium	45	<0.004	<0.004	<0.004	c	c
Zinc	45	0.26	0.07	0.1	c	c
Zirconium	45	<0.004	<0.004	<0.004	c	c

(a)All units in mg/L unless otherwise indicated.

(b)Sanitary Sewer Industrial Discharge Permit limits.

(c)Not applicable.

Table 4.66. City Flow Monitoring Station (northeast of Y-12 Plant)  
(Summed DCG percentage = 1.88)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG
		Max	+/-	Min	+/-	Median	+/-		
Alpha activity (pCi/L)	45	33	11	-4.8	7.4	6.7	7.1	1.0	a
Beta activity (pCi/L)	45	24	7.4	-8.5	8.8	8.1	5.6	0.90	a
Plutonium-238 (pCi/L)	45	0.54	0.40	-0.44	0.84	0	0	0.029	0
Plutonium-239/240 (pCi/L)	45	2.9	0.78	-0.18	0.18	0.25	0	0.066	0.83
Uranium-234 (pCi/L)	45	19	3.7	0.99	0.48	3.5	1.1	0.47	0.70
Uranium-235 (%)	45	10	a	0.2	a	0.9	a	0.2	a
Uranium-235 (pCi/L)	44	0.73	0.45	-0.04	0.07	0.2	a	0.03	0.03
Uranium-236 (pCi/L)	44	0.31	0.26	-0.026	0.053	0.11	a	0.013	0.021
Uranium-238 (pCi/L)	45	19	3.2	0.25	0.20	1.8	0.67	0.42	0.30
Uranium, total (mg/L)	45	0.039	a	0.002	a	0.004	a	a	a
Gamma activity (pCi/L)	40	78	16	-14	16	28	a	3.7	a

(a)Not applicable.

Table 4.67. Union Valley Flow Monitoring Station (east of Y-12 Plant)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
pH, standard units	45	8.8	6.4	c	c	c
Cyanide	45	0.056	<0.0017	<0.010	c	c
Oil and Grease	45	250	3.3	34	c	c
Phenols	45	0.13	<0.0018	<0.036	c	c
Total Volatile Organics	45	0.579	<0.01	<0.04	c	c
Benzene	45	<0.01	<0.01	<0.01	c	c
Methylene Chloride	45	540	<0.01	<20	c	c
Tetrachloroethene	45	2	<0.001	<0.05	c	c
Trichloroethylene	45	<0.01	<0.01	<0.01	c	c
Toluene	45	22	<0.001	<0.5	c	c
Total Chlorinated Hydrocarbons	45	0.579	<0.01	<0.04	c	c
Ammonia	45	41	0.94	23	c	c
Biochemical Oxygen Demand	45	>400	<31	<140	c	c
Chemical Oxygen Demand	45	1100	<5	<350	c	c
Hexavalent Chromium	45	0.4	<0.01	<0.02	c	c
Trivalent Chromium	45	0.15	-0.004	0.007	c	c
Mercury	45	0.015	<0.0002	<0.001	c	c
Total Kjeldahl Nitrogen	45	65	6.7	35	c	c
Total Suspended Solids	45	900	6.0	157	c	c
Selenium	45	0.1	<0.002	<0.05	c	c
Aluminum	45	33	0.14	1.5	c	c
Arsenic	45	<0.04	<0.004	<0.04	c	c
Barium	45	0.237	0.0424	0.0763	c	c
Beryllium	45	0.0052	<0.0004	<0.001	c	c
Boron	45	1.05	0.026	0.22	c	c
Cadmium	45	0.006	<0.004	<0.004	c	c
Calcium	45	72.9	45.7	56.6	c	c
Cerium	45	0.02	<0.02	<0.02	c	c
Chromium, total	45	0.55	<0.006	<0.03	c	c
Cobalt	45	1.85	<0.002	<0.06	c	c
Copper	45	0.212	0.014	0.061	c	c
Gallium	45	<0.02	<0.02	<0.02	c	c
Iron	45	3.47	0.30	0.77	c	c
Lead	45	0.12	<0.02	<0.03	c	c
Lithium	45	1.11	<0.02	<0.09	c	c
Magnesium	44	14.3	8.45	11.6	c	c
Manganese	45	0.349	0.079	0.22	c	c
Molybdenum	45	0.031	<0.006	<0.007	c	c
Nickel	45	0.339	<0.008	<0.02	c	c
Niobium	45	<0.01	<0.01	<0.01	c	c
Phosphorus	7	9.53	<2.02	<4.05	c	c
Potassium	45	29.6	6.7	18	c	c
Silver	45	0.015	<0.006	<0.006	c	c

Table 4.67 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)	Number of values exceeding reference
		Max	Min	Av		
Sodium	45	64.5	11.5	28.0	c	c
Strontium	45	0.209	0.111	0.138	c	c
Thorium	45	<0.03	<0.03	<0.03	c	c
Thallium	45	<0.01	<0.01	<0.01	c	c
Titanium	45	11.6	<0.01	<0.4	c	c
Vanadium	45	0.018	<0.004	<0.004	c	c
Zinc	45	14	0.06	0.5	c	c
Zirconium	45	<0.012	<0.004	<0.004	c	c

(a)All units in mg/L unless otherwise indicated.

(b)Sanitary Sewer Industrial Discharge Permit limits.

(c)Not applicable.

**Table 4.68. Union Valley Flow Monitoring Station (east of Y-12 Plant)**  
(Summed DCG percentage = 1.27)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG
		Max	+/-	Min	+/-	Median	+/-		
Alpha activity (pCi/L)	45	42	13	-5.8	6.7	8.8	8.9	1.6	a
Beta activity (pCi/L)	45	49	10	1.2	8.8	18	6.9	1.6	a
Plutonium-238 (pCi/L)	45	0.61	0.95	-0.27	0.23	0.013	0.10	0.025	0.033
Plutonium-239/240 (pCi/L)	45	0.65	0.60	-0.11	0.16	0	0	0.019	0
Uranium-234 (pCi/L)	45	6.4	1.9	-0.007	0.21	1	0.48	0.2	0.2
Uranium-235 (%)	45	0.78	a	0.12	a	0.22	a	0.017	a
Uranium-235 (pCi/L)	44	0.76	0.57	-0.09	0.18	0.2	a	0.03	0.03
Uranium-236 (pCi/L)	44	0.36	0.33	-0.06	0.09	0.05	a	0.01	0.01
Uranium-238 (pCi/L)	45	45	9.8	0.03	0.17	8	1.7	2	1
Uranium, total (mg/L)	45	0.092	a	<0.001	a	<0.015	a	a	a
Gamma activity (pCi/L)	40	510	51	-35	0	35	a	14	a

(a)Not applicable.

Table 4.69. Y-12 calculated sanitary sewer concentrations

Parameter	Number of samples	Concentration(a)			Reference value(b)
		Max	Min	Av	
Flow, L	45	38138761	1361488	3530860	c
Flow, gal	45	10074720	359650	932711	c
pH, standard units	45	8.7	6.9	7.5	6-9(d)
Cyanide	45	<0.020	<0.002(e)	<0.008	0.007
Oil and Grease	45	75	<2(e)	<9	50
Phenols	45	0.059	<0.001(e)	<0.016	5.0
Total Volatile Organics	45	0.04	<0.010(e)	<0.012	c
Benzene	45	<0.01	<0.010	<0.010	c
Methylene Chloride	45	0.02	<0.010(e)	<0.010(e)	c
Tetrachloroethene	45	10.57	<0.001	<2.41	c
Trichloroethylene	45	<0.01	<0.01	<0.010	c
Toluene	45	<0.01	<0.010(e)	<0.010(e)	c
Total Chlorinated Hydrocarbons	45	0.04	<0.010(e)	<0.012	c
Ammonia	45	20.1	<0.2(e)	9.7	c
Biochemical Oxygen Demand	45	176	<5(e)	<43	300
Chemical Oxygen Demand	45	387	<5(e)	<90	c
Hexavalent Chromium	45	<0.05	<0.01(e)	<0.01	0.002
Trivalent Chromium	45	0.004	<0.03(e)	<0.03(e)	c
Mercury	45	0.0124	<0.0005	<0.001	0.1
Total Kjeldahl Nitrogen	45	42.3	<0.2(e)	13.1	90
Total Suspended Solids	45	127.4	<5	25.5	300
Selenium	45	<0.100	<0.002	<0.05	c
Aluminum	45	0.27	<0.2(e)	0.073	c
Arsenic	45	<0.04	<0.04	<0.04	0.1
Barium	45	0.508	<0.004(e)	0.052	c
Beryllium	45	0.0004	<0.002(e)	<0.0003	c
Boron	45	0.059	<0.006(e)	0.021	c
Cadmium	45	<0.004	<0.004	<0.004	0.000024
Calcium	45	58.2	26.5	40.3	c
Cerium	45	<0.02	<0.02	<0.02	c
Chromium, total	45	0.014	<0.006(e)	<0.004	c
Cobalt	45	0.008	<0.01(e)	<0.01(e)	c
Copper	45	0.022	<0.006(e)	0.010	0.04
Gallium	45	<0.02	<0.02	<0.02	c
Iron	45	0.66	<0.06(e)	0.31	1.5
Lead	45	<0.05	<0.01	<0.02	0.0016
Lithium	45	0.07	<0.08(e)	<0.01	c
Magnesium	45	11.6	8.7	9.8	c
Manganese	45	0.103	<0.002(e)	0.054	1.0
Molybdenum	45	0.006	<0.002	<0.006	c
Nickel	45	0.008	<0.008(e)	<0.005	0.10
Niobium	45	<0.01	<0.01	<0.01	c

Table 4.69 (continued)

Parameter	Number of samples	Concentration(a)			Reference value(b)
		Max	Min	Av	
Phosphorus	5	3.7	1.2	2.1	c
Potassium	45	10.5	1.2	5.9	c
Silver	45	<0.019	<0.005	<0.007	0.1
Sodium	45	51.8	6.8	16.1	c
Strontium	45	0.17	0.05	0.11	c
Thorium	45	<0.03	<0.03	<0.03	c
Thallium	45	<0.01	<0.01	<0.01	c
Titanium	45	0.059	<0.06(e)	<0.06(e)	c
Vanadium	45	<0.004	<0.02(e)	<0.004	c
Zinc	45	0.212	<0.01(e)	<0.107	2.0
Zirconium	45	<0.004	<0.004	<0.004	c

(a)All units in mg/L unless otherwise indicated.

(b)Sanitary Sewer Industrial Discharge Permit limits.

(c)Not applicable.

(d)Minimum value/maximum value.

(e)Calculated value was below the detection limit.



**Table 4.70. Y-12 calculated sanitary sewer concentrations**  
(Summed DCG percentage = 1.03)

Parameter	Number of samples	Concentration						Standard error	Percentage of DCG
		Max	+/-	Min	+/-	Median	+/-		
Alpha activity (pCi/L)	45	34.4	11	-5.6	8	6.1	8	1.1	a
Beta activity (pCi/L)	45	24.8	7	-10.7	9	6.97	6	0.970	a
Plutonium-238 (pCi/L)	44	0.61	0.41	-0.48	0.39	0.012	a	0.033	0.029
Plutonium-239/240 (pCi/L)	43	3.13	0.83	-0.19	0.16	0.0023	0.0046	0.074	0.0058
Uranium-234 (pCi/L)	45	20.27	3.92	0.99	0.48	3.8	1.2	0.50	0.75
Uranium-235 (%)	45	14.41	a	-8.57	a	1.04	a	0.416	a
Uranium-235 (pCi/L)	44	0.80	0.50	-0.07	0.06	0.18	a	0.03	0.03
Uranium-236 (pCi/L)	42	0.32	0.27	-0.03	0.05	0.11	a	0.01	0.02
Uranium-238 (pCi/L)	45	19.13	3.22	-3.05	0.23	1.1	0.50	0.46	0.19
Uranium, total (mg/L)	45	0.050	a	-0.005	a	<0.004	a	0.001	a
Gamma activity (pCi/L)	40	81.8	16	-20.2	13	25.5	a	4.08	a

(a)Not applicable.

Table 4.71. 1993 sampling and analysis plan for  
ORNL off-site treated water monitoring

Station	Analysis	Collection frequency	Sample type	Analysis frequency
Gallaher	Gamma scan, Gross alpha, Gross beta, H-3, Pu-238, Pu-239, Total rad Sr, Total U	Weekly	Time proportional composite	Quarterly
Kingston	Gamma scan, Gross alpha, Gross beta, H-3, Pu-238, Pu-239, Total rad Sr, Total U	Weekly	Grab	Quarterly

Table 4.72. 1993 analyses for OPNL off-site treated water monitoring at Gallaher water treatment plant

Parameter	N det/ N total	Concentration			Standard error <sup>c</sup>	DWS <sup>d</sup>	Percent of DWS <sup>e</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>			
Metals (mg/L)							
Uranium, total <sup>f</sup>	4/4	0.00025	0.00010	0.00017*	0.000030	g	g
Radionuclides (pCi/L)							
Co-60	0/4	0.41	-0.27	0.14	0.16	200	g
Cs-137	0/4	0.49	-0.081	0.21	0.13	120	g
Gross alpha	2/4	0.70*	0.054	0.39*	0.15	15	2.6
Gross beta	4/4	3.8*	1.9*	2.6*	0.42	50	5.3
H-3	0/4	810	-650	150	300	20,000	g
Pu-238	0/4	0.011	-0.011	-0.00061	0.0051	1.6	g
Pu-239	0/4	0.0014	-0.097	-0.030	0.023	1.2	g
Total rad Sr	4/4	1.5*	0.57*	1.1*	0.23	8	14
Total U <sup>f,h</sup>	4/4	0.16	0.066	0.11*	0.020	20	0.57

<sup>a</sup>Individual radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>b</sup>Average radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>c</sup>Standard error of the mean.

<sup>d</sup>Drinking Water Standards (from 40 CFR Parts 141 and 143, as amended, and the Tennessee General Water Quality Criteria for Domestic Water Supplies, as amended). For radionuclides that do not have a drinking water standard, 4% of DCG for ingestion of water (from DOE Order 5400.5) is used.

<sup>e</sup>Average concentration as a percentage of the drinking water standards, calculated when a reference exists and the parameter is a contaminant. For radionuclides, percentage of DWS is calculated only when a reference exists and the average concentration is significantly greater than zero.

<sup>f</sup>Laboratory method does not permit a test of significance for the maximum and minimum values.

<sup>g</sup>Not applicable.

<sup>h</sup>Activity derived from mass assuming natural abundance of U-234, U-235, and U-238.

Table 4.73. 1993 analyses for ORNL off-site treated water monitoring at Kingston water treatment plant

Parameter	N det/ N total	Concentration			Standard error <sup>c</sup>	DWS <sup>d</sup>	Percent of DWS <sup>e</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>			
Metals (mg/L)							
Uranium, total <sup>f</sup>	4/4	0.00014	0.00010	0.00012*	0.0000082	g	g
Radionuclides (pCi/L)							
Co-60	0/4	0.11	-0.27	-0.014	0.087	200	g
Cs-137	2/4	0.35*	0.027	0.18*	0.068	120	0.15
Gross alpha	2/4	0.95*	0.016	0.46	0.21	15	g
Gross beta	4/4	2.2*	1.0*	1.7*	0.26	50	3.4
H-3	0/4	110	-350	-88	100	20,000	g
Pu-238	0/4	0.011	-0.00019	0.0058	0.0026	1.6	g
Pu-239	0/4	0.0084	0.00051	0.0036	0.0018	1.2	g
Total rad Sr	4/4	0.70*	0.20*	0.38*	0.11	8	4.8
Total U <sup>f, h</sup>	4/4	0.093	0.066	0.079*	0.0054	20	0.39

<sup>a</sup>Individual radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>b</sup>Average radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>c</sup>Standard error of the mean.

<sup>d</sup>Drinking Water Standards (from 40 CFR Parts 141 and 143, as amended, and the Tennessee General Water Quality Criteria for Domestic Water Supplies, as amended). For radionuclides that do not have a drinking water standard, 4% of DCG for ingestion of water (from DOE Order 5400.5) is used.

<sup>e</sup>Average concentration as a percentage of the drinking water standards, calculated when a reference exists and the parameter is a contaminant. For radionuclides, percentage of DWS is calculated only when a reference exists and the average concentration is significantly greater than zero.

<sup>f</sup>Laboratory method does not permit a test of significance for the maximum and minimum values.

<sup>g</sup>Not applicable.

<sup>h</sup>Activity derived from mass assuming natural abundance of U-234, U-235, and U-238.

Table 4.74. Calculated sanitary sewer compliance summary for Y-12 Plant, 1993

Parameter	No. of samples	Concentration <sup>a</sup>			Reference value <sup>b</sup>	No. of values exceeding reference
		Max	Min	Av		
pH, standard units	45	8.7	6.9	7.5	6-9 <sup>c</sup>	0
Cyanide	45	0.020	<0.002 <sup>d</sup>	<0.008	0.007	0
Oil and grease	45	75	<2 <sup>d</sup>	9	50	0
Phenols	45	0.059	<0.001 <sup>d</sup>	<0.016	5.0	0
Biochemical oxygen demand	45	176	<5 <sup>d</sup>	<43	300	0
Mercury	45	0.0124	<0.0005	<0.001	0.1	0
Total Kjeldahl nitrogen	45	42.3	<0.2	13.1	90	0
Total suspended solids	45	127.4	<5	25.5	300	0
Arsenic	45	<0.04	<0.04	<0.04	0.1	0
Cadmium	45	<0.004	<0.004	<0.004	0.000024	0
Copper	45	0.022	<0.006 <sup>d</sup>	0.10	0.04	0
Iron	45	0.66	<0.06 <sup>d</sup>	0.31	1.5	0
Lead	45	<0.05	<0.01	<0.02	0.0016	0
Manganese	45	0.103	<0.002 <sup>d</sup>	0.054	1.0	0
Nickel	45	0.008	<0.008 <sup>d</sup>	<0.005	0.10	0
Silver	45	<0.019	<0.005	<0.007	0.1	0
Zinc	45	0.212	<0.01 <sup>d</sup>	<0.107	2.0	0

<sup>a</sup>All units in mg/L unless otherwise indicated.

<sup>b</sup>Sanitary Sewer Industrial Discharge Permit limits.

<sup>c</sup>Minimum to maximum value.

<sup>d</sup>Calculated value was below the detection limit.

Table 4.75. NPDES compliance at the K-25 Site, 1993

Discharge point	Effluent parameter	Effluent limits				No. of noncompliances	Percentage compliance
		Monthly av <sup>a</sup>	Daily max <sup>a</sup>	Monthly av (kg/d)	Daily max (kg/d)		
005 (K-1203 Sewage Treatment Facility)	Ammonia nitrogen	5	7	12	17		100
	Biochemical oxygen demand	15	20	37	49		100
	Chlorine, total residual	0.14	0.24				100
	Dissolved oxygen		5 <sup>b</sup>				100
	Fecal coliform, col/100 ml	200 <sup>c</sup>	400				99.6
	Flow, Mgd	<i>d</i>	<i>d</i>				100
	LC <sub>50</sub> , <i>Ceriodaphnia</i> , %		14.6 <sup>b</sup>				100
	LC <sub>50</sub> , <i>Pimephales</i> , %		14.6 <sup>b</sup>				100
	NOEL, <sup>c</sup> <i>Ceriodaphnia</i> , %		4.2 <sup>b</sup>				83.3
	NOEL, <sup>c</sup> <i>Pimephales</i> , %		4.2 <sup>b</sup>				100
	pH, standard units		6.0-9.0				100
	Settleable solids, mL/L		0.5				100
	Suspended solids	30	45	74	111		100
	Unpermitted discharge	<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>		<i>f</i>
	009 (K-1515-C Sanitary Water Plant)	Aluminum	1.0	2.0			
Chlorine, total residual			1.0				
Flow, Mgd		<i>d</i>	<i>d</i>				
pH, standard units			6.0-9.0				
Settleable solids, mL/L			0.5				
011 (K-1407-J Central Neutralization Facility)	Suspended solids	30	40				
	Unpermitted discharge	<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>		<i>f</i>
	1,1,1-Trichloroethane	<i>d</i>	<i>d</i>				100
	Acetone	<i>d</i>	<i>d</i>				100
	Acetonitrile	<i>d</i>	<i>d</i>				100
	Benzene	<i>d</i>	<i>d</i>				100
	Bromoform	<i>d</i>	<i>d</i>				100
	Cadmium	0.18	0.69				100
	Carbon tetrachloride	0.5	0.5				100
	Chemical oxygen demand	<i>d</i>	<i>d</i>				100
	Chloride, total	9711	39,479				100
	Chlorine, total residual		0.14				100
	Chlorodibromomethane	<i>d</i>	<i>d</i>				100
	Chloroform	0.5	0.5				100
	Chromium	1.71	2.77				100
	Copper	1.34	2.15				100
	Dichlorobromomethane	<i>d</i>	<i>d</i>				100
	Flow, Mgd	<i>d</i>	<i>d</i>				100
	Ethylbenzene	<i>d</i>	<i>d</i>				100
	Gross alpha, pci/L	<i>d</i>	<i>d</i>				100
	Gross beta, pci/L	<i>d</i>	<i>d</i>				100
	LC <sub>50</sub> , <i>Ceriodaphnia</i> , %		7.05 <sup>b</sup>				100
	LC <sub>50</sub> , <i>Pimephales</i> , %		7.05 <sup>b</sup>				100
	Lead	0.38	0.69				100
	Methyl ethyl ketone	<i>d</i>	<i>d</i>				100
	Methylene chloride	<i>d</i>	<i>d</i>				100
	Naphthalene	<i>d</i>	<i>d</i>				100
	Nickel	2.38	3.98				100
	NOEL, <sup>c</sup> <i>Ceriodaphnia</i> , %		2.11 <sup>b</sup>				100
NOEL, <sup>c</sup> <i>Pimephales</i> , %		2.11 <sup>b</sup>				100	
Oil and grease		30				100	
PCB	0.00014	0.00014				100	
pH, standard units		6.0-9.0				100	
Silver	0.24	0.43				100	
Suspended solids		40				100	

Table 4.75 (continued)

Discharge point	Effluent parameter	Effluent limits				No. of noncompliances	Percentage compliance
		Monthly av <sup>e</sup>	Daily max <sup>a</sup>	Monthly av (kg/d)	Daily max (kg/d)		
	Temperature <sup>f</sup>						
	Tetrachloroethylene		0.7				100
	Toluene	<i>d</i>	<i>d</i>				100
	Total toxic organics		2.13				100
	Trichloroethylene	0.5	0.5				100
	Unpermitted discharge	<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>		<i>f</i>
	Uranium, total	<i>d</i>	<i>d</i>				100
	Vinyl chloride	0.2	0.2				100
	Zinc	1.48	2.61				100
Category I storm drains	Flow, Mgd	<i>d</i>	<i>d</i>				100
	pH, standard units		4.0-9.0				100
	Unpermitted discharge	<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>		<i>f</i>
Category II storm drains	Flow, Mgd	<i>d</i>	<i>d</i>				100
	pH, standard units		4.0-9.0				100
	Suspended solids	<i>d</i>	<i>d</i>				100
	Unpermitted discharge	<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>	1	<i>f</i>
Category III storm drains	Flow, Mgd	<i>d</i>	<i>d</i>				100
	Oil and grease	<i>d</i>	<i>d</i>				100
	pH, standard units		4.0-9.0			1	99.7
	Suspended solids	<i>d</i>	<i>d</i>				100
	Unpermitted discharge	<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>		<i>f</i>
Category IV storm drains (to Poplar Creek)	Chlorine, total residual		0.14				99
	Flow, Mgd	<i>d</i>	<i>d</i>				100
	Oil and grease	<i>d</i>	<i>d</i>				100
	pH, standard units		6.0-9.0			1	99.3
	Suspended solids	<i>d</i>	<i>d</i>				100
	Unpermitted discharge	<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>		<i>f</i>
Category IV storm drains (to Mitchell Branch)	Chlorine, total residual		0.019			1	99.5
	Flow, Mgd	<i>d</i>	<i>d</i>				100
	Oil and grease	<i>d</i>	<i>d</i>				100
	pH, standard units		6.0-9.0				100
	Suspended solids	<i>d</i>	<i>d</i>				100
	Unpermitted discharge	<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>	4	<i>f</i>

<sup>a</sup>Units are mg/L unless otherwise stated.

<sup>b</sup>Daily minimum.

<sup>c</sup>Geometric mean.

<sup>d</sup>Nonlimited parameter.

<sup>e</sup>No-observed-effect limit.

<sup>f</sup>Not applicable.

<sup>g</sup>Effluent must not cause the temperature of the receiving stream to exceed 30.5°C.

Table 4.76. Y-12 Plant Toxicity Control and Monitoring Program (TCMP)  
summary information, 1993<sup>a</sup>

Outfall	Test date	Species	NOEC (%)	IWC <sup>b</sup> (%)
Lithium evaporator process condensate (Outfall 402)	1/21/93	Fathead minnow	<3	<NOEC
	1/21/93	<i>Ceriodaphnia</i>	<3	<NOEC
Steam Plant Wastewater Treatment Facility (Outfall 503)	2/4/93	Fathead minnow	100	13.3
	2/4/93	<i>Ceriodaphnia</i>	25	13.3
Oil/Water Separator—9204-3 (Outfall 506)	3/4/93	Fathead minnow	50	0.3
	3/4/93	<i>Ceriodaphnia</i>	100	0.3
Central Pollution Control Facility (Outfall 501)	5/13/93	Fathead minnow	100	1.6
	5/13/93	<i>Ceriodaphnia</i>	50	1.6
Groundwater Treatment Facility (Outfall 512)	6/10/93	Fathead minnow	<6	2.2
	6/10/93	<i>Ceriodaphnia</i>	<6	2.2
Groundwater Treatment Facility (Outfall 512)	6/15/93	Fathead minnow	3	2.2
	6/15/93	<i>Ceriodaphnia</i>	1.5	2.2
West End Treatment Facility (Outfall 502)	6/24/93	Fathead minnow	30	0.9
	6/24/93	<i>Ceriodaphnia</i>	15	0.9
Proposed Outfall 201	9/9/93	Fathead minnow	100	c
	9/9/93	<i>Ceriodaphnia</i>	50	c
Groundwater Treatment Facility (Outfall 512)	10/14/93	Fathead minnow	3	2.2
	10/14/93	<i>Ceriodaphnia</i>	<1	2.2
Cooling Tower No. 13 (Outfall 613)	10/14/93	Fathead minnow	100	2.0
	10/14/93	<i>Ceriodaphnia</i>	100	2.0
West End Treatment Facility (Outfall 502)	10/28/93	Fathead minnow	30	0.9
	10/28/93	<i>Ceriodaphnia</i>	<10	0.9
Groundwater Treatment Facility (Outfall 512)	11/11/93	Fathead minnow	3	2.2
	11/11/93	<i>Ceriodaphnia</i>	3	2.2

<sup>a</sup>These 7-day toxicity tests using fathead minnows and *Ceriodaphnia* were completed in 1993 as part of the TCMP conducted for the Y-12 Plant by Oak Ridge National Laboratory. Summarized are the effluents and their corresponding no-observed-effect concentrations (NOECs) and instream waste concentrations (IWCs). *Note:* Discharge from the treatment facilities is intermittent because of batch operations.

<sup>b</sup>The instream waste concentration (IWC) is based on 3.9 cfs at East Fork Poplar Creek, Station 8 (based on U.S. Geological Study data taken during drought conditions).

<sup>c</sup>This is an instream point; therefore, an IWC is not applicable.



Table 4.77. Toxicity test results of ORNL wastewaters and ambient waters, 1993

Outfall	Test date	Treatment <sup>f</sup>	NOEC <sup>b</sup> (%)		IWC <sup>c</sup> (%)
			Fathead minnow	<i>Ceriodaphnia</i>	
Coal Yard Runoff Treatment Facility (X02)	May	N	100	<i>d</i>	2.4
	May	N	<i>d</i>	12	0.5
	Nov.	N	100	25	0.4
	Dec.	N	100	<i>d</i>	3.1
Sewage Treatment Plant (X01)	Apr.	N	<i>d</i>	25	17.8
	Oct.	N	<i>d</i>	25	18.0
Nonradiological Wastewater Treatment Plant (X12)	June	N	<i>d</i>	100	<i>e</i>
	Oct.	N	<i>d</i>	100	<i>e</i>
Melton Branch (X13)	Feb.	N	80	100	
		UV	100	<i>d</i>	
	Apr.	N	<80	100	
		UV	100	<i>d</i>	
	May <sup>f</sup>	N	100	<i>d</i>	
		UV	100	<i>d</i>	
	June	N	100	100	
		UV	100	<i>d</i>	
	Aug.	N	<80	100	
		UV	<100	<i>d</i>	
	Aug. <sup>f</sup>	N	100	<i>d</i>	
		UV	100	<i>d</i>	
	Sept.	N	100	100	
		UV	100	<i>d</i>	
	Dec.	N	100	80	
		UV	100	<i>d</i>	
Dec. <sup>f</sup>	N	<i>d</i>	100		
	UV				
White Oak Creek (X14)	Feb.	N	100	100	
		UV	100	<i>d</i>	
	Apr.	N	100	100	
		UV	100	<i>d</i>	
	June	N	80	100	
		UV	100	<i>d</i>	
	June <sup>f</sup>	N	80	<i>d</i>	
		UV	100	<i>d</i>	
	June <sup>f</sup>	N	100	<i>d</i>	
		UV	100	<i>d</i>	
	Aug.	N	100	100	
		UV	100	<i>d</i>	
Sept.	N	100	100		
	UV	100	<i>d</i>		
Dec.	N	100	100		
	UV	100	<i>d</i>		

<sup>a</sup>N = no sample pretreatment; UV = ultraviolet light pretreatment.

<sup>b</sup>No-observed-effect concentration.

<sup>c</sup>Instream waste concentration (based on critical low flow of White Oak Creek).

<sup>d</sup>Not tested.

<sup>e</sup>Not calculated.

<sup>f</sup>Confirmatory test.

**Table 4.78. Average water quality parameters measured during toxicity tests of ORNL wastewaters and ambient waters, 1993**

Values are for full-strength wastewater for each test ( $N = 1$ ) or averages of full-strength ambient water for each test ( $N = 7$ )

Outfall	Test date	pH (standard units)	Conductivity ( $\mu\text{S}/\text{cm}$ )	Alkalinity ( $\text{mg}/\text{L CaCO}_3$ )	Hardness ( $\text{mg}/\text{L CaCO}_3$ )
Coal Yard Runoff Treatment Facility (X02)	May <sup>a</sup>	7.45	1567	16	880
	May <sup>b</sup>	7.48	1737	20	1128
	Nov.	7.44	2400	27	1600
	Dec.	7.39	4130	29	2000
Sewage Treatment Plant (X01)	Apr.	8.13	425	112	173
	Oct.	7.83	403	100	171
Nonradiological Wastewater Treatment Facility (X12)	June	8.02	782	88	172
	Oct.	7.78	764	89	172
Melton Branch (X13)	Feb.	7.95	527	109	237
	Apr.	8.04	251	113	144
	May	8.24	389	145	203
	June	8.02	747	102	380
	Aug. <sup>c</sup>	7.95	568	103	292
	Aug. <sup>d</sup>	7.78	793	65	407
	Sept.	8.00	390	134	190
	Dec. <sup>e</sup>	7.99	278	92	130
White Oak Creek (X14)	Dec. <sup>f</sup>	7.96	357	80	169
	Feb.	7.98	380	113	169
	Apr.	8.07	291	112	147
	June <sup>g</sup>	8.14	372	118	171
	June <sup>h</sup>	8.07	392	113	175
	June <sup>i</sup>	8.11	343	113	154
	Aug.	8.04	358	113	156
	Sept.	8.07	373	119	164
Dec.	8.08	361	112	155	

<sup>a</sup>Data for test conducted May 6–13, 1993.

<sup>b</sup>Data for test conducted May 19–26, 1993.

<sup>c</sup>Data for test conducted August 12–19, 1993.

<sup>d</sup>Data for test conducted August 27–September 3, 1993.

<sup>e</sup>Data for test conducted December 9–16, 1993.

<sup>f</sup>Data for test conducted December 30–January 6, 1994.

<sup>g</sup>Data for test conducted June 3–10, 1993.

<sup>h</sup>Data for test conducted June 10–17, 1993.

<sup>i</sup>Data for test conducted June 30–July 7, 1993.

Table 4.79. Toxicity test results of K-25 Site wastewaters, 1993

Outfall	Test date	Species	NOEL <sup>a</sup> (%)	LC <sub>50</sub> <sup>b</sup> (%)	
K-1407-J (Outfall 011)	January	Fathead minnows	75	>75	
		<i>Ceriodaphnia</i>	25	>75	
	March <sup>c</sup>	Fathead minnows	25	>75	
	April	<i>Ceriodaphnia</i>	75	>75	
	May	Fathead minnows	75	>75	
		<i>Ceriodaphnia</i>	75	>75	
	July	Fathead minnows	7.05	>7.05	
		<i>Ceriodaphnia</i>	25	>25	
	September	Fathead minnows	75	>75	
		<i>Ceriodaphnia</i>	25	>75	
	November	Fathead minnows	75	>75	
		<i>Ceriodaphnia</i>	75	>75	
	K-1203 (Outfall 005)	January	Fathead minnows	100	>100
			<i>Ceriodaphnia</i>	100	>100
March <sup>c</sup>		Fathead minnows	100	>100	
April		<i>Ceriodaphnia</i>	100	>100	
May		Fathead minnows	100	>100	
		<i>Ceriodaphnia</i>	100	>100	
July		Fathead minnows	14.6	>14.6	
		<i>Ceriodaphnia</i>	<4.2	>30	
August <sup>d</sup>		<i>Ceriodaphnia</i>	30	>100	
September		Fathead minnows	100	>100	
		<i>Ceriodaphnia</i>	30	>100	
November		Fathead minnows	100	>100	
		<i>Ceriodaphnia</i>	14.6	>100	

<sup>a</sup>No-observed-effect limit.

<sup>b</sup>96-hour lethal concentration for 50% of the test organisms.

<sup>c</sup>Individual *Ceriodaphnia* test (unacceptable control survival); a retest was conducted in April 1993.

<sup>d</sup>Confirmatory test.

**Table 4.80. Average water quality parameters measured during toxicity tests of K-25 Site wastewaters, 1993**

Outfall	Test date	pH (standard units)	Conductivity ( $\mu$ S/cm)	Alkalinity (mg/L CaCO <sub>3</sub> )	Hardness (mg/L CaCO <sub>3</sub> )
K-1407-J (Outfall 011)	January	7.80	2831	52	594
	March	7.69	1831	74	363
	April	7.73	1484	41	568
	May	7.76	1899	41	511
	July <sup>a</sup>	7.92	3007	80	438
	July <sup>b</sup>	7.57	4044	41	455
	September	7.65	1808	54	639
	November	7.63	1615	64	680
K-1203 (Outfall 005)	January	7.97	390	101	149
	March	8.09	380	101	172
	April	8.02	390	96	158
	May	7.93	402	85	147
	July <sup>a</sup>	7.71	400	86	155
	July <sup>b</sup>	7.88	414	90	154
	August	7.83	389	81	143
	September	7.90	391	92	147
November	7.89	435	107	151	

<sup>a</sup>Data are for test conducted July 8–15, 1993.

<sup>b</sup>Data are for test conducted July 29–August 5, 1993.

**Table 4.81. Changes in average concentrations of PCBs and fraction of fish exceeding U.S. Food and Drug Administration (FDA) limit for channel catfish, 1986–93**

Site <sup>a</sup>	1986	1987	1988	1989	1990	1991	1992	1993
<i>PCBs (<math>\mu</math>g/g wet weight)</i>								
WCK 0.3	1.30	1.59	0.96	1.54	3.56	3.60	3.29	8.40
CRK 32.2	1.01	1.61	0.58	1.20	0.31	1.38	0.36	0.67
MHR	0.46	0.81	0.52	0.28	0.41	0.29	0.34	0.62
PCK 6.9	<i>b</i>	<i>b</i>	0.71	1.07	0.92	0.68	0.34	0.92
CRK 15.0	<i>b</i>	<i>b</i>	0.50	0.79	0.88	1.08	1.27	0.63
<i>Fraction over FDA limit</i>								
WCK 0.3	3/12	2/8	2/8	4/8	4/8	6/8	5/8	4/4
CRK 32.2	0/8	2/8	1/8	1/8	0/8	1/8	0/8	0/8
MHR	0/6	1/7	0/10	0/8	0/8	0/8	0/8	0/8
PCK 6.9	<i>b</i>	<i>b</i>	0/8	1/8	1/8	0/8	0/8	0/8
CRK 15.0	<i>b</i>	<i>b</i>	0/9	1/8	1/8	1/8	2/8	0/8

<sup>a</sup>WCK = White Oak Creek Embayment kilometer, CRK = Clinch River kilometer, MHR = Melton Hill Reservoir, and PCK = Poplar Creek kilometer.

<sup>b</sup>Not sampled.

Table 4.82. 1993 Potable water data from DOE-owned water-treatment facility<sup>a</sup>  
serving the Y-12 Plant, ORNL, and city of Oak Ridge<sup>b</sup>

Parameter	Max	Min	Avg	No. samples	Frequency
Aiachlor	<0.0001	<0.0001	<0.0001	1	Annual
Aldicarb	<0.0001	<0.0001	<0.0001	1	Annual
Aldicarb sulfoxide	<0.0001	<0.0001	<0.0001	1	Annual
Aldicarb sulfone	<0.0001	<0.0001	<0.0001	1	Annual
Atrazine	<0.0001	<0.0001	<0.0001	1	Annual
Carbofuran	<0.0001	<0.0001	<0.0001	1	Annual
Chlordane	<0.0001	<0.0001	<0.0001	1	Annual
Dalapon	<0.0001	<0.0001	<0.0001	1	Annual
Dinoseb	<0.0001	<0.0001	<0.0001	1	Annual
Diquat	<0.0001	<0.0001	<0.0001	1	Annual
Endothall	<0.0001	<0.0001	<0.0001	1	Annual
Glyphosate	<0.0001	<0.0001	<0.0001	1	Annual
Oxamyl (Vydate)	<0.0001	<0.0001	<0.0001	1	Annual
Picloram	<0.0001	<0.0001	<0.0001	1	Annual
Simazine	<0.0001	<0.0001	<0.0001	1	Annual
Toxaphene	<0.002	<0.002	<0.002	1	Annual
Methoxychlor	<0.0002	<0.0002	<0.002	1	Annual
Lindane	<0.0004	<0.0004	<0.0004	1	Annual
Endrin	<0.0004	<0.0004	<0.0004	1	Annual
2,4-D	<0.008	<0.008	<0.008	1	Annual
2,4,5,-TP (silvex)	<0.0008	<0.0008	<0.0008	1	Annual
<i>trans</i> -1,2-Dichloroethylene	<0.0005	<0.0001	<0.0001	8	Quarterly
<i>tert</i> -Butylbenzene	<0.0005	<0.0002	<0.0005	8	Quarterly
<i>sec</i> -Butylbenzene	<0.0005	<0.0002	<0.0005	8	Quarterly
<i>p</i> -Xylene	<0.0005	<0.0002	<0.0005	8	Quarterly
<i>p</i> -Isopropyltoluene	<0.0005	<0.0001	<0.0005	8	Quarterly
<i>p</i> -Dichlorobenzene	<0.005	<0.0001	<0.005	8	Quarterly
<i>p</i> -Chlorotoluene	<0.0005	<0.0002	<0.0005	8	Quarterly
<i>o</i> -Xylene	<0.0005	<0.0001	<0.0005	8	Quarterly
<i>o</i> -Dichlorobenzene	<0.0005	<0.0001	<0.0005	8	Quarterly
<i>o</i> -Chlorotoluene	<0.0005	<0.0002	<0.0005	8	Quarterly
<i>n</i> -Propylbenzene	<0.0005	<0.0001	<0.0005	8	Quarterly
<i>n</i> -Butylbenzene	<0.0005	<0.0002	<0.0005	8	Quarterly
<i>m</i> -Xylene	<0.0005	<0.0002	<0.0005	8	Quarterly
<i>m</i> -Dichlorobenzene	<0.0005	<0.0001	<0.0005	8	Quarterly
<i>cis</i> -1,2-Dichloroethylene	<0.0005	<0.0001	<0.0005	8	Quarterly
Xylenes (total)	<0.0005	<0.0001	<0.0005	8	Quarterly
Vinyl chloride	<0.0005	<0.0002	<0.0005	8	Quarterly
Trichloroethylene	<0.0005	<0.0001	<0.0005	8	Quarterly
Toluene	<0.0005	<0.0005	<0.0005	8	Quarterly
Tetrachloroethylene	<0.0005	<0.0002	<0.0005	8	Quarterly
Styrene	<0.0005	<0.0002	<0.0005	8	Quarterly
Naphthalene	<0.0005	<0.0002	<0.0005	8	Quarterly
Isopropylbenzene	<0.0005	<0.0001	<0.0005	8	Quarterly
Hexachlorobutadiene	<0.0005	<0.0002	<0.0005	8	Quarterly
Fluorotrichloromethane	<0.0005	<0.0005	<0.0005	8	Quarterly

Table 4.82 (continued)

Parameter	Max	Min	Avg	No. samples	Frequency
Ethylene dibromide	<0.00002	<0.00001	<0.00002	8	Quarterly
Ethylbenzene	<0.0005	<0.0001	<0.0005	8	Quarterly
Dichloromethane	<0.0005	<0.0005	<0.0005	8	Quarterly
Dichlorodifluoromethane	<0.0005	<0.0005	<0.0005	8	Quarterly
Dibromomethane	<0.0005	<0.0001	<0.0005	8	Quarterly
Chloromethane	<0.0005	<0.0005	<0.0005	8	Quarterly
Chloroform	0.011	<0.0001	<0.0044	8	Quarterly
Chloroethane	<0.0005	<0.0005	<0.0005	8	Quarterly
Chlorodibromomethane	0.0009	<0.0001	<0.0002	8	Quarterly
Chlorobenzene	<0.0005	<0.0002	<0.0005	8	Quarterly
Carbon tetrachloride	<0.0005	<0.0001	<0.0005	8	Quarterly
Bromomethene	<0.0005	<0.0005	<0.0005	8	Quarterly
Bromoform	<0.0005	<0.0001	<0.0005	8	Quarterly
Bromodichloromethane	0.0058	<0.0001	0.0012	8	Quarterly
Bromochloromethane	0.0045	<0.0002	0.0006	8	Quarterly
Bromobenzene	<0.0005	<0.0002	<0.0005	8	Quarterly
Benzene	<0.0005	<0.0005	<0.0005	8	Quarterly
2,2-Dichloropropane	<0.0005	<0.0002	<0.0005	8	Quarterly
1,3-Dichloropropene	<0.0005	<0.0001	<0.0005	8	Quarterly
1,3-Dichloropropane	<0.0005	<0.0001	<0.0005	8	Quarterly
1,3,5-Trimethylbenzene	<0.0005	<0.0001	<0.0005	8	Quarterly
1,2-Dichloropropane	<0.0005	<0.0001	<0.0005	8	Quarterly
1,2-Dichloroethane	<0.005	<0.0001	<0.005	8	Quarterly
1,2-dibromo-3-chloropropane	<0.00002	<0.00002	<0.00002	8	Quarterly
1,2,4-Trimethylbenzene	<0.0005	<0.0001	<0.0005	8	Quarterly
1,2,4-Trichlorobenzene	<0.0005	<0.0002	<0.0005	8	Quarterly
1,2,3-Trichloropropane	<0.0005	<0.0002	<0.0005	8	Quarterly
1,2,3-Trichlorobenzene	<0.0005	<0.0002	<0.0005	8	Quarterly
1,1-Dichloropropene	<0.0005	<0.0001	<0.0005	8	Quarterly
1,1-Dichloroethylene	<0.005	<0.0002	<0.005	8	Quarterly
1,1-Dichloroethane	<0.0005	<0.0001	<0.0005	8	Quarterly
1,1,2-Trichloroethane	<0.0005	<0.0001	<0.0005	8	Quarterly
1,1,2,2-Tetrachloroethane	<0.0005	<0.0001	<0.0005	8	Quarterly
1,1,1-Trichloroethane	<0.0005	<0.0005	<0.005	8	Quarterly
1,1,1,2-Tetrachloroethane	<0.0005	<0.0001	<0.0005	8	Quarterly
Trihalomethanes (total)	0.043	0.01	0.025	16	Quarterly
Trichloromethane	0.035	0.01	0.02	16	Quarterly
Tribromomethane	<0.005	<0.005	<0.005	16	Quarterly
Dibromochloromethane	<0.005	<0.005	<0.005	16	Quarterly
Bromodichloromethane	0.009	<0.005	0.005	16	Quarterly
P-PO4	0.432	0.21	0.358	9	Monthly
Ortho P	0.075	<0.01	0.037	4	Monthly
pH	7.4	6.8	7.2	12	Monthly
Zinc	0.177	0.042	0.119	12	Monthly
Volatile	101	18.5	49.6	12	Monthly
Uranium	0.003	<0.001	0.0004	12	Monthly
Turbidity	<2	<2	<2	12	Monthly
Total solids	198	121	163.7	12	Monthly
Total dissolved solids (TDS)	182	100	156.2	12	Monthly
TOC	1.36	<1	0.113	12	Monthly

Table 4.82 (continued)

Parameter	Max	Min	Avg	No. samples	Frequency
Thorium (pCi/L)	<0.6	<0.6	<0.60	12	Monthly
Suspended solids	6	<2	0.5	12	Monthly
Sodium	7.2	4.48	5.8	12	Monthly
SO <sub>4</sub>	<28.3	19.6	23.7	12	Monthly
Silver	<0.1	<0.007	<0.1	12	Monthly
Selenium	0.003	<0.002	0.0004	12	Monthly
Potassium	2.07	1.13	1.62	12	Monthly
Poly P	0.879	0.034	0.37	12	Monthly
Odor (T.O.N.)	0	0	0	12	Monthly
Nitrate (AS N)	0.712	0.106	0.439	12	Monthly
N-total	2.53	1.06	1.67	12	Monthly
N-Kjeldahl	2.95	<0.5	1.24	12	Monthly
Mercury	<0.001	<0.001	0	12	Monthly
MBAS	0.048	0.006	0.074	12	Monthly
Manganese	0.03	<0.002	0.003	12	Monthly
Magnesium	11.6	8.9	10.2	12	Monthly
Lithium	<0.002	<0.002	<0.002	12	Monthly
Lead	<0.002	<0.001	<0.002	12	Monthly
Iron	0.226	<0.007	0.0563	12	Monthly
Hardness	149	116	132	12	Monthly
Fluoride	1.27	0.5	1.05	12	Monthly
Cr+6	<0.004	<0.004	<0.004	12	Monthly
Cyanide	<0.001	<0.001	<0.004	12	Monthly
Copper	0.018	<0.006	0.0015	12	Monthly
Conductance	280	130	242	12	Monthly
Color (color units)	<1	<1	<1	12	Monthly
Cobalt 60 (pCi/L)	<5	<5	<5	12	Monthly
Chromium	0.009	<0.007	0.0008	12	Monthly
Chlorine	1.28	0.9	1.10	12	Monthly
Chloride	10	3.75	7.11	12	Monthly
Calcium hardness	107	79.2	87.5	12	Monthly
Calcium	43	31.7	36.0	12	Monthly
Cadmium	<0.004	<0.002	<0.004	12	Monthly
Beta activity (pCi/L)	32	<3	8.2	12	Monthly
Barium	0.09	0.027	0.024	12	Monthly
Arsenic	<0.002	<0.001	<0.002	12	Monthly
Aluminium	0.71	<0.01	0.15	12	Monthly
Alpha activity (pCi/L)	11	<2	1.5	12	Monthly
Alkalinity	138	100	111.3	12	Monthly
Chlorine	1.7	0.1	0.71	98	8/Month
Coliform (per 100 mL)	<1	<1	<1	96	8/Month
Asbestos (MFL)	0	0	0	0	

<sup>a</sup>Operated by Johnson Controls World Services, Inc.

<sup>b</sup>Units are mg/L unless noted otherwise.

**Table 4.83. 1993 potable water data—lead and copper rule data from DOE-owned water-treatment facility serving the Y-12 Plant, ORNL, and the city of Oak Ridge**

Parameter	Unit	No. samples	90% Percentile results July 1993
Lead	mg/L	40	0.004
Copper	mg/L	40	0.374

**Table 4.84. 1993 sampling and analysis plan for ORNL surface waters receiving effluents**

Station	Analysis	Collection frequency	Sample type	Analysis frequency
STP	Gamma scan, Gross beta, H-3, Total rad Sr	Weekly	Flow proportional composite	Monthly
7500 Road Bridge, MB1, MB2, WOC	Gamma scan, H-3, Total rad Sr	Weekly	Flow proportional composite	Monthly
First Creek, Fifth Creek, Raccoon Creek	Gamma scan, Total rad Sr	Weekly	Grab	Monthly
MHD	Gamma scan, Gross alpha <sup>a</sup> , Gross beta <sup>b</sup>	Weekly	Flow proportional composite	Monthly
NRWTF	Gamma scan, Gross alpha, Gross beta, H-3, Total rad Sr	Weekly	Flow proportional composite	Monthly
NWT	Gamma scan, Total rad Sr	Weekly	Flow proportional composite	Monthly
WOC Headwaters	Gamma scan, Gross alpha <sup>a</sup> , Gross beta <sup>b</sup>	Weekly	Flow proportional composite	Monthly
WOD	Gamma scan, Gross alpha <sup>a</sup> , Gross beta <sup>b</sup>	Weekly	Flow proportional composite	Weekly
WOD	H-3, Total rad Sr	Weekly	Flow proportional composite	Monthly

<sup>a</sup>If gross alpha > 27 pCi/L, analyze for Am-241, Cm-244, Pu-238, Pu-239, Th-228, Th-230, Th-232, U-234, U-235, and U-238.

<sup>b</sup>If gross beta > 810 pCi/L, analyze for total rad Sr.



Table 4.85. 1993 radionuclide concentrations at ORNL NPDES locations

Radionuclide	N det/ N total	Concentration (pCi/L)			Standard error <sup>c</sup>	DCG <sup>d</sup>	Percent of DCG <sup>e</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>			
<i>Sewage Treatment Plant (X01)</i>							
Co-60	0/12	32	-22	5.8	4.8	5,000	f
Cs-137	1/12	23*	-2.7	10*	2.4	3,000	0.34
Gross beta	12/12	700*	220*	440*	55		f
H-3	3/5	2,000*	0	830*	380	2,000,000	0.042
Total rad Sr	12/12	410*	110*	210*	30	1,000	21
<i>Nonradiological Wastewater Treatment Facility (X12)</i>							
Co-60	1/12	30	-38	0.99	6.4	5,000	f
Cs-137	12/12	2,200*	540*	1,000*	150	3,000	35
Gross alpha	12/12	23*	2.7*	9.9*	1.6		f
Gross beta	12/12	3,200*	430*	1,200*	240		f
H-3	12/12	120,000*	43,000*	77,000*	6,600	2,000,000	3.9
Total rad Sr	12/12	570*	7.0*	120*	46	1,000	12
<i>Melton Branch 1 (X13)</i>							
Co-60	0/12	22	-2.7	6.4*	2.2	5,000	0.13
Cs-137	1/12	30*	-5.4	12*	3.0	3,000	0.41
H-3	12/12	1,300,000*	410,000*	770,000*	70,000	2,000,000	38
Total rad Sr	12/12	890*	300*	540*	57	1,000	54
<i>White Oak Creek (X14)</i>							
Co-60	0/12	16	-16	-2.7	2.6	5,000	f
Cs-137	9/12	380*	22	160*	33	3,000	5.3
H-3	12/12	73,000*	8,900*	33,000*	6,500	2,000,000	1.6
Total rad Sr	12/12	190*	15*	88*	14	1,000	8.8
<i>White Oak Dam (X15)</i>							
Co-60	20/52	9.2*	-4.1	3.7*	0.42	5,000	0.074
Cs-137	52/52	190*	11*	51*	5.1	3,000	1.7
Gross alpha	51/52	11*	1.6	6.2*	0.33		f
Gross beta	52/52	620*	220*	400*	15		f
H-3	12/12	230,000*	41,000*	140,000*	20,000	2,000,000	6.9
Total rad Sr	12/12	270*	81*	180*	16	1,000	18

<sup>a</sup>Individual radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>b</sup>Average radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>c</sup>Standard error of the mean.

<sup>d</sup>Derived concentration guide for ingestion of water. From DOE Order 5400.5.

<sup>e</sup>Average concentration as a percentage of the derived concentration guide (DCG), calculated only when a DCG exists and the average concentration is significantly greater than zero.

<sup>f</sup>Not applicable.

Table 4.86. 1993 radionuclide concentrations in surface waters around ORNL

Radionuclide	N det/ N total	Concentration (pCi/L)				DCG <sup>d</sup>	Percent of DCG <sup>e</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Standard error <sup>c</sup>		
<i>Melton Hill Dam</i>							
Co-60	0/12	19	-14	0.72	3.3	5,000	f
Cs-137	0/12	16	-32	-2.5	4.2	3,000	f
Gross alpha	7/12	7.0*	-0.27	2.1*	0.61	f	f
Gross beta	12/12	24*	2.7*	11*	1.9	f	f
<i>White Oak Creek Headwaters</i>							
Co-60	1/12	51*	-16	9.0*	4.9	5,000	0.18
Cs-137	1/12	24	-14	3.7	3.6	3,000	f
Gross alpha	8/12	8.9*	0.81	2.4*	0.65	f	f
Gross beta	10/12	22*	1.1	8.0*	1.5	f	f
<i>7500 Road Bridge</i>							
Co-60	0/12	22	-11	5.4*	2.7	5,000	0.11
Cs-137	12/12	430*	38*	140*	29	3,000	4.7
H-3	12/12	21,000*	3,200*	8,800*	1,600	2,000,000	0.44
Total rad Sr	12/12	120*	35*	68*	7.3	1,000	6.8
<i>First Creek</i>							
Co-60	2/12	38*	-27	5.7	6.1	5,000	f
Cs-137	3/12	49*	-2.7	14*	5.4	3,000	0.46
Total rad Sr	12/12	490*	86*	220*	34	1,000	22
<i>Fifth Creek</i>							
Co-60	1/12	32	-30	5.5	4.8	5,000	f
Cs-137	3/12	51*	-22	17*	7.0	3,000	0.57
Total rad Sr	12/12	41*	11*	27*	2.5	1,000	2.7
<i>Melton Branch 2</i>							
Co-60	1/12	38*	-16	4.8	4.7	5,000	f
Cs-137	0/12	32	-16	1.1	4.1	3,000	f
H-3	12/12	30,000*	5,700*	17,000*	2,300	2,000,000	0.86
Total rad Sr	6/12	5.7*	0.38	2.4*	0.44	1,000	0.24
<i>Northwest Tributary</i>							
Co-60	2/12	51*	-30	7.3	6.2	5,000	f
Cs-137	4/12	65*	-22	19*	7.7	3,000	0.63
Total rad Sr	12/12	59*	3.8*	34*	6.2	1,000	3.4
<i>Raccoon Creek</i>							
Co-60	1/12	46*	-24	5.4	5.2	5,000	f
Cs-137	1/12	32*	-24	4.3	5.1	3,000	f
Total rad Sr	12/12	78*	4.6*	32*	8.2	1,000	3.2

<sup>a</sup>Individual radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>b</sup>Average radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>c</sup>Standard error of the mean.

<sup>d</sup>Derived concentration guide for ingestion of water. From DOE Order 5400.5.

<sup>e</sup>Average concentration as a percentage of the derived concentration guide (DCG), calculated only when a DCG exists and the average concentration is significantly greater than zero.

<sup>f</sup>Not applicable.

Table 4.87. 1993 monthly stream flows, ORNL

Month	Flow ( $10^9$ L)				Average Ratio <sup>d</sup>
	Melton Branch 1	White Oak Creek <sup>a</sup>	White Oak Dam <sup>b</sup>	Clinch River <sup>c</sup>	
January	0.39	0.95	1.3	480	0.0057
February	0.26	0.73	1.2	270	0.0083
March	0.60	1.5	1.9	640	0.0054
April	0.32	0.88	1.2	520	0.0046
May	0.10	0.37	0.59	110	0.0059
June	0.061	0.31	0.50	250	0.0024
July	0.048	0.32	0.60	250	0.0029
August	0.058	0.35	0.45	390	0.0012
September	0.040	0.36	0.42	350	0.0013
October	0.023	0.33	0.38	200	0.0043
November	0.048	0.44	0.56	200	0.0065
December	0.61	0.74	1.6	600	0.0097

<sup>a</sup>White Oak Creek above its confluence with Melton Branch.

<sup>b</sup>White Oak Creek at White Oak Dam.

<sup>c</sup>Clinch River at Melton Hill Dam.

<sup>d</sup>Flow ratios (White Oak Creek at White Oak Dam:Clinch River at Melton Hill Dam) are calculated daily and averaged for the month.

Table 4.88. ORNL NPDES radionuclide sampling and analysis plan  
for the category outfalls

Radionuclide	Collection frequency	Sample type	Analysis frequency
<i>Category I outfalls</i>			
Gross beta <sup>a</sup>	Yearly	Grab	Yearly
<i>Category II outfalls</i>			
Gross beta <sup>a</sup>	Quarterly	Grab	Quarterly
<i>Category III outfalls</i>			
Co-60	Quarterly	Grab	Quarterly
Cs-137	Quarterly	Grab	Quarterly
Gross beta <sup>a</sup>	Quarterly	Grab	Quarterly

<sup>a</sup>If gross beta > 810 pCi/L, analyze for total rad Sr.

Table 4.89. 1993 radionuclide concentrations at JRNL category outfalls

Radionuclide	N det/ N total	Concentration (pCi/L)			Standard error <sup>c</sup>	DCG <sup>d</sup>	Percent of DCG <sup>e</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>			
<i>Category I outfalls</i>							
Gross beta	20/21	2,100*	2.7	120	98	f	f
Total rad Sr <sup>g</sup>	1/1	1,300*	1,300*	1,300	f	1,000	f
<i>Category II outfalls</i>							
Gross beta	149/163	1,900*	0.54	46*	14	f	f
Total rad Sr <sup>g</sup>	1/1	1,100*	1,100*	1,100	f	1,000	f
<i>Category III outfalls<sup>h</sup></i>							
Co-60	15/20	65*	-0.81	11*	3.1	5,000	0.22
Cs-137	13/20	190*	-1.1	29*	12	3,000	0.97
Gross beta	20/20	9,700*	35*	3,100*	730	f	f
Total rad Sr <sup>g</sup>	13/13	4,900*	380*	2,000*	360	1,000	200

<sup>a</sup>Individual radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>b</sup>Average radionuclide concentrations significantly greater than zero are identified by an \*.

<sup>c</sup>Standard error of the mean.

<sup>d</sup>Derived concentration guide for ingestion of water. From DOE Order 5400.5.

<sup>e</sup>Average concentration as a percentage of the derived concentration guide (DCG), calculated only when a DCG exists and the average concentration is significantly greater than zero.

<sup>f</sup>Not applicable.

<sup>g</sup>Total rad Sr analyzed when gross beta > 810 pCi/L.

<sup>h</sup>Radionuclide concentrations are monitored at outfalls 302, 304, 341, 342, and 368.

Table 4.90. 1993 sampling and analysis plan for ORNL reference surface waters: Melton Hill Dam and White Oak Creek headwaters

Parameter	Collection frequency	Sample type	Analysis frequency
<b>Anions</b>			
Fluoride	Monthly	Flow proportional composite	Monthly
Nitrate, as N	Monthly	Flow proportional composite	Monthly
Sulfate, as SO <sub>4</sub>	Monthly	Flow proportional composite	Monthly
<b>Field Measurements</b>			
Conductivity	Monthly	Grab, instant read	Monthly
Dissolved oxygen	Monthly	Grab, instant read	Monthly
pH	Monthly	Grab, instant read	Monthly
Temperature	Monthly	Grab, instant read	Monthly
Turbidity	Monthly	Grab, instant read	Monthly
<b>Metals</b>			
Aluminum	Monthly	Flow proportional composite	Monthly
Arsenic	Monthly	Flow proportional composite	Monthly
Cadmium	Monthly	Flow proportional composite	Monthly
Chromium	Monthly	Flow proportional composite	Monthly
Copper	Monthly	Flow proportional composite	Monthly
Iron	Monthly	Flow proportional composite	Monthly
Lead	Monthly	Flow proportional composite	Monthly
Manganese	Monthly	Flow proportional composite	Monthly
Nickel	Monthly	Flow proportional composite	Monthly
Phosphorus	Monthly	Flow proportional composite	Monthly
Silver	Monthly	Flow proportional composite	Monthly
Zinc	Monthly	Flow proportional composite	Monthly
<b>Others</b>			
Oil and grease	Monthly	Grab	Monthly
Total dissolved solids	Monthly	Grab	Monthly
Total organic carbon	Monthly	Grab	Monthly
Total suspended solids	Monthly	Flow proportional composite	Monthly

Table 4.91. 1993 analyses for ORNL reference surface waters

Parameter	N det/ N total	Concentration (mg/L)			Standard error <sup>c</sup>	DWS <sup>d</sup>	Percent of DWS <sup>e</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>			
<i>Melton Hill Dam</i>							
<b>Anions</b>							
Fluoride	3/12	0.20	<0.10	-0.11	0.0083	4	2.7
Nitrate, as N	0/12	<1.0	<1.0	-1.0	0	10	10
Sulfate, as SO <sub>4</sub>	12/12	27	16	21	0.83	250	8.2
<b>Field Measurements</b>							
Conductivity (mS/cm)	12/12	0.35	0	0.24	0.033	f	f
Dissolved oxygen (ppm)	12/12	11	7.4	9.2	0.35	f	f
pH (SU)	12/12	8.1	7.3	7.8	0.073	f	f
Temperature (°C)	12/12	21	7.5	14	1.4	f	f
Turbidity (NTU)	12/12	64	4.0	18	4.8	f	f
<b>Metals</b>							
Aluminum, total	12/12	1.6	0.14	0.47	0.12	0.2	240
Arsenic, total	0/12	<0.050	<0.050	-0.050	0	0.05	100
Cadmium, total	0/12	<0.0050	<0.0050	-0.0050	0	0.005	100
Chromium, total	2/12	0.011	<0.0040	-0.0050	0.00067	0.05	5.0
Copper, total	1/12	0.017	<0.0070	-0.0078	0.00083	1.3	0.60
Iron, total	12/12	2.0	0.054	0.50	0.15	0.3	170
Lead, total	0/12	<0.050	<0.050	-0.050	0	0.015	330
Manganese, total	12/12	0.79	0.021	0.16	0.059	0.05	330
Nickel, total	0/12	<0.010	<0.010	-0.010	0	f	f
Phosphorus, total	9/12	0.44	<0.20	-0.29	0.024	f	f
Silver, total	1/12	0.0074	<0.0050	-0.0052	0.00020	0.05	5.2
Zinc, total	10/12	0.086	<0.0050	-0.019	0.0079	5	0.38
<b>Others</b>							
Oil and grease	1/12	7.0	<2.0	-2.4	0.42	f	f
Total dissolved solids	12/12	310	140	170	13	500	35
Total organic carbon	12/12	2.6	1.4	1.9	0.087	f	f
Total suspended solids	11/12	120	<5.0	-23	9.2	f	f
<i>White Oak Creek Headwaters</i>							
<b>Anions</b>							
Fluoride	2/12	0.20	<0.10	-0.12	0.011	4	2.9
Nitrate, as N	0/12	<1.0	<1.0	-1.0	0	10	10
Sulfate, as SO <sub>4</sub> <sup>g</sup>	10/12	<10	1.7	-3.7	0.87	250	1.5
<b>Field Measurements</b>							
Conductivity (mS/cm)	12/12	0.29	0	0.20	0.030	f	f
Dissolved oxygen (ppm)	12/12	12	8.0	10	0.29	f	f
pH (SU)	12/12	8.1	7.0	7.6	0.11	f	f
Temperature (°C)	12/12	18	7.2	13	0.97	f	f
Turbidity (NTU)	12/12	110	6.0	21	8.4	f	f

Table 4.91 (continued)

Parameter	N det/ N total	Concentration (mg/L)			Standard error <sup>c</sup>	DWS <sup>d</sup>	Percent of DWS <sup>e</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>			
<b>Metals</b>							
Aluminum, total	11/12	1.6	<0.050	-0.43	0.13	0.2	210
Arsenic, total	0/12	<0.050	<0.050	-0.050	0	0.05	100
Cadmium, total	0/12	<0.0050	<0.0050	-0.0050	0	0.005	100
Chromium, total	3/12	0.016	<0.0040	-0.0061	0.0012	0.05	6.1
Copper, total	0/12	<0.0070	<0.0070	-0.0070	0	1.3	0.54
Iron, total	10/12	1.0	<0.050	-0.32	0.082	0.3	110
Lead, total	0/12	<0.050	<0.050	-0.050	0	0.015	330
Manganese, total	11/12	0.11	<0.0010	-0.043	0.010	0.05	86
Nickel, total	0/12	<0.010	<0.010	-0.010	0	f	f
Phosphorus, total	7/12	0.34	<0.20	-0.26	0.016	f	f
Silver, total	1/12	0.0060	<0.0050	-0.0051	0.000083	0.05	5.1
Zinc, total	7/12	0.069	<0.0050	-0.014	0.0052	5	0.29
<b>Others</b>							
Oil and grease	1/12	5.0	<2.0	-2.3	0.25	f	f
Total dissolved solids	12/12	390	69	150	24	500	30
Total organic carbon	12/12	0.96	0.60	0.82	0.028	f	f
Total suspended solids	9/12	52	<5.0	-17	4.0	f	f

<sup>a</sup>Prefix "<" indicates the value of a parameter (excluding organics) was not quantifiable at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

<sup>d</sup>Drinking Water Standards. From 40 CFR Parts 141 and 143, as amended, and the Tennessee General Water Quality Criteria for Domestic Water Supplies, as amended.

<sup>e</sup>Average concentration as a percentage of the drinking water standards, calculated when a reference exists and the parameter is a contaminant.

<sup>f</sup>Not applicable.

<sup>g</sup>Note that the analytical detection limit for Sulfate as SO<sub>4</sub> was <10 mg/L for January and February. The detection limit for March through December was <1 mg/L.



Table 4.92. 1993 NPDES compliance at ORNL

Discharge Point	Effluent parameters	Permit Limits						Permit Compliance		
		Monthly avg (kg/d)	Daily max (kg/d)	Monthly avg (mg/L)	Daily max (mg/L)	Daily min (mg/L)	Number of noncompliances	Number of samples	Percent of compliance <sup>a</sup>	
X01 (Sewage Treatment Plant)	Ammonia, as N (summer)	3.5	5.2	4.0	6.0		0	91	100	
	Ammonia, as N (winter)	7.8	11.8	9.0	13.5		0	65	100	
	Biochemical oxygen demand (summer)	8.7	13.1	10	15		0	91	100	
	Biochemical oxygen demand (winter)	17.4	26.2	20	30		0	65	100	
	Chlorine, total residual				0.5		0	156	100	
	Dissolved oxygen					6.0	0	249	100	
	Downstream pH (SU)				9.0	6.0	0	52	100	
	Fecal coliform (col/100 mL) <sup>b</sup>			1000	5000		0	156	100	
	Oil and grease pH (SU)	8.7	13.1	10	15	6.0	0	156	100	
	Total suspended solids	26.2	39.2	30	45		0	52	100	
						2	156	99		
X02 (Coal Yard Runoff Treatment Facility)	Chromium, total			0.2	0.2		0	47	100	
	Copper, total			1.0	1.0		0	47	100	
	Downstream pH (SU)				9.0	6.0	0	248	100	
	Iron, total			1.0	1.0		0	47	100	
	Oil and grease			15	20		0	47	100	
	pH (SU)				9.0	6.0	0	248	100	
	Selenium, total			0.22	0.95		0	47	100	
	Temperature (°C)				30.5		0	248	100	
	Total suspended solids				50		1	47	98	
	Zinc			1.0	1.0		0	47	100	
X12 (Nonradiological Wastewater Treatment Facility)	Cadmium, total	0.79	2.09	0.26	0.69		0	52	100	
	Chromium, total	5.18	8.39	1.71	2.77		0	52	100	
	Copper, total	6.27	10.24	2.07	3.38		0	52	100	
	Cyanide, total	1.97	3.64	0.65	1.20		0	52	100	
	Downstream pH (SU)				9.0	6.0	0	249	100	
	Lead, total	1.30	2.09	0.43	0.69		0	52	100	
	Nickel, total	7.21	12.06	2.38	3.98		0	52	100	
	Oil and grease	30.3	45.4	10	15		0	52	100	

Table 4.92 (continued)

Discharge Point	Effluent parameters	Permit Limits				Permit Compliance		
		Monthly avg (kg/d)	Daily max (kg/d)	Monthly avg (mg/L)	Daily max (mg/L)	Daily min (mg/L)	Number of noncompliances	Number of samples
X12 (Nonradiological Wastewater Treatment Facility)	pH (SU)			9.0	6.0	0	c	100
	Silver, total	0.73	1.30	0.24	0.43	0	52	100
	Temperature (°C)			30.5		0	249	100
	Total suspended solids	93.9	182	31	60	0	52	100
	Total toxic organics		6.45		2.13	0	52	100
	Zinc, total	4.48	7.91	1.48	2.61	0	52	100
Category I outfalls <sup>d</sup>	Downstream pH (SU)			9.0	6.0	0	20	100
	Oil and grease		10		15	0	20	100
	pH (SU)			9.0	6.0	0	20	100
	Temperature (°C)			30.5		0	20	100
	Total suspended solids		30		50	6	20	70
Category II outfalls	Downstream pH (SU)			9.0	6.0	0	154	100
	Downstream temperature (°C) <sup>e</sup>			30.5		0	39	100
	Oil and grease		10		15	4	154	97
	pH (SU)			9.0	6.0	0	154	100
	Total suspended solids		30		50	9	154	94
Cooling Systems	Chlorine, total residual			0.2		0	38	100
	Chromium, total			1.0		0	38	100
	Copper, total			0.5		0	38	100
	Downstream pH (SU)			9.0	6.0	0	38	100
	pH (SU)			9.0	6.0	0	38	100
	Temperature (°C)		35		38	0	38	100
	Zinc, total		0.5		1.0	0	38	100

<sup>a</sup>Percent compliance = 100 - [(number of noncompliances/number of samples) \* 100].

<sup>c</sup>Colonies per 100 mL.

<sup>d</sup>pH monitoring is continuous.

<sup>e</sup>Category I outfalls are monitored annually by the NPDES Permit year of April 1-March 31.

<sup>f</sup>Downstream temperature is monitored to check that the stream temperature standards stated in the General Water Quality Criteria for the Definition and Control of Pollution in the Waters of Tennessee, as amended, are not violated as a result of this discharge.

Table 4.93. ORNL NPDES sampling and analysis plan for the facility and ambient locations

Analysis	Collection frequency	Sample type	Analysis frequency
<i>X01 (Sewage Treatment Plant)</i>			
Field Measurements			
Chlorine, total residual	3/week	Grab, instant read	3/week
Dissolved oxygen	5/week	Grab, instant read	5/week
Downstream pH	Weekly	Grab, instant read	Weekly
Flow	Daily	Continuous	Daily
pH	Weekly	Grab, instant read	Weekly
Metals	Monthly	24-h composite	Monthly
Others			
Ammonia, as N	3/week	24-h composite	3/week
Biochemical oxygen demand	3/week	24-h composite	3/week
Cyanide, total	Monthly	Grab	Monthly
Fecal coliform	3/week	Grab	3/week
Oil and grease	3/week	Grab	3/week
Phenolics, total recoverable	Monthly	Grab	Monthly
Total suspended solids	3/week	24-h composite	3/week
Volatile Organics	Monthly	Grab	Monthly
<i>X02 (Coal Yard Runoff Treatment Facility)</i>			
Anions	Monthly	24-h composite	Monthly
Field Measurements			
Downstream pH	Weekly	Grab, instant read	Weekly
Flow	Daily	Continuous	Daily
pH	Weekly	Grab, instant read	Weekly
Temperature	Weekly	Grab, instant read	Weekly
Metals	Weekly	24-h composite	Weekly
Others			
Oil and grease	Weekly	Grab	3/week
Total suspended solids	Weekly	24-h composite	3/week
<i>X12 (Nonradiological Wastewater Treatment Facility)</i>			
Anions	Weekly	24-h composite	Weekly
Field Measurements			
Downstream pH	Daily	Grab, instant read	Daily
Flow	Daily	Continuous	Daily
pH	Continuous	Continuous	Continuous
Temperature	Weekly	Grab, instant read	Weekly
Metals	Weekly	24-h composite	Weekly
Others			
Biochemical oxygen demand	Weekly	24-h composite	Weekly
Cyanide, total	Weekly	Grab	Weekly
Oil and grease	Weekly	Grab	Weekly
Phenolics, total recoverable	Weekly	Grab	Weekly
Total suspended solids	Weekly	24-h composite	Weekly
Total toxic organics	Weekly	Grab	Weekly
Volatile Organics	Weekly	Grab	Weekly

Table 4.93 (continued)

Analysis	Collection frequency	Sample type	Analysis frequency
<i>X13 (Melton Branch), X14 (White Oak Creek), X15 (White Oak Dam)</i>			
Anions	Monthly	24-h composite	Monthly
Field Measurements			
Chlorine, total residual	Weekly	Grab, instant read	Weekly
Conductivity	Monthly	Grab, instant read	Monthly
Dissolved oxygen	Weekly	Grab, instant read	Weekly
Flow	Daily	Continuous	Daily
pH	Monthly	Grab, instant read	Monthly
Temperature	Monthly	Grab, instant read	Monthly
Turbidity	Monthly	Grab, instant read	Monthly
Metals	Monthly	24-composite	Monthly
Others			
Ammonia, as N	Monthly	24-composite	Monthly
Biochemical oxygen demand	Monthly	24-composite	Monthly
Oil and grease	Weekly	Grab	Weekly
Phenolics, total recoverable <sup>a</sup>	Monthly	Grab	Monthly
Total dissolved solids	Monthly	Grab	Monthly
Total organic carbon	Monthly	Grab	Monthly
Total suspended solids	Monthly	24-h composite	Monthly
PCBs	Monthly	24-h composite	Monthly
Volatile Organics	Monthly	Grab	Monthly

<sup>a</sup>Phenolics, total recoverable not required at X15 (White Oak Dam).

Table 4.94. ORNL NPDES sampling and analysis plan for the category outfalls and cooling systems

Analysis	Collection frequency	Sample type	Analysis frequency
<i>Category I outfalls</i>			
Field Measurements			
Downstream pH	Yearly	Grab, instant read	Yearly
Flow	Yearly	Instantaneous	Yearly
pH	Yearly	Grab, instant read	Yearly
Temperature	Yearly	Grab, instant read	Yearly
Others			
Oil and grease	Yearly	Grab	Yearly
Total suspended solids	Yearly	Grab	Yearly
<i>Category II outfalls</i>			
Field Measurements			
Downstream pH	Quarterly	Grab, instant read	Quarterly
Downstream temperature	Quarterly	Grab, instant read	Quarterly
Flow	Quarterly	Instantaneous	Quarterly
pH	Quarterly	Grab, instant read	Quarterly
Temperature	Quarterly	Grab, instant read	Quarterly
Others			
Oil and grease	Quarterly	Grab	Quarterly
Total suspended solids	Quarterly	Grab	Quarterly
<i>Category III outfalls</i>			
Field Measurements			
Flow	Quarterly	Instantaneous	Quarterly
pH	Quarterly	Grab, instant read	Quarterly
Temperature	Quarterly	Grab, instant read	Quarterly
<i>Cooling Systems</i>			
Field Measurements			
Chlorine, total residual	Quarterly	Grab, instant read	Quarterly
Downstream pH	Quarterly	Grab, instant read	Quarterly
Flow	Quarterly	Grab, instant read <sup>a</sup>	Quarterly
pH	Quarterly	Grab, instant read	Quarterly
Temperature	Quarterly	Grab, instant read	Quarterly
Metals	Quarterly	Grab	Quarterly

<sup>a</sup>Not applicable.

Table 4.95. NPDES Permit Number TN 0002941, 1993,  
ORNL discharge point X01 (Sewage Treatment Plant)

Flow rates (1x10<sup>6</sup> L/d)-Max: 2.0, Min: 0.051, Avg: 0.92

Parameter	N det/ N total	Concentration (mg/L)			Standard error <sup>c</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	
Field Measurements					
Chlorine, total residual	156/156	0.39	0.050	0.19	0.0064
Dissolved oxygen	249/249	13	7.1	9.0	0.070
Downstream pH (SU)	52/52	8.0	7.2	7.6	0.019
pH (SU)	52/52	7.8	7.0	7.3	0.022
Metals					
Copper, total	0/12	<0.0070	<0.0070	~0.0070	0
Mercury, total	2/12	0.000088	<0.000050	~0.000056	0.0000042
Silver, total	0/12	<0.0050	<0.0050	~0.0050	0
Zinc, total	12/12	0.15	0.028	0.066	0.0085
Others					
Ammonia, as N	156/156	2.0	0.030	0.26	0.023
Biochemical oxygen demand	3/156	6.0	<5.0	~5.0	0.0090
Cyanide, total	0/12	<0.0020	<0.0020	~0.0020	0
Fecal coliform (col/100 mL) <sup>d</sup>	101/156	3,600	<1.0	~3.8	1.2
Oil and grease	28/156	9.0	<2.0	~2.3	0.080
Phenolics, total recoverable	0/12	<0.0010	<0.0010	~0.0010	0
Total suspended solids	7/156	50	1.0	~5.3	0.29
Volatile Organics					
Bromodichloromethane	0/12	U0.0050	U0.0050	~0.0050	0
Trichloroethene	0/12	U0.0050	U0.0050	~0.0050	0

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

<sup>d</sup>The geometric mean is computed rather than the average.

Table 4.96. NPDES Permit Number TN 0002941, 1993,  
ORNL discharge point X02 (Coal Yard Runoff Treatment Facility)

Flow rates ( $1 \times 10^6$  L/d)-Max: 1.3, Min: 0, Avg: 0.057

Parameter	N det/ N total	Concentration (mg/L)			
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Standard error <sup>c</sup>
<b>Anions</b>					
Sulfate, as SO <sub>4</sub>	12/12	2,100	67	1,300	190
<b>Field Measurements</b>					
Downstream pH (SU)	248/248	8.2	7.1	7.8	0.012
pH (SU)	248/248	8.9	6.8	7.6	0.028
Temperature (°C)	248/248	30	2.9	17	0.50
<b>Metals</b>					
Arsenic, total	5/47	0.29	<0.050	~0.064	0.0066
Cadmium, total	0/47	<0.0050	<0.0050	~0.0050	0
Chromium, total	12/47	0.020	<0.0040	~0.0064	0.00071
Copper, total	5/47	0.0095	<0.0070	~0.0071	0.000069
Iron, total	45/47	0.88	<0.050	~0.29	0.024
Lead, total	1/47	0.051	<0.050	~0.050	0.000021
Manganese, total	46/47	0.17	<0.0010	~0.039	0.0057
Nickel, total	1/47	0.016	<0.010	~0.010	0.00013
Selenium, total	12/47	0.10	<0.050	~0.057	0.0022
Silver, total	0/47	<0.0050	<0.0050	~0.0050	0
Zinc, total	31/47	0.082	<0.0050	~0.013	0.0020
<b>Others</b>					
Oil and grease	11/47	13	<2.0	~3.1	0.39
Total suspended solids	24/47	69	<5.0	~7.6	1.4

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

Table 4.97. NPDES Permit Number TN 0002941, 1993,  
ORNL discharge point X12 (Nonradiological Wastewater Treatment Facility)

Flow rates (1x10<sup>6</sup> L/d)-Max: 2.9, Min: 1.3, Avg: 1.9

Parameter	N det/ N total	Concentration (mg/L)			Standard error <sup>c</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	
<b>Anions</b>					
Fluoride	52/52	2.2	0.50	1.3	0.049
Nitrate, as N	41/45	19	<1.0	~4.3	0.58
Sulfate, as SO <sub>4</sub>	52/52	330	18	200	7.8
<b>Field Measurements</b>					
Downstream pH (SU)	249/249	8.4	7.1	7.8	0.014
pH (SU)	d	7.6	7.1	7.4	0.0064
Temperature (°C)	249/249	27	10	19	0.27
<b>Metals</b>					
Arsenic, total	8/52	<0.050	<0.00050	~0.033	0.0033
Cadmium, total	2/52	<0.0050	<0.00050	~0.0035	0.00030
Chromium, total	31/52	0.018	<0.00050	~0.0058	0.00054
Copper, total	29/52	0.025	<0.00050	~0.0097	0.00064
Iron, total	19/52	0.26	<0.050	~0.068	0.0051
Lead, total	16/52	0.068	<0.00050	~0.034	0.0032
Mercury, total	3/52	0.00034	<0.000050	~0.000056	0.0000056
Nickel, total	17/52	<0.010	<0.00050	~0.0075	0.00051
Phosphorus, total	44/52	0.48	0.070	~0.28	0.013
Selenium, total	11/52	<0.050	<0.00050	~0.033	0.0032
Silver, total	1/52	0.0090	<0.00050	~0.0035	0.00032
Zinc, total	51/52	0.13	0.0032	~0.027	0.0024
<b>Others</b>					
Biochemical oxygen demand	0/52	<5.0	<5.0	~5.0	0
Cyanide, total	2/52	0.0060	<0.0020	~0.0021	0.000077
Oil and grease	10/52	6.0	<2.0	~2.3	0.12
Phenolics, total recoverable	0/52	<0.0010	<0.0010	~0.0010	0
Total suspended solids	0/52	<5.0	<5.0	~5.0	0
Total toxic organics	2/52	B0.041	<0.010	~0.011	0.00060
<b>Volatile Organics</b>					
1,1-Dichloroethane	0/52	U0.0050	U0.0050	~0.0050	0
Benzene	0/52	U0.0050	U0.0050	~0.0050	0
Bromodichloromethane	0/52	U0.0050	U0.0050	~0.0050	0
Chlorobenzene	0/52	U0.0050	U0.0050	~0.0050	0
Chloroform	1/52	U0.0050	J0.0024	~0.0050	0.000050
Methylene chloride	1/52	U0.0050	J0.0024	~0.0050	0.000050
Tetrachloroethene	0/52	U0.0050	U0.0050	~0.0050	0
Trichloroethene	0/52	U0.0050	U0.0050	~0.0050	0

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; "B" indicates the compound was found in the laboratory blank; "U" indicates the value for an organic parameter was undetected at the analytical detection limit; and "J" indicates the value was estimated at or below the analytical detection limit by the laboratory.

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

<sup>d</sup>pH monitoring is continuous.



Table 4.98. NPDES Permit Number TN 0002941, 1993,  
ORNL discharge point X13 (Melton Branch)

Flow rates (1x10<sup>6</sup> L/d)-Max: 190, Min: 0.26, Avg: 6.6

Parameter	N det/ N total	Concentration (mg/L)			Standard error <sup>c</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	
<b>Anions</b>					
Fluoride	12/12	2.7	0.20	1.1	0.22
Nitrate, as N	2/12	1.5	<1.0	-1.1	0.047
Sulfate, as SO <sub>4</sub>	12/12	310	18	110	28
<b>Field Measurements</b>					
Chlorine, total residual	0/52	<0.010	<0.010	-0.010	0
Conductivity (mS/cm)	12/12	0.85	0.17	0.49	0.058
Dissolved oxygen	52/52	14	6.0	9.2	0.27
pH (SU)	13/13	8.0	7.1	7.6	0.072
Temperature (°C)	65/65	25	4.3	14	0.83
Turbidity (NTU)	12/12	29	2.0	13	2.2
<b>Metals</b>					
Aluminum, total	12/12	2.2	0.084	0.73	0.15
Arsenic, total	0/12	<0.050	<0.050	-0.050	0
Cadmium, total	0/12	<0.0050	<0.0020	-0.0048	0.00025
Chromium, total	3/12	0.020	<0.0040	-0.0067	0.0015
Copper, total	4/12	0.017	<0.0070	-0.0082	0.00086
Iron, total	12/12	2.3	0.16	0.71	0.17
Lead, total	0/12	<0.050	<0.0040	-0.046	0.0038
Manganese, total	12/12	0.25	0.070	0.15	0.016
Mercury, total	0/12	<0.000050	<0.000050	-0.000050	0
Nickel, total	0/12	<0.010	<0.010	-0.010	0
Phosphorus, total	11/12	1.2	<0.20	-0.57	0.097
Silver, total	0/12	<0.0050	<0.0050	-0.0050	0
Zinc, total	12/12	0.11	0.016	0.056	0.0091
<b>Others</b>					
Ammonia, as N	13/13	0.11	0.030	0.052	0.0060
Biochemical oxygen demand	0/12	<5.0	<5.0	-5.0	0
Oil and grease	17/52	17	<2.0	-3.2	0.43
Phenolics, total recoverable	0/12	<0.0010	<0.0010	-0.0010	0
Total dissolved solids	12/12	790	140	-310	54
Total organic carbon	12/12	4.0	2.0	2.8	0.19
Total suspended solids	10/12	89	<5.0	-30	7.5
<b>PCBs</b>					
Total Aroclors	0/12	U0.0020	U0.0020	-0.0020	0
<b>Volatile Organics</b>					
Chloroform	0/12	U0.0050	U0.0050	-0.0050	0
Trichloroethene	0/12	U0.0050	U0.0050	-0.0050	0

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

Table 4.99. NPDES Permit Number TN 0002941, 1993,  
ORNL discharge point X14 (White Oak Creek)

Flow rates (1x10<sup>6</sup> L/d)-Max: 320, Min: 7.9, Avg: 20

Parameter	N det/ N total	Concentration (mg/L)			
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Standard error <sup>c</sup>
<b>Anions</b>					
Fluoride	12/12	1.2	0.20	0.71	0.089
Nitrate, as N	7/12	2.3	<1.0	-1.3	0.11
Sulfate, as SO <sub>4</sub>	12/12	87	17	51	5.7
<b>Field Measurements</b>					
Chlorine, total residual	0/52	<0.010	<0.010	-0.010	0
Conductivity (mS/cm)	12/12	0.51	0.20	0.37	0.023
Dissolved oxygen	52/52	12	7.1	9.2	0.18
pH (SU)	13/13	8.2	7.3	7.8	0.062
Temperature (°C)	65/65	25	8.8	16	0.63
Turbidity (NTU)	12/12	24	2.0	8.8	2.0
<b>Metals</b>					
Aluminum, total	10/12	1.2	<0.050	-0.26	0.10
Arsenic, total	0/12	<0.050	<0.050	-0.050	0
Cadmium, total	0/12	<0.0050	<0.0020	-0.0048	0.00025
Chromium, total	3/12	0.013	<0.0040	-0.0059	0.0010
Copper, total	2/12	0.014	<0.0070	-0.0076	0.00058
Iron, total	11/12	1.3	<0.050	-0.29	0.12
Lead, total	0/12	<0.050	<0.0040	-0.046	0.0038
Manganese, total	12/12	0.093	0.0033	0.035	0.0080
Mercury, total	0/12	<0.000050	<0.000050	-0.000050	0
Nickel, total	0/12	<0.010	<0.010	-0.010	0
Phosphorus, total	9/12	0.50	<0.20	-0.36	0.038
Silver, total	0/12	<0.0050	<0.0050	-0.0050	0
Zinc, total	12/12	0.091	0.019	0.041	0.0058
<b>Others</b>					
Ammonia, as N	13/13	0.080	0.020	0.050	0.0044
Biochemical oxygen demand	0/12	<5.0	<5.0	-5.0	0
Oil and grease	14/52	11	<2.0	-2.7	0.26
Phenolics, total recoverable	0/12	<0.0010	<0.0010	-0.0010	0
Total dissolved solids	12/12	310	140	-230	16
Total organic carbon	12/12	3.5	1.3	1.8	0.17
Total suspended solids	4/12	43	<5.0	-11	3.5
<b>PCBs</b>					
Total Aroclors	0/12	U0.0020	U0.0020	-0.0020	0
<b>Volatile Organics</b>					
Chloroform	7/12	U0.0050	J0.0010	-0.0030	0.00052
Trichloroethene	0/12	U0.0050	U0.0050	-0.0050	0

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

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

Table 4.100. NPDES Permit Number TN 0002941, 1993,  
ORNL discharge point X15 (White Oak Dam)

Flow rates (1x10<sup>6</sup> L/d)-Max: 340, Min: 9.4, Avg: 29

Parameter	N det/ N total	Concentration (mg/L)			Standard error <sup>c</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	
<b>Anions</b>					
Fluoride	12/12	1.2	0.20	0.65	0.087
Nitrate, as N	2/12	1.2	<1.0	-1.0	0.022
Sulfate, as SO <sub>4</sub>	12/12	74	20	48	5.6
<b>Field Measurements</b>					
Chlorine, total residual	1/52	0.040	<0.010	-0.011	0.00058
Conductivity (mS/cm)	12/12	0.42	0.20	0.36	0.018
Dissolved oxygen	52/52	14	6.3	9.0	0.25
pH (SU)	12/12	8.8	7.4	8.0	0.12
Temperature (°C)	64/64	30	5.8	17	0.99
Turbidity (NTU)	12/12	32	8.0	17	1.9
<b>Metals</b>					
Aluminum, total	12/12	1.9	0.22	0.85	0.18
Arsenic, total	0/12	<0.050	<0.050	-0.050	0
Cadmium, total	0/12	<0.0050	<0.0020	-0.0048	0.00025
Chromium, total	10/12	0.025	<0.0040	-0.013	0.0022
Copper, total	1/12	0.0084	<0.0070	-0.0071	0.00012
Iron, total	12/12	2.0	0.30	0.87	0.16
Lead, total	0/12	<0.050	<0.0040	-0.046	0.0038
Manganese, total	12/12	0.18	0.035	0.10	0.015
Mercury, total	1/12	0.00042	<0.000050	-0.000081	0.000031
Nickel, total	1/12	0.010	<0.010	-0.010	0
Phosphorus, total	8/12	0.52	<0.20	-0.33	0.032
Silver, total	0/12	<0.0050	<0.0050	-0.0050	0
Zinc, total	11/12	0.059	<0.0050	-0.027	0.0046
<b>Others</b>					
Ammonia, as N	12/12	0.20	0.020	0.085	0.015
Biochemical oxygen demand	2/12	6.0	<5.0	-5.1	0.087
Oil and grease	27/52	36	<2.0	-4.3	0.79
Total dissolved solids	12/12	730	140	-270	44
Total organic carbon	12/12	4.8	1.7	3.0	0.27
Total suspended solids	12/12	71	5.0	31	6.4
<b>PCBs</b>					
Total Aroclors	0/14	U0.0020	U0.0020	-0.0020	0
<b>Volatile Organics</b>					
Chloroform	0/12	U0.0050	U0.0050	-0.0050	0
Trichloroethene	0/12	U0.0050	U0.0050	-0.0050	0

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

Table 4.101. NPDES Permit Number TN 0002941, 1993,  
ORNL Category I outfalls

Parameter	N det/ N total	Concentration (mg/L)			Standard error <sup>c</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	
Field Measurements					
Downstream pH (SU)	21/21	7.9	7.2	7.5	0.062
Flow (MGD)	21/21	0.17	0.00036	0.024	0.0095
pH (SU)	21/21	8.0	7.0	7.6	0.063
Temperature (°C)	21/21	16	7.6	9.5	0.46
Others					
Oil and grease	14/21	10	<2.0	-4.0	0.55
Total suspended solids	19/21	210	<5.0	-50	13

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit.

<sup>b</sup>A tilde (-) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

Table 4.102. NPDES Permit Number TN 0002941, 1993,  
ORNL Category II outfalls

Parameter	N det/ N total	Concentration (mg/L)			Standard error <sup>c</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	
Field Measurements					
Downstream pH (SU)	163/163	8.4	7.1	7.8	0.016
Downstream temperature (°C)	39/39	25	8.0	17	0.75
Flow (MGD)	166/166	0.12	0.00014	0.016	0.0018
pH (SU)	163/163	8.4	6.9	7.7	0.022
Temperature (°C)	163/163	60	6.4	18	0.54
Others					
Oil and grease	64/163	34	<2.0	-4.1	0.38
Total suspended solids	71/163	390	<5.0	-20	3.7

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

Table 4.103. NPDES Permit Number TN 0002941, 1993,  
ORNL Category III outfalls

Parameter	N det/ N total	Concentration (mg/L)			Standard error <sup>a</sup>
		Max	Min	Av	
Field Measurements					
Flow (MGD)	55/55	0.14	0.00022	0.018	0.0041
pH (SU)	56/56	9.0	7.3	7.8	0.041
Temperature (°C)	56/56	33	6.9	17	0.73

<sup>a</sup>Standard error of the mean.

Table 4.104. NPDES Permit Number TN 0002941, 1993,  
ORNL Cooling Systems

Parameter	N det/ N total	Concentration (mg/L)			
		Max	Min <sup>a</sup>	Av <sup>b</sup>	Standard error <sup>c</sup>
Field Measurements					
Chlorine, total residual	26/38	0.18	<0.010	-0.051	0.0074
Downstream pH (SU)	38/38	8.3	7.3	7.9	0.049
Flow (MGD)	38/38	0.19	0.0016	0.035	0.011
pH (SU)	38/38	8.9	7.0	8.2	0.080
Temperature (°C)	38/38	33	7.8	22	1.0
Metals					
Chromium, total	14/38	0.19	<0.0040	-0.019	0.0060
Copper, total	28/38	0.32	<0.0070	-0.083	0.014
Zinc, total	38/38	0.94	0.026	0.20	0.034

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit.

<sup>b</sup>A tilde (-) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

Table 4.105. 1993 mercury concentrations in ORNL surface water

Location	N det/ N total	Concentration ( $\mu\text{g/L}$ )			Standard error <sup>c</sup>	Percent of TWQ <sup>d</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>		
<i>First Creek</i>						
Outfall 341	0/6	<0.050	<0.050	-0.050	0	2.1
<i>Fifth Creek</i>						
Outfall 261	0/6	<0.050	<0.050	-0.050	0	2.1
Outfall 363	0/6	<0.050	<0.050	-0.050	0	2.1
Outfall 367	2/6	0.12	<0.050	-0.072	0.014	5.0
<i>White Oak Creek</i>						
Outfall 106	6/6	0.12	0.066	0.090	0.0094	5.0
Outfall 202	3/6	0.10	<0.050	-0.072	0.010	4.2
Outfall 207	3/6	0.31	<0.050	-0.18	0.057	13
Outfall 222	0/6	<0.050	<0.050	-0.050	0	2.1
Outfall 301	4/6	0.10	<0.050	-0.070	0.0092	4.2
Outfall 302	3/6	0.096	<0.050	-0.067	0.0082	4.0
Outfall 304	6/6	0.26	0.12	0.17	0.023	11
Headwaters	0/6	<0.050	<0.050	-0.050	0	2.1
Sewage Treatment Plant	1/6	0.066	<0.050	-0.053	0.0027	2.7

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit.

<sup>b</sup>A tilde (-) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

<sup>d</sup>Maximum concentration as a percentage of the Tennessee General Water Quality (TWQ) standard, 2.4  $\mu\text{g/L}$ , for the protection of fish and aquatic life.

Table 4.106. 1993 mercury concentrations in ORNL sediment

Location	N det/ N total	Concentration ( $\mu\text{g/g}$ )			Standard error <sup>a</sup>
		Max	Min	Av	
<i>First Creek</i>					
Upstream Northwest Tributary	6/6	0.085	0.029	0.060	0.0095
<i>Fifth Creek</i>					
Outfall 261	6/6	57	5.5	27	9.1
Outfall 362	6/6	120	4.3	42	18
<i>Melton Branch</i>					
Headwaters	6/6	0.047	0.016	0.031	0.0055
<i>White Oak Creek</i>					
Upstream Fifth Creek	6/6	2.9	0.64	1.4	0.33
Downstream First Creek	6/6	3.2	2.0	2.4	0.19
Headwaters	6/6	0.068	0.049	0.059	0.0030
Upstream Melton Branch	6/6	0.20	0.041	0.10	0.026
Downstream White Oak Dam	6/6	0.12	0.020	0.060	0.018

<sup>a</sup>Standard error of the mean.



Table 4.107. 1993 PCB concentrations in ORNL sediment

Parameter	N det/ N total	Concentration ( $\mu\text{g}/\text{kg}$ )			Standard error <sup>c</sup>
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	
<i>Site 04-Confluence of Fifth Creek and White Oak Creek</i>					
Aroclor-1016	0/4	U80	U80	~80	0
Aroclor-1221	0/4	U80	U80	~80	0
Aroclor-1232	0/4	U80	U80	~80	0
Aroclor-1242	1/4	U80	74	~78	1.5
Aroclor-1248	1/4	200	U80	~110	30
Aroclor-1254	2/4	460	U160	~270	72
Aroclor-1260	2/4	U160	56	~130	25
<i>Site 06-Upstream of Weir at 7500 Road Bridge</i>					
Aroclor-1016	0/4	U120	U80	~99	11
Aroclor-1221	0/4	U120	U80	~99	11
Aroclor-1232	0/4	U120	U80	~99	11
Aroclor-1242	0/4	U120	U80	~99	11
Aroclor-1248	2/4	3,900	U80	~1,300	900
Aroclor-1254	3/4	1,900	U240	~890	360
Aroclor-1260	2/4	1,300	U240	~650	270
<i>Site 07-Upstream of Weir at Melton Branch</i>					
Aroclor-1016	0/4	U120	U80	~100	11
Aroclor-1221	0/4	U120	U80	~100	11
Aroclor-1232	0/4	U120	U80	~100	11
Aroclor-1242	0/4	U120	U80	~100	11
Aroclor-1248	0/4	U120	U80	~100	11
Aroclor-1254	2/4	U240	J11	~130	64
Aroclor-1260	0/4	U240	U160	~200	23
<i>Site 08-Melton Hill Lake southeast of 7600</i>					
Aroclor-1016	0/4	U80	U80	~80	0
Aroclor-1221	0/4	U80	U80	~80	0
Aroclor-1232	0/4	U80	U80	~80	0
Aroclor-1242	0/4	U80	U80	~80	0
Aroclor-1248	0/4	U80	U80	~80	0
Aroclor-1254	0/4	U160	U160	~160	0
Aroclor-1260	0/4	U160	U160	~160	0
<i>Site 09-Melton Hill Lake west of PCB Storage Areas 7652 and 7656</i>					
Aroclor-1016	0/4	U80	U79	~80	0.20
Aroclor-1221	0/4	U80	U79	~80	0.20
Aroclor-1232	0/4	U80	U79	~80	0.20
Aroclor-1242	0/4	U80	U79	~80	0.20
Aroclor-1248	0/4	U80	U79	~80	0.20
Aroclor-1254	1/4	U160	J12	~120	37
Aroclor-1260	0/4	U160	U160	~160	0.40
<i>Site 10-White Oak Lake at Mouth of White Oak Creek</i>					
Aroclor-1016	0/4	U120	U80	~100	11
Aroclor-1221	0/4	U120	U80	~100	11
Aroclor-1232	0/4	U120	U80	~100	11
Aroclor-1242	0/4	U120	U80	~100	11
Aroclor-1248	0/4	U120	U80	~100	11
Aroclor-1254	2/4	270	22	~150	50
Aroclor-1260	4/4	330	170	250	33

Table 4.107 (continued)

Parameter	N det/ N total	Concentration ( $\mu\text{g}/\text{kg}$ )			
		Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Standard error <sup>c</sup>
<i>Site 11-Melton Hill Lake east of 7600 and south of 7709</i>					
Aroclor-1016	0/4	U80	U80	-80	0
Aroclor-1221	0/4	U80	U80	-80	0
Aroclor-1232	0/4	U80	U80	-80	0
Aroclor-1242	0/4	U80	U80	-80	0
Aroclor-1248	0/4	U80	U80	-80	0
Aroclor-1254	1/4	U160	J12	-120	37
Aroclor-1260	0/4	U160	U160	-160	0
<i>Site 12-Watts Bar Lake south of 7700, Tower Shielding Facility</i>					
Aroclor-1016	0/4	U80	U79	-80	0.20
Aroclor-1221	0/4	U80	U79	-80	0.20
Aroclor-1232	0/4	U80	U79	-80	0.20
Aroclor-1242	0/4	U80	U79	-80	0.20
Aroclor-1248	2/4	U80	11	-46	20
Aroclor-1254	1/4	U160	J17	-120	36
Aroclor-1260	0/4	U160	U160	-160	0.40
<i>Site 13-White Oak Dam</i>					
Aroclor-1016	0/4	U80	U80	-80	0
Aroclor-1221	0/4	U80	U80	-80	0
Aroclor-1232	0/4	U80	U80	-80	0
Aroclor-1242	0/4	U80	U80	-80	0
Aroclor-1248	0/4	U80	U80	-80	0
Aroclor-1254	2/4	U160	J10	-87	42
Aroclor-1260	0/4	U160	U160	-160	0
<i>Site 14-Headwaters of White Oak Creek</i>					
Aroclor-1016	0/4	U80	U80	-80	0
Aroclor-1221	0/4	U80	U80	-80	0
Aroclor-1232	0/4	U80	U80	-80	0
Aroclor-1242	0/4	U80	U80	-80	0
Aroclor-1248	0/4	U80	U80	-80	0
Aroclor-1254	2/4	U160	J47	-100	32
Aroclor-1260	0/4	U160	U160	-160	0

<sup>a</sup>Prefix "U" indicates the value for an organic parameter was undetected at the analytical detection limit and "J" indicates the value was estimated at or below the analytical detection limit by the laboratory.

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation.

<sup>c</sup>Standard error of the mean.

Table 4.108. Radionuclide concentrations at K-25 Site discharges and surface water monitoring locations

Radionuclide	Number of samples	Concentration (pCi/L) <sup>a</sup>					DCG	Percent of DCG	Sum of the fractions of the DCGs
		Max	Min	Median	Average	DCG			
<i>K-716 (Poplar Creek)</i>									
<sup>234</sup> U	12	5.80E+00	0.00E+00	7.74E-01	1.45E+00	5.00E+02	2.91E-01	b	
<sup>235</sup> U	12	7.62E+01	0.00E+00	1.35E+01	2.77E+01	6.00E+02	4.61E+00 <sup>c</sup>	b	
<sup>238</sup> U	12	2.96E+00	-7.48E-01	9.09E-01	8.65E-01	6.00E+02	1.44E-01	b	
<sup>137</sup> Cs	12	5.91E+01	-1.66E+01	1.12E+01	1.35E+01	3.00E+03	4.48E-01 <sup>c</sup>	b	
<sup>99</sup> Tc	12	3.92E+02	-1.37E+03	-8.50E+01	-1.65E+02	1.00E+05	-1.65E-01	b	
<sup>237</sup> Np	12	2.08E+00	-7.59E-01	0.00E+00	2.14E-01	3.00E+01	7.12E-01	b	
<sup>238</sup> Pu	12	1.04E+00	-2.28E+00	0.00E+00	-3.23E-01	4.00E+01	-8.06E-01	b	
<sup>239</sup> Pu	12	7.59E-01	-7.54E-01	0.00E+00	-1.13E-01	3.00E+01	-3.78E-01	b	
<sup>234</sup> Th	12	1.51E+03	-3.99E+02	0.00E+00	2.31E+02	1.00E+04	2.31E+00 <sup>c</sup>	b	
<sup>234m</sup> Pa	12	8.03E+03	0.00E+00	0.00E+00	2.51E+03	7.00E+04	3.59E+00 <sup>c</sup>	b	
<sup>106</sup> Ru	12	1.68E+02	0.00E+00	0.00E+00	1.40E+01	6.00E+03	2.33E-01 <sup>c</sup>	b	
<sup>40</sup> K	12	6.08E+02	0.00E+00	0.00E+00	9.81E+01	7.00E+03	1.40E+00 <sup>c</sup>	b	
Gross alpha	12	2.46E+00	-1.52E+00	-9.20E-02	1.57E-01	b	b	b	
Gross beta	12	8.80E+00	-3.55E+00	2.14E+00	2.50E+00	b	b	b	
All listed isotopes		b	b	b	b	b	b	1.24E-01 <sup>c</sup>	
<i>K-901-A (settling basin for laboratory and surface water runoff)</i>									
<sup>234</sup> U	12	7.26E+00	0.00E+00	2.38E+00	2.36E+00	5.00E+02	4.71E-01	b	
<sup>235</sup> U	12	5.55E+01	-5.00E+01	1.44E+00	7.09E+00	6.00E+02	1.18E+00 <sup>c</sup>	b	
<sup>238</sup> U	12	2.11E+01	0.00E+00	1.33E+00	3.16E+02	6.00E+02	5.27E-01	b	
<sup>137</sup> Cs	12	1.17E+01	-1.70E+01	-8.35E-01	-3.22E+00	3.00E+03	-1.07E-01 <sup>c</sup>	b	
<sup>99</sup> Tc	12	4.12E+02	-4.37E+02	3.04E+01	-3.39E+01	1.00E+05	-3.39E-02	b	
<sup>237</sup> Np	12	7.30E-01	-6.68E-01	0.00E+00	-4.27E-02	3.00E+01	-1.42E-01	b	
<sup>238</sup> Pu	12	4.49E+00	-2.00E+00	0.00E+00	6.88E-01	4.00E+01	1.72E+00	b	

Table 4.108 (continued)

Radionuclide	Number of samples	Concentration (pCi/L) <sup>a</sup>				DCG	Percent of DCG	Sum of the fractions of the DCGs
		Max	Min	Median	Average			
<sup>239</sup> Pu	12	3.49E-01	-1.59E+00	0.00E+00	-2.62E-01	3.00E+01	-8.73E-01	b
<sup>228</sup> Th	12	1.04E+03	0.00E+00	0.00E+00	8.67E+01	4.00E+02	2.17E+01	b
<sup>234</sup> Th	12	1.61E+03	-2.22E+02	0.00E+00	2.92E+02	1.00E+04	2.92E+00 <sup>c</sup>	b
<sup>234m</sup> Pa	12	4.63E+03	-4.71E+02	0.00E+00	7.17E+02	7.00E+04	1.02E+00 <sup>c</sup>	b
<sup>106</sup> Ru	12	5.49E+02	0.00E+00	0.00E+00	9.73E+01	6.00E+03	1.62E+00	b
<sup>143</sup> Ce	12	1.06E+03	0.00E+00	0.00E+00	8.83E+01	3.00E+04	2.94E-01	b
<sup>51</sup> Cr	12	2.41E+03	0.00E+00	0.00E+00	2.01E+02	1.00E+06	2.01E-02	b
<sup>131</sup> I	12	1.25E+02	0.00E+00	0.00E+00	1.04E+01	3.00E+03	3.47E-01	b
Gross alpha	12	3.98E+00	-9.02E-01	1.01E+00	1.29E+00	b	b	b
Gross beta	12	2.47E+01	-1.65E-01	5.54E+00	9.03E+00	b	b	b
All listed isotopes		b	b	b	b	b	b	3.07E-01 <sup>c</sup>
<i>K-1007-B (settling basin for laboratory and surface water runoff)</i>								
<sup>234</sup> U	12	1.32E+01	-4.94E-01	1.64E+00	2.64E+00	5.00E+02	5.28E-01	b
<sup>235</sup> U	12	3.78E+01	-9.25E+01	1.26E+01	5.63E+00	6.00E+02	9.38E-01 <sup>c</sup>	b
<sup>238</sup> U	12	1.77E+01	0.00E+00	1.14E+00	2.27E+00	6.00E+02	3.79E-01	b
<sup>137</sup> Cs	12	1.88E+01	-2.04E+01	4.52E+00	2.88E+00	3.00E+03	9.59E-02 <sup>c</sup>	b
<sup>99</sup> Tc	12	4.96E+02	-4.18E+02	-5.38E+01	-1.73E+01	1.00E+05	-1.73E-02	b
<sup>237</sup> Np	12	6.95E-01	-1.10E+00	0.00E+00	4.42E-02	3.00E+01	1.47E-01	b
<sup>238</sup> Pu	12	1.37E+00	-2.08E+00	0.00E+00	-3.90E-02	4.00E+01	-9.75E-02	b
<sup>239</sup> Pu	12	3.28E-01	-3.60E+00	0.00E+00	-5.16E-01	3.00E+01	-1.72E+00	b
<sup>228</sup> Th	12	1.22E+03	0.00E+00	0.00E+00	1.02E+02	4.00E+02	2.54E+01	b
<sup>234</sup> Th	12	1.25E+03	-1.06E+03	0.00E+00	1.30E+02	1.00E+04	1.30E+00 <sup>c</sup>	b
<sup>234m</sup> Pa	12	4.86E+03	0.00E+00	0.00E+00	1.06E+03	7.00E+04	1.52E+00 <sup>c</sup>	b
<sup>106</sup> Ru	12	1.67E+02	0.00E+00	0.00E+00	1.39E+01	6.00E+03	2.32E-01	b

Table 4.108 (continued)

Radionuclide	Number of samples	Concentration (pCi/L) <sup>a</sup>				DCG	Percent of DCG	Sum of the fractions of the DCGs
		Max	Min	Median	Average			
Gross alpha	12	2.09E+00	-6.01E-01	3.77E-01	3.94E-01	b	b	b
Gross beta	12	9.73E+00	2.06E+00	5.15E+00	5.17E+00	b	b	b
All listed isotopes		b	b	b	b	b	b	2.78E-01 <sup>c</sup>
<i>K-1700 (coal pile runoff and once-through cooling water)</i>								
<sup>234</sup> U	12	1.38E+01	5.84E-01	7.61E+00	8.18E+00	5.00E+02	1.64E+00	b
<sup>235</sup> U	12	6.65E+01	-3.89E+01	1.69E-01	7.19E+00	6.00E+02	1.20E+00 <sup>c</sup>	b
<sup>238</sup> U	12	1.16E+01	8.34E-01	4.55E+00	4.68E+00	6.00E+02	7.81E-01	b
<sup>137</sup> Cs	12	3.57E+01	-3.90E+01	2.36E+00	2.94E+00	3.00E+03	9.79E-02 <sup>c</sup>	b
<sup>99</sup> Tc	12	4.94E+02	-3.78E+02	-4.52E+01	1.22E+00	1.00E+05	1.22E-03	b
<sup>237</sup> Np	12	1.90E+00	-6.57E-01	8.74E-01	7.89E-01	3.00E+01	2.63E+00	b
<sup>238</sup> Pu	12	7.24E-01	-2.22E+00	0.00E+00	-4.24E-01	4.00E+01	-1.06E+00	b
<sup>239</sup> Pu	12	1.48E+00	-3.54E+00	0.00E+00	-1.40E-01	3.00E+01	-4.67E-01	b
<sup>228</sup> Th	12	1.48E+03	0.00E+00	0.00E+00	1.28E+02	4.00E+02	3.20E+01 <sup>c</sup>	b
<sup>230</sup> Th	12	1.04E+03	-2.63E+02	0.00E+00	2.27E+02	1.00E+04	2.27E+00 <sup>c</sup>	b
<sup>234m</sup> Pa	12	4.24E+03	0.00E+00	0.00E+00	9.98E+02	7.00E+04	1.43E+00 <sup>c</sup>	b
<sup>40</sup> K	12	4.63E+02	0.00E+00	0.00E+00	3.86E+01	7.00E+03	5.51E-01 <sup>c</sup>	b
Gross alpha	12	1.31E+01	4.93E+00	9.31E+00	8.81E+00	b	b	b
Gross beta	12	2.26E+01	1.03E+01	1.79E+01	1.71E+01	b	b	b
All listed isotopes		b	b	b	b	b	b	4.11E-01 <sup>c</sup>
<i>K-1710 (Poplar Creek upstream of the K-25 Site)</i>								
<sup>234</sup> U	12	3.21E+00	0.00E+00	4.97E-01	1.03E+00	5.00E+02	2.06E-01	b
<sup>235</sup> U	12	5.84E+01	-3.46E+01	1.10E+01	1.16E+01	6.00E+02	1.94E+00 <sup>c</sup>	b
<sup>238</sup> U	12	4.35E+00	0.00E+00	9.36E-01	1.31E+00	6.00E+02	2.19E-01	b
<sup>137</sup> Cs	12	6.01E+01	-2.89E+01	5.36E+00	1.15E+01	3.00E+03	3.83E-01 <sup>c</sup>	b

Table 4.108 (continued)

Radionuclide	Number of samples	Concentration (pCi/L) <sup>a</sup>				Average	DCG	Percent of DCG	Sum of the fractions of the DCGs
		Max	Min	Median					
<sup>99</sup> Tc	12	4.58E+02	-1.31E+03	-1.39E+02	-2.30E+02	1.00E+05	-2.30E-01	b	
<sup>237</sup> Np	12	1.78E+00	-7.30E-01	0.00E+00	2.03E-01	3.00E+01	6.76E-01	b	
<sup>238</sup> Pu	12	1.50E+00	-2.19E+00	0.00E+00	9.10E-02	4.00E+01	2.28E-01	b	
<sup>239</sup> Pu	12	7.30E-01	-1.50E+00	0.00E+00	-1.19E-01	3.00E+01	-3.98E-01	b	
<sup>234</sup> Th	12	9.33E+02	-3.08E+02	0.00E+00	1.10E+02	1.00E+04	1.10E+00 <sup>c</sup>	b	
<sup>234m</sup> Pa	12	8.34E+03	-2.83E+02	0.00E+00	1.73E+03	7.00E+04	2.47E+00 <sup>c</sup>	b	
<sup>106</sup> Ru	12	1.69E+02	0.00E+00	0.00E+00	2.73E+01	6.00E+03	4.54E-01 <sup>c</sup>	b	
<sup>143</sup> Ce	12	8.25E+03	0.00E+00	0.00E+00	6.88E+02	3.00E+04	2.29E+00	b	
Gross alpha	12	2.52E+00	-1.15E+00	7.62E-01	8.41E-01	b	b	b	
Gross beta	12	8.73E+00	-1.75E+00	2.40E+00	2.87E+00	b	b	b	
All listed isotopes		b	b	b	b	b	b	9.34E-02 <sup>c</sup>	
<i>West Fork Poplar Creek (upstream of the K-25 Site)</i>									
<sup>234</sup> U	12	4.21E+00	-6.90E-01	7.65E-01	1.10E+00	5.00E+02	2.20E-01	b	
<sup>235</sup> U	12	4.61E+01	-1.73E+02	5.26E+00	-2.05E+00	6.00E+02	-3.41E-01 <sup>c</sup>	b	
<sup>238</sup> U	12	1.40E+00	-5.83E-01	4.20E-01	4.76E-01	6.00E+02	7.94E-02	b	
<sup>137</sup> Cs	12	2.27E+01	-2.11E+01	7.11E+00	3.95E+00	3.00E+03	1.32E-01 <sup>c</sup>	b	
<sup>99</sup> Tc	12	4.51E+02	-1.09E+03	-2.19E+02	-2.30E+02	1.00E+05	-2.30E-01	b	
<sup>237</sup> Np	12	6.57E-01	-6.68E-01	0.00E+00	7.21E-02	3.00E+01	2.40E-01	b	
<sup>238</sup> Pu	12	2.99E+00	-2.00E+00	0.00E+00	1.81E-01	4.00E+01	4.51E-01	b	
<sup>239</sup> Pu	12	7.54E-01	-1.62E+00	0.00E+00	-5.07E-02	3.00E+01	-1.69E-01	b	
<sup>238</sup> Th	12	9.54E+02	0.00E+00	0.00E+00	7.95E+01	4.00E+02	1.99E+01 <sup>c</sup>	b	
<sup>234</sup> Th	12	7.12E+02	-1.10E+03	0.00E+00	-7.72E+01	1.00E+04	-7.72E-01 <sup>c</sup>	b	
<sup>234m</sup> Pa	12	6.13E+03	-2.61E+02	0.00E+00	1.05E+03	7.00E+04	1.49E+00 <sup>c</sup>	b	
<sup>106</sup> Ru	12	2.85E+02	0.00E+00	0.00E+00	4.50E+01	6.00E+03	7.50E-01	b	

Table 4.108 (continued)

Radionuclide	Number of samples	Concentration (pCi/L) <sup>a</sup>				DCG	Percent of DCG	Sum of the fractions of the DCGs
		Max	Min	Median	Average			
<sup>40</sup> K	12	4.09E+02	0.00E+00	0.00E+00	5.83E+01	7.00E+03	8.32E-01	b
Gross alpha	12	5.36E+00	-2.51E+00	-8.64E-01	-1.94E-01	b	b	b
Gross beta	12	8.25E+00	-3.49E+00	1.36E+00	1.57E+00	b	b	b
All listed isotopes		b	b	b	b	b	b	2.26E-01 <sup>c</sup>

<sup>a</sup>1 pCi/L = 3.7E-02 Bq/L.

<sup>b</sup>Not applicable.

<sup>c</sup>This calculated value includes sampling results that are at or below the detection limits and/or below background activities.

Table 4.109. K-25 Site NPDES sampling and analysis frequencies

Discharge point	Effluent parameters	Sample type	Sample frequency	Analysis frequency <sup>a</sup>
005 (K-1203 Sewage Treatment Facility)	Ammonia nitrogen	grab	3/week	3/week
	Biochemical oxygen demand	24 hour composite b	3/week	3/week
	Chlorine, total residual	grab	daily	daily
	Dissolved oxygen	grab	daily	daily
	Fecal coliform	grab	3/week	3/week
	Flow	recorder	continuous	continuous
	LC-50, Ceriodaphnia	7 - 24 hour composites	bimonthly	bimonthly
	LC-50, Pimephales	7 - 24 hour composites	bimonthly	bimonthly
	NOEL, Ceriodaphnia	7 - 24 hour composites	bimonthly	bimonthly
	NOEL, Pimephales	7 - 24 hour composites	bimonthly	bimonthly
	pH	grab	daily	daily
	Settleable solids	grab	5/week	5/week
	Suspended solids	composite	3/week b	3/week b
009 (K-1515-C Sanitary Water Plant)	Aluminum	grab	weekly	weekly
	Chlorine, total residual	grab	weekly	weekly
	Flow	instantaneous	daily	daily
	pH, standard units	grab	weekly	weekly
	pH	grab	weekly	weekly
	Settleable solids	grab	weekly	weekly
	011 (K-1407-J Central Neutralization Facility)	1,1,1-Trichloroethane	grab	monthly
Acetone		grab	quarterly	quarterly
Acetonitrile		grab	quarterly	quarterly
Benzene		grab	monthly	monthly
Bromoform		grab	monthly	monthly
Cadmium		composite	quarterly	quarterly
Carbon tetrachloride		grab	monthly	monthly
Chemical oxygen demand		composite	weekly	weekly
Chloride, total		composite	4/week	4/week
Chlorine, total residual		grab	2/week	2/week
Chlorodibromomethane		grab	monthly	monthly
Chloroform		grab	monthly	monthly
Chromium		composite	quarterly	quarterly
Copper		composite	quarterly	quarterly
Dichlorobromomethane		grab	monthly	monthly
Ethylbenzene		grab	quarterly	quarterly
Flow		recorder	continuous	continuous



Table 109 (continued)

Discharge point	Effluent parameters	Sample type	Sample frequency	Analysis frequency
O11 (continued)	Gross alpha	24 hour composite	weekly	monthly
	Gross beta	24 hour composite	weekly	monthly
	LC-50, Ceriodaphnia	7 - 24 hour composites	bimonthly	
	LC-50, Pimephales	7 - 24 hour composites	bimonthly	
	Lead	composite	quarterly	
	Methyl ethyl ketone	grab	quarterly	
	Methylene chloride	grab	quarterly	
	Naphthalene	grab	quarterly	
	Nickel	composite	monthly	
	NOEL, Ceriodaphnia	7 - 24 hour composites	quarterly	
	NOEL, Pimephales	7 - 24 hour composites	bimonthly	
	Oil and grease	grab	bimonthly	
	PCB	composite	2/week	
	pH	recorder	continuous	
	Silver	composite	quarterly	
	Suspended Solids	composite	4/week	
	Temperature	grab	daily	
	Tetrachloroethylene	grab	monthly	
	Toluene	grab	quarterly	
Total Toxic Organics	grab	quarterly		
Trichloroethylene	grab	monthly		
Uranium, total	24 hour composite	weekly	monthly	
Vinyl chloride	grab	monthly		
Zinc	composite	quarterly		
Category I Storm drains	Flow	estimate	biannually	
	pH	grab	biannually	
Category II Storm drains	Flow	estimate	quarterly	
	pH	grab	quarterly	
	Suspended solids	grab	quarterly	
Category III Storm drains	Flow	estimate	monthly	
	Oil and grease	grab	monthly	

Table 4.109 (continued)

Discharge point	Effluent parameters	Sample type	Sample frequency	Analysis frequency <sup>a</sup>
Category IV Storm drains	pH	grab	monthly	
	Suspended solids	grab	monthly	
Category IV Storm drains	Chlorine, total residual	grab	weekly	
	Flow	estimate	weekly	
	Oil and grease	grab	weekly	
	pH	grab	weekly	
	Suspended solids	grab	weekly	

<sup>a</sup> Analysis frequency is identical to sample frequency unless otherwise noted.

<sup>b</sup> Sampled at influent and effluent locations. Influent sampling data are used for operational purposes only.

Table 4.110. 1993 NPDES Permit Number TN 0002950

Parameter	Number of samples	Concentration			Reference Value	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 05A</i>						
Flow, MGD	11	0.0750	0.0040	0.0268	b	b
Oil and Grease, mg/L	11	2.3	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	11	35	< 1	< 5	b	b
pH, Standard Units	11	8.1	7.0	b	4.0/9.0	0
<i>Discharge Point SD 100</i>						
Chlorine, Total Residual, mg/L	119	1.27	< 0.05	< 0.34	0.14c	0
Flow, MGD	52	32.3160	0.0533	1.1214	b	0
Oil and Grease, mg/L	52	5.5	< 2.0	< 2.2	b	b
Total Suspended Solids, mg/L	52	114	< 1	< 6	b	b
pH, Standard Units	52	9.2	7.4	b	6.0/9.0	1
<i>Discharge Point SD 110</i>						
Flow, MGD	3	0.0712	0.0001	0.0243	b	b
Total Suspended Solids, mg/L	3	158	9	60	b	b
pH, Standard Units	3	7.7	7.5	b	4.0/6.0	0
<i>Discharge Point SD 120</i>						
Flow, MGD	10	0.7756	0.0589	0.3044	b	b
Oil and Grease, mg/L	10	2.4	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	10	25	< 1	< 11	b	b
pH, Standard Units	10	7.7	6.6	b	4.0/9.0	0
<i>Discharge Point SD 124</i>						
Chlorine, Total Residual, mg/L	47	0.31	< 0.05	< 0.07	0.14c	0
Flow, GPD	46	45654	54	3409	b	b
Oil and Grease, mg/L	46	2.6	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	46	17	< 1	< 3	b	b
pH, Standard Units	46	8.8	7.0	b	6.0/9.0	0
<i>Discharge Point SD 130</i>						
Chlorine, Total Residual, mg/L	52	0.20	< 0.05	< 0.06	0.14c	0
Flow, MGD	52	5.2261	0.0055	0.5320	b	b
Oil and Grease, mg/L	52	2.6	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	52	89	2	13	b	b
pH, Standard Units	52	8.2	7.0	b	6.0/9.0	b

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 140</i>						
Flow, GPD	4	10963	2693	7296	b	b
Total Suspended Solids, mg/L	4	34	< 1	< 9	b	b
pH, Standard Units	4	8.0	7.0	b	4.0/9.0	0
<i>Discharge Point SD 142</i>						
Flow, MGD	12	0.2517	0.0002	0.0356	b	b
Oil and Grease, mg/L	12	7.3	< 2.0	< 2.6	b	b
Total Suspended Solids, mg/L	12	17	< 1	< 4	b	b
pH, Standard Units	12	8.5	6.4	b	4.0/9.0	0
<i>Discharge Point SD 144</i>						
Flow, MGD	10	0.4226	0.0015	0.1610	b	b
Oil and Grease, mg/L	10	3.3	< 2.0	< 2.2	b	b
Total Suspended Solids, mg/L	10	17	< 1	< 7	b	b
pH, Standard Units	10	8.0	6.9	b	4.0/9.0	0
<i>Discharge Point SD 146</i>						
Flow, MGD	9	0.5007	0.0006	0.0585	b	b
Oil and Grease, mg/L	9	< 2.0	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	9	57	6	20	b	b
pH, Standard Units	9	8.8	7.1	b	4.0/9.0	0
<i>Discharge Point SD 148</i>						
Flow, GPD	9	37443	190	4828	b	b
Oil and Grease, mg/L	9	4.3	< 2.0	< 2.3	b	b
Total Suspended Solids, mg/L	9	24	< 1	< 6	b	b
pH, Standard Units	9	8.3	6.8	b	4.0/9.0	0
<i>Discharge Point SD 150</i>						
Flow, MGD	10	1.8743	0.0134	0.3593	b	b
Oil and Grease, mg/L	10	2.4	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	10	195	< 1	< 26	b	b
pH, Standard Units	10	8.1	6.4	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 152</i>						
Flow, MGD	4	0.2074	0.0131	0.0966	b	b
Total Suspended Solids, mg/L	4	138	2	41	b	b
pH, Standard Units	4	8.1	7.3	b	4.0/9.0	b
<i>Discharge Point SD 154</i>						
Flow, MGD	10	0.3623	0.0110	0.0893	b	b
Oil and Grease, mg/L	11	4.1	< 2.0	< 2.3	b	b
Total Suspended Solids, mg/L	11	12	1	5	b	b
pH, Standard Units	11	8.1	6.7	b	4.0/9.0	0
<i>Discharge Point SD 156</i>						
Flow, GPD	1	190	190	190	b	b
pH, Standard Units	1	7.3	7.3	b	4.0/9.0	b
<i>Discharge Point SD 158</i>						
Flow, GPD	4	16878	380	6685	b	b
Total Suspended Solids, mg/L	4	2	< 1	< 2	b	b
pH, Standard Units	4	7.9	7.0	b	4.0/9.0	0
<i>Discharge Point SD 160</i>						
Flow, GPD	3	11520	495	4697	b	b
Total Suspended Solids, mg/L	3	2	< 1	< 1	b	b
pH, Standard Units	3	7.8	7.4	b	4.0/9.0	0
<i>Discharge Point SD 162</i>						
Flow, MGD	9	0.4955	0.0300	0.1890	b	b
Oil and Grease, mg/L	9	2.0	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	9	16	1	5	b	b
pH, Standard Units	9	8.0	6.8	b	4.0/9.0	0
<i>Discharge Point SD 168</i>						
Flow, GPD	2	760	152	456	b	b
Total Suspended Solids, mg/L	2	1	< 1	< 1	b	b
pH, Standard Units	2	8.5	8.0	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 170</i>						
Chlorine, Total Residual, mg/L	65	0.09	< 0.05	< 0.05	0.019c	1
Flow, MGD	52	0.4440	0.1008	0.1671	b	b
Oil and Grease, mg/L	52	3.2	< 2.0	2.1	b	b
Total Suspended Solids, mg/L	52	17	< 1	< 2	b	0
pH, Standard Units	53	8.8	7.4	b	6.0/9.0	0
<i>Discharge Point SD 180</i>						
Chlorine, Total Residual, mg/L	67	0.16	< 0.05	< 0.06	0.019c	0
Flow, MGD	53	0.1584	0.0288	0.0545	b	b
Oil and Grease, mg/L	53	3.7	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	53	26	< 1	< 2	b	b
pH, Standard Units	53	8.7	7.5	b	6.0/9.0	0
<i>Discharge Point SD 190</i>						
Chlorine, Total Residual, mg/L	65	0.22	< 0.05	< 0.06	0.019c	b
Flow, MGD	53	0.6959	0.000043	0.1302	b	b
Oil and Grease, mg/L	52	4.6	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	52	176	< 1	< 7	b	b
pH, Standard Units	52	8.4	7.1	b	6.0/9.0	0
<i>Discharge Point SD 192</i>						
Flow, GPD	1	380	380	380	b	b
pH, Standard Units	1	8.0	8.0	b	4.0/9.0	0
<i>Discharge Point SD 194</i>						
Flow, GPD	2	4565	1141	2853	b	b
pH, Standard Units	2	8.4	7.0	b	4.0/9.0	0
<i>Discharge Point SD 196</i>						
Flow, GPD	1	76	76	76	b	b
pH, Standard Units	1	7.9	7.9	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 197</i>						
Flow, MGD	11	0.3501	0.0007	0.0531	b	b
Oil and Grease, mg/L	11	2.4	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	11	82	2	21	b	b
pH, Standard Units	11	8.4	7.4	b	4.0/9.0	0
<i>Discharge Point SD 198</i>						
Flow, MGD	6	0.0457	0.0002	0.0100	b	b
Total Suspended Solids, mg/L	6	35	< 1	< 8	b	b
pH, Standard Units	6	8.8	7.7	b	4.0/9.0	0
<i>Discharge Point SD 200</i>						
Flow, MGD	10	1.4184	0.0004	0.1901	b	b
Oil and Grease, mg/L	10	< 2.0	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	10	102	< 1	< 23	b	b
pH, Standard Units	10	8.2	6.9	b	4.0/9.0	0
<i>Discharge Point SD 210</i>						
Flow, MGD	4	2.7894	0.0014	0.7379	b	b
Total Suspended Solids, mg/L	4	68	12	43	b	b
pH, Standard Units	4	7.9	6.6	b	4.0/9.0	0
<i>Discharge Point SD 220</i>						
Flow, MGD	7	0.6832	0.0008	0.1289	b	b
Oil and Grease, mg/L	7	3.6	< 2.0	< 2.4	b	b
Total Suspended Solids, mg/L	7	462	7	78	b	b
pH, Standard Units	7	8.6	7.2	b	4.0/9.0	0
<i>Discharge Point SD 230</i>						
Flow, MGD	12	30.6664	0.0008	2.6548	b	b
Oil and Grease, mg/L	12	3.5	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	12	16	< 1	< 3	b	b
pH, Standard Units	12	8.6	7.0	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 240</i>						
Flow, MGD	12	4.9123	0.0038	0.4686	b	b
Oil and Grease, mg/L	12	4.3	< 2.0	< 2.2	b	b
Total Suspended Solids, mg/L	12	41	< 1	< 8	b	b
pH, Standard Units	12	8.4	7.0	b	4.0/9.0	0
<i>Discharge Point SD 242</i>						
Flow, GPD	1	18540	18540	18540	b	b
pH, Standard Units	1	7.5	7.5	b	4.0/9.0	0
<i>Discharge Point SD 250</i>						
Flow, MGD	2	1.7122	0.0216	0.8669	b	b
Total Suspended Solids, mg/L	2	33	30	32	b	b
pH, Standard Units	2	8.2	6.6	b	4.0/9.0	0
<i>Discharge Point SD 254</i>						
Flow, GPD	1	432	432	432	b	b
Total Suspended Solids, mg/L	1	23	23	23	b	b
pH, Standard Units	1	7.7	7.7	b	4.0/9.0	0
<i>Discharge Point SD 262</i>						
Flow, MGD	1	0.0256	0.0256	0.0256	b	b
pH, Standard Units	1	7.0	7.0	b	4.0/9.0	0
<i>Discharge Point SD 264</i>						
Flow, MGD	2	0.6900	0.3555	0.0523	b	b
pH, Standard Units	2	7.7	7.0	b	4.0/9.0	0
<i>Discharge Point SD 270</i>						
Flow, GPD	1	673	673	673	b	b
pH, Standard Units	1	7.9	7.9	b	4.0/9.0	0



Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 280</i>						
Flow, GPD	1	993	993	993	b	b
pH, Standard Units	1	8.1	8.1	b	4.0/9.0	0
<i>Discharge Point SD 290</i>						
Flow, GPD	1	4320	4320	4320	b	b
pH, Standard Units	1	8.1	8.1	b	4.0/9.0	0
<i>Discharge Point SD 292</i>						
Flow, GPD	2	95	63	79	b	b
pH, Standard Units	2	7.8	7.7	b	4.0/9.0	0
<i>Discharge Point SD 294</i>						
Flow, GPD	1	12371	12371	12371	b	b
pH, Standard Units	1	7.8	7.8	b	4.0/9.0	0
<i>Discharge Point SD 296</i>						
Flow, GPD	1	69369	69369	69369	b	b
pH, Standard Units	1	7.6	7.6	b	4.0/9.0	0
<i>Discharge Point SD 297</i>						
Flow, MGD	2	0.0457	0.000038	0.0229	b	b
pH, Standard Units	2	8.1	7.2	b	4.0/9.0	0
<i>Discharge Point SD 300</i>						
Flow, GPD	2	288	76	182	b	b
pH, Standard Units	2	8.0	7.7	b	4.0/9.0	0
<i>Discharge Point SD 310</i>						
Flow, GPD	1	1141	1141	1141	b	b
pH, Standard Units	1	7.4	7.4	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 320</i>						
Flow, MGD	2	0.5273	0.3176	0.4225	b	b
pH, Standard Units	2	7.7	7.4	b	4.0/9.0	0
<i>Discharge Point SD 322</i>						
Flow, GPD	2	25885	4120	15003	b	b
pH, Standard Units	2	7.7	7.2	b	4.0/9.0	0
<i>Discharge Point SD 326</i>						
Flow, GPD	2	176300	360	88330	b	b
pH, Standard Units	2	7.8	7.6	b	4.0/9.0	0
<i>Discharge Point SD 330</i>						
Flow, MGD	3	1.7540	0.0031	0.6356	b	b
Total Suspended Solids, mg/L	3	5	< 1	< 4	b	b
pH, Standard Units	3	7.9	7.6	b	4.0/9.0	0
<i>Discharge Point SD 332</i>						
Flow, MGD	2	0.1553	0.1526	0.1540	b	b
pH, Standard Units	2	7.6	7.2	b	4.0/9.0	0
<i>Discharge Point SD 334</i>						
Flow, GPD	2	177400	144	88772	b	b
pH, Standard Units	2	7.3	7.3	b	4.0/9.0	0
<i>Discharge Point SD 340</i>						
Flow, MGD	3	0.5848	0.0004	0.1999	b	b
pH, Standard Units	3	8.0	7.6	b	4.0/9.0	0
<i>Discharge Point SD 350</i>						
Flow, GPD	4	6575	432	2472	b	b
pH, Standard Units	4	7.9	7.3	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 352</i>						
Flow, GPD	2	495	144	320	b	b
Total Suspended Solids, mg/L	2	4	3	4	b	b
pH, Standard Units	2	8.2	7.0	b	4.0/9.0	0
<i>Discharge Point SD 360</i>						
Flow, MGD	1	0.1430	0.1430	0.1430	b	b
pH, Standard Units	1	7.5	7.5	b	4.0/9.0	0
<i>Discharge Point SD 362</i>						
Flow, GPD	2	2880	2170	2525	b	b
pH, Standard Units	2	7.5	7.4	b	4.0/9.0	0
<i>Discharge Point SD 370</i>						
Flow, GPD	1	31216	31216	31216	b	b
pH, Standard Units	1	7.7	7.7	b	4.0/9.0	0
<i>Discharge Point SD 380</i>						
Flow, MGD	10	3.2631	0.0038	0.5966	b	b
Oil and Grease, mg/L	10	< 2.0	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	10	8	< 1	< 3	b	b
pH, Standard Units	10	8.5	6.4	b	4.0/9.0	0
<i>Discharge Point SD 382</i>						
Flow, GPD	2	380	48	214	b	b
pH, Standard Units	2	7.9	7.8	b	4.0/9.0	0
<i>Discharge Point SD 390</i>						
Flow, MGD	6	0.8104	0.0014	0.2714	b	b
Oil and Grease, mg/L	6	2.9	< 2.0	< 2.2	b	b
Total Suspended Solids, mg/L	6	29	3	16	b	b
pH, Standard Units	6	7.7	6.9	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 400</i>						
Flow, GPD	3	761	360	614	b	b
pH, Standard Units	3	7.9	7.2	b	4.0/9.0	0
<i>Discharge Point SD 410</i>						
Flow, GPD	3	3600	720	2400	b	b
pH, Standard Units	3	7.8	7.4	b	4.0/9.0	0
<i>Discharge Point SD 420</i>						
Flow, GPD	1	128970	360	645030	b	b
pH, Standard Units	2	8.0	7.1	b	4.0/9.0	0
<i>Discharge Point SD 430</i>						
Flow, MGD	12	12.1173	0.0023	1.2230	b	b
Oil and Grease, mg/L	12	3.5	< 2.0	< 2.2	b	b
Total Suspended Solids, mg/L	12	22	< 1	< 5	b	b
pH, Standard Units	12	8.2	6.9	b	4.0/9.0	0
<i>Discharge Point SD 440</i>						
Flow, MGD	10	12.8190	0.0011	2.6405	b	b
Oil and Grease, mg/L	10	2.9	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	10	131	1	19	b	b
pH, Standard Units	10	7.6	7.0	b	4.0/9.0	0
<i>Discharge Point SD 450</i>						
Flow, MGD	4	0.0404	0.0007	0.0177	b	b
pH, Standard Units	4	8.0	7.1	b	4.0/9.0	0
<i>Discharge Point SD 460</i>						
Flow, MGD	2	0.0573	0.0010	0.0291	b	b
pH, Standard Units	2	7.7	7.1	b	4.0/9.0	0
<i>Discharge Point SD 470</i>						
Flow, GPD	3	2283	144	929	b	b
pH, Standard Units	3	8.0	7.6	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 480</i>						
Flow, MGD	11	11.9590	0.0874	1.5479	b	b
Oil and Grease, mg/L	11	11.5	< 2.0	< 3.0	b	b
Total Suspended Solids, mg/L	11	43	< 1	< 11	b	b
pH, Standard Units	11	7.9	6.8	b	4.0/9.0	0
<i>Discharge Point SD 490</i>						
Flow, MGD	11	11.9590	0.0874	1.5479	b	b
Oil and Grease, mg/L	11	11.5	2.0	3.0	b	b
Total Suspended Solids, mg/L	11	43	1	11	b	b
pH, Standard Units	11	7.9	6.8	b	4.0/9.0	0
<i>Discharge Point SD 510</i>						
Flow, GPD	12	37598	3504	3135	b	b
Oil and Grease, mg/L	12	5.1	< 2.0	< 2.4	b	b
Total Suspended Solids, mg/L	12	11	< 1	< 4	b	b
pH, Standard Units	12	8.2	6.7	b	4.0/9.0	0
<i>Discharge Point SD 520</i>						
Flow, MGD	1	2.4454	2.4454	2.4454	b	b
pH, Standard Units	1	7.4	7.4	b	4.0/9.0	0
<i>Discharge Point SD 522</i>						
Flow, MGD	1	0.0784	0.0784	0.0784	b	b
pH, Standard Units	1	7.8	7.8	b	4.0/9.0	0
<i>Discharge Point SD 532</i>						
Flow, GPD	2	2880	2208	2544	b	b
pH, Standard Units	2	8.0	7.7	b	4.0/9.0	0
<i>Discharge Point SD 540</i>						
Flow, GPD	3	87710	720	30437	b	b
pH, Standard Units	3	7.4	7.3	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 550</i>						
Flow, GPD	3	35648	432	13947	b	b
pH, Standard Units	3	7.4	7.3	b	4.0/9.0	0
<i>Discharge Point SD 560</i>						
Flow, MGD	10	3.0309	0.0004	0.5416	b	b
Oil and Grease, mg/L	10	2.8	< 2.0	< 2.2	b	b
Total Suspended Solids, mg/L	10	15	< 1	< 6	b	b
pH, Standard Units	10	8.1	6.9	b	4.0/9.0	0
<i>Discharge Point SD 570</i>						
Flow, MGD	2	0.3046	0.0058	0.1552	b	b
pH, Standard Units	2	8.0	7.4	b	4.0/9.0	0
<i>Discharge Point SD 580</i>						
Flow, MGD	2	0.0214	0.0043	0.0129	b	b
pH, Standard Units	2	7.7	7.4	b	4.0/9.0	0
<i>Discharge Point SD 590</i>						
Flow, GPD	1	576	576	576	b	b
pH, Standard Units	1	7.4	7.4	b	4.0/9.0	0
<i>Discharge Point SD 610</i>						
Flow, MGD	7	1.8450	0.0072	0.5501	b	b
Oil and Grease, mg/L	7	4.8	< 2.0	< 2.4	b	b
Total Suspended Solids, mg/L	7	11	2	5	b	b
pH, Standard Units	7	8.3	7.1	b	4.0/9.0	0
<i>Discharge Point SD 620</i>						
Flow, MGD	1	0.2705	0.2705	0.2705	b	b
pH, Standard Units	1	7.5	7.5	b	4.0/9.0	0
<i>Discharge Point SD 630</i>						
Flow, GPD	1	2880	2880	2880	b	b
pH, Standard Units	1	7.8	7.8	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 640</i>						
Flow, MGD	2	0.0345	0.0029	0.0190	b	b
Total Suspended Solids, mg/L	2	15	4	10	b	b
pH, Standard Units	2	8.0	7.8	b	4.0/9.0	0
<i>Discharge Point SD 650</i>						
Flow, MGD	1	0.0114	0.0114	0.0114	b	b
pH, Standard Units	1	7.3	7.3	b	4.0/9.0	0
<i>Discharge Point SD 660</i>						
Flow, GPD	2	2064	1080	1572	b	b
Total Suspended Solids, mg/L	2	350	4	177	b	b
pH, Standard Units	2	8.2	8.0	b	4.0/9.0	0
<i>Discharge Point SD 670</i>						
Flow, GPD	2	1240	761	1001	b	b
Total Suspended Solids, mg/L	2	41	18	30	b	b
pH, Standard Units	2	7.8	7.6	b	4.0/9.0	0
<i>Discharge Point SD 680</i>						
Flow, GPD	3	4421	3240	4027	b	b
Total Suspended Solids, mg/L	3	8	< 1	< 5	b	b
pH, Standard Units	3	7.7	7.4	b	4.0/9.0	0
<i>Discharge Point SD 690</i>						
Flow, MGD	11	14.3177	0.0004	1.3543	b	b
Oil and Grease, mg/L	11	3.1	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	11	20	< 1	< 3	b	b
pH, Standard Units	11	8.1	6.7	b	4.0/9.0	0
<i>Discharge Point SD 692</i>						
Flow, MGD	2	0.6472	0.0024	0.3248	b	b
pH, Standard Units	2	7.7	6.9	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 694</i>						
Flow, GPD	1	7406	7406	7406	b	b
pH, Standard Units	1	8.1	8.1	b	4.0/9.0	0
<i>Discharge Point SD 696</i>						
Flow, MGD	2	0.2257	0.0015	0.1136	b	b
pH, Standard Units	2	7.8	7.7	b	4.0/9.0	0
<i>Discharge Point SD 700</i>						
Flow, MGD	8	1.9389	0.0152	0.3394	b	b
Oil and Grease, mg/L	8	2.5	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	8	81	< 1	< 22	b	b
pH, Standard Units	8	8.0	6.6	b	4.0/9.0	0
<i>Discharge Point SD 702</i>						
Flow, GPD	2	1522	127	825	b	b
pH, Standard Units	2	8.2	7.2	b	4.0/9.0	0
<i>Discharge Point SD 710</i>						
Flow, MGD	12	27.7269	0.0002	3.0154	b	b
Oil and Grease, mg/L	12	3.1	< 2.0	< 2.1	b	b
Total Suspended Solids, mg/L	12	68	< 1	< 13	b	b
pH, Standard Units	13	9.3	6.4	b	4.0/9.0	0
<i>Discharge Point SD 712</i>						
Flow, MGD	9	0.1837	0.0014	0.0225	b	b
Oil and Grease, mg/L	9	3.5	2.0	2.2	b	b
Total Suspended Solids, mg/L	9	15	1	5	b	b
pH, Standard Units	9	7.9	6.9	b	4.0/9.0	0
<i>Discharge Point SD 720</i>						
Flow, MGD	8	1.4542	0.0004	0.2366	b	b
Oil and Grease, mg/L	8	2.2	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	8	12	< 1	< 7	b	b
pH, Standard Units	8	8.5	6.8	b	4.0/9.0	0



Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 724</i>						
Flow, MGD	2	0.2859	0.0582	0.1720	b	b
pH, Standard Units	2	8.0	7.7	b	4.0/9.0	0
<i>Discharge Point SD 730</i>						
Flow, GPD	4	457	23	286	b	b
pH, Standard Units	4	8.1	7.5	b	4.0/9.0	0
<i>Discharge Point SD 740</i>						
Flow, GPD	3	15218	4562	9130	b	b
pH, Standard Units	3	7.8	7.2	b	4.0/9.0	0
<i>Discharge Point SD 750</i>						
Flow, GPD	5	14400	761	4706	b	b
Oil and Grease, mg/L	5	< 2.0	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	5	4	1	3	b	b
pH, Standard Units	5	7.9	7.2	b	4.0/9.0	0
<i>Discharge Point SD 760</i>						
Flow, MGD	6	0.0173	0.0057	0.0108	b	b
Oil and Grease, mg/L	6	< 2.0	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	6	3	< 1	< 2	b	b
pH, Standard Units	6	8.1	7.5	b	4.0/9.0	0
<i>Discharge Point SD 770</i>						
Flow, GPD	3	285	76	215	b	b
Oil and Grease, mg/L	3	< 2.0	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	3	8	< 1	< 3	b	b
pH, Standard Units	3	8.3	7.5	b	4.0/9.0	0
<i>Discharge Point SD 780</i>						
Flow, MGD	4	0.0304	0.0001	0.0142	b	b
Total Suspended Solids, mg/L	4	20	1	7	b	b
pH, Standard Units	4	8.2	7.5	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 800</i>						
Flow, GPD	4	11413	38	3406	b	b
Total Suspended Solids, mg/L	4	28	< 1	< 9	b	b
pH, Standard Units	4	8.2	7.5	b	4.0/9.0	0
<i>Discharge Point SD 810</i>						
Flow, MGD	3	0.0173	0.0046	0.0111	b	b
Total Suspended Solids, mg/L	3	13	< 1	< 9	b	b
pH, Standard Units	3	7.9	7.3	b	4.0/9.0	0
<i>Discharge Point SD 820</i>						
Flow, GPD	3	11413	760	6594	b	b
Total Suspended Solids, mg/L	3	12	2	8	b	b
pH, Standard Units	3	8.4	7.8	b	4.0/9.0	0
<i>Discharge Point SD 830</i>						
Flow, MGD	3	0.3390	0.0685	0.2371	b	b
Total Suspended Solids, mg/L	3	16	< 1	< 6	b	b
pH, Standard Units	3	7.9	7.4	b	4.0/9.0	0
<i>Discharge Point SD 850</i>						
Flow, GPD	4	9511	1141	5128	b	b
Total Suspended Solids, mg/L	4	5	< 1	< 3	b	b
pH, Standard Units	4	8.1	7.7	b	4.0/9.0	0
<i>Discharge Point SD 860</i>						
Flow, GPD	2	380	126	253	b	b
Total Suspended Solids, mg/L	2	15	3	9	b	b
pH, Standard Units	2	8.0	8.0	b	4.0/9.0	0
<i>Discharge Point SD 870</i>						
Flow, GPD	2	8640	3804	6222	b	b
Total Suspended Solids, mg/L	2	4	3	4	b	b
pH, Standard Units	2	7.8	7.2	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 880</i>						
Flow, MGD	3	0.0216	0.0057	0.0130	b	b
Total Suspended Solids, mg/L	3	10	< 1	< 4	b	b
pH, Standard Units	3	8.0	7.5	b	4.0/9.0	0
<i>Discharge Point SD 890</i>						
Flow, MGD	3	0.0230	0.0046	0.0111	b	b
Total Suspended Solids, mg/L	3	6	2	4	b	b
pH, Standard Units	3	7.8	7.3	b	4.0/9.0	0
<i>Discharge Point SD 900</i>						
Flow, GPD	3	7609	761	3170	b	b
Total Suspended Solids, mg/L	3	4	2	3	b	b
pH, Standard Units	3	8.0	7.2	b	4.0/9.0	0
<i>Discharge Point SD 910</i>						
Flow, GPD	1	533	533	533	b	b
pH, Standard Units	1	7.7	7.7	b	4.0/9.0	0
<i>Discharge Point SD 920</i>						
Flow, GPD	1	5760	5760	5760	b	b
pH, Standard Units	1	7.2	7.2	b	4.0/9.0	0
<i>Discharge Point SD 930</i>						
Flow, GPD	2	12240	266	6253	b	b
pH, Standard Units	2	8.1	7.8	b	4.0/9.0	0
<i>Discharge Point SD 934</i>						
Flow, GPD	2	5760	1522	3641	b	b
pH, Standard Units	2	8.2	7.9	b	4.0/9.0	0
<i>Discharge Point SD 950</i>						
Flow, GPD	2	7609	3804	5707	b	b
pH, Standard Units	2	7.5	7.2	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 960</i>						
Flow, GPD	2	17280	2160	9720	b	b
pH, Standard Units	2	7.7	7.5	b	4.0/9.0	0
<i>Discharge Point SD 970</i>						
Flow, GPD	2	419400	720	210060	b	b
pH, Standard Units	2	7.9	6.6	b	4.0/9.0	0
<i>Discharge Point SD 980</i>						
Flow, GPD	2	266900	720	133810	b	b
pH, Standard Units	2	7.6	6.8	b	4.0/9.0	0
<i>Discharge Point SD 982</i>						
Flow, GPD	2	226300	360	113330	b	b
pH, Standard Units	2	7.6	7.3	b	4.0/9.0	0
<i>Discharge Point SD 990</i>						
Flow, GPD	2	2164	761	1463	b	b
pH, Standard Units	2	8.0	7.8	b	4.0/9.0	0
<i>Discharge Point SD 992</i>						
Flow, MGD	10	1.2479	0.0011	0.4201	b	b
Oil and Grease, mg/L	10	2.1	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	10	299	10	62	b	b
pH, Standard Units	10	7.7	5.0	b	4.0/9.0	0
<i>Discharge Point SD 994</i>						
Flow, GPD	6	6087	114	1361	b	b
Oil and Grease, mg/L	6	< 2.0	< 2.0	< 2.0	b	b
Total Suspended Solids, mg/L	6	3	< 1	< 2	b	b
pH, Standard Units	6	8.2	6.5	b	4.0/9.0	0

Table 4.110 (continued)

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
<i>Discharge Point SD 996</i>						
Flow, GPD	2	11520	5707	8614	b	b
pH, Standard Units	2	8.0	7.9	b	4.0/9.0	0

a = NPDES permit limit

b = not applicable

c = NPDES permit limit became effective 10/1/93

d = storm drain was removed from permit during 1993

e = storm drain was sealed during 1993

**Table 4.111. 1993 NPDES Permit Number TN 0002950**  
 Discharge Point K-1203, Sewage Treatment Plant, K-25 Site

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
Ammonia nitrogen, mg/l	192	0.31	<0.2	<0.2	7	0
Biological oxygen demand, mg/l	192	14.1	4.4	6.7	20	0
Chlorine, total residual, mg/l	428	0.18	<0.05	<0.07	0.24	0
Dissolved oxygen, mg/l	411	11.6	5.6	8.6	5b	0
Fecal coliform, Col./100ml	234	>400	<1	<4	400	1
Flow, MGD	365	1.3466	0.0567	0.3594	c	d
pH, standard units	407	8.6	7	d	6.0-9.0	0
Settleable solids, mg/l	305	0.2	<0.1	<0.1	0.5	0
Suspended solids, mg/l	192	19	1	6	45	0

- <sup>a</sup> NPDES permit limit
- <sup>b</sup> Daily minimum
- <sup>c</sup> Non-limited parameter
- <sup>d</sup> Not applicable

Table 4.112. 1993 NPDES Permit Number TN 0002950

Discharge Point K-1407-J, Treatment Pond at K-25 Site

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
1,1,1-Trichloroethane, mg/l	13	<0.0005	<0.0005	<0.0005	b	c
Acetone, mg/l	4	<0.01	<0.01	<0.01	b	c
Acetonitrile, mg/l	4	<0.01	<0.01	<0.01	b	c
Benzene	13	<0.0007	<0.0007	<0.0007	b	c
Bromoform, mg/l	13	<0.0019	<0.0019	<0.0019	b	c
Cadmium, mg/l	5	0.003	<0.002	<0.002	0.69	0
Carbontetrachloride, mg/l	13	<0.0006	<0.0006	<0.0006	0.5	0
Chemical Oxygen Demand (COD), mg/l	62	31	<1	<8	b	c
Chloride, mg/l	241	2051	75	524	39,479	0
Chlorine, total residual, mg/L	124	0.13	<0.05	<0.05	0.14	0
Chlorodibromomethane	13	<0.0008	<0.0008	<0.0008	b	c
Chloroform, mg/l	13	0.0055	0.0018	0.0031	0.5	0
Chromium, mg/l	4	0.02	<0.01	<0.01	2.77	0
Copper, mg/l	4	0.011	<0.004	<0.007	2.15	0
Dichlorobromomethane, mg/l	13	<0.0017	<0.0017	<0.0017	b	c
Ethylbenzene, mg/l	4	<0.0005	<0.0005	<0.0005	b	c
Flow, MGD	365	0.4401	0	0.1102	b	c
Lead	4	<0.004	<0.004	<0.004	0.69	0
Methylethylketone, mg/l	5	<0.01	<0.01	<0.01	b	c
Methylene chloride, mg/l	4	<0.0012	<0.0012	<0.0012	b	c
Naphthalene, mg/l	14	<0.0016	<0.0009	<0.0011	b	c
Nickel, mg/l	4	0.1	<0.05	<0.07	3.98	0
Oil and Grease, mg/L	118	3.8	<2	<2.1	30	0
PCB, mg/l	16	<0.0005	<0.0005	<0.0005	0.00014	0
pH, standard units	365	8.7	6	c	6.0-9.0	0
Silver, mg/l	4	0.02	<0.01	0.01	0.43	0
Total Suspended Solids, mg/L	241	36	1	4	40	0
Temperature, c	396	35.3	9.4	23.3	d	0
Tetrachloroethylene, mg/l	13	<0.0004	<0.0004	<0.0004	0.7	0
Toluene, mg/l	4	<0.0006	<0.0006	<0.0006	b	c
Total toxic organics, mg/l	4	0.0064	0.0022	0.0038	2.13	0
Trichloroethylene, mg/l	13	0.0041	<0.0009	<0.0035	0.5	0
Uranium, mg/l	12	0.327	0.022	0.097	b	c
Vinyl Chloride, mg/l	13	<0.0015	<0.0014	<0.0015	0.2	0
Zinc, mg/l	4	0.056	<0.02	<0.03	2.61	0

<sup>a</sup> NPDES permit limit<sup>b</sup> Non-limited parameter<sup>c</sup> Not applicable<sup>d</sup> Effluent must not cause the temperature of receiving stream to exceed 30.5c.

**Table 4.113. 1993 NPDES Permit Number TN 0002950**

Discharge Point K-1515-C, Holding Pond, K-25 Site

Parameter	Number of samples	Concentration			Reference Value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
Aluminum, mg/l	69	1.7	0.21	0.67	2.0	0
Chlorine, total residual, mg/l	70	0.25	<0.05	<0.09	1.0	0
Flow, MGD	365	2.0685	0.0361	0.2336	b	c
pH, standard units	70	8.5	6.1	c	6.0-9.0	0
Settleable solids, mg/l	69	0.2	<0.1	<0.1	0.5	0
Suspended solids, mg/l	69	32	2	8	40	0

- <sup>a</sup> NPDES permit limit
- <sup>b</sup> Non-limited parameter
- <sup>c</sup> Not applicable



**Table 5.1. External gamma radiation measurements at ORR perimeter air monitoring stations, 1993**

Station No.	No. of measurements	Exposure rate ( $\mu\text{R/hr}$ )			Standard error <sup>a</sup>
		Max	Min	Av	
35	32	11.9	0.4	7.4	0.3
39	44	12.6	7.0	9.9	0.2
40	44	9.4	4.1	7.6	0.1
41	50	11.0	0.5	4.6	0.2
42	48	21.8	1.0	7.4	0.4
46	52	13.5	2.9	8.5	0.2
48	50	11.0	3.4	7.0	0.2
Average	46	13.0	2.8	7.5	0.2

<sup>a</sup>Standard error of the mean.

**Table 5.2. Summary of collection and analysis frequencies for continuous high- and low-volume samples at ORR ambient air monitoring stations**

Parameter <sup>a</sup>	Collection frequency	Analysis frequency
U, Pu, Th, Be, Am, Cm	Weekly	Monthly
Total rad Sr	Weekly	Monthly
Gamma scan (filter)	Weekly	Monthly
Tritium	Biweekly	Monthly

<sup>a</sup>All parameters are checked at all locations (35, 37, 38, 39, 40, 42, 46, and remote locations 51 and 52).

Table 5.3. ORR radionuclide concentrations in air, 1993

Determination	No. detected/ No. sampled	Concentration (10 <sup>-15</sup> μCi/mL) <sup>a</sup>				DCG %
		Average <sup>b</sup>	Max	Min	Standard error	
<i>PAMs</i>						
<sup>241</sup> Am	32/72	1.37E-03	1.90E-03	6.77E-04	1.51E-04	0.0069
<sup>7</sup> Be	72/72	8.18E+01	8.99E+01	7.40E+01	2.03E+00	0.00016
<sup>244</sup> Cm	9/72	3.05E-03	9.51E-03	1.34E-04	1.40E-03	0.0076
<sup>60</sup> Co	12/72	8.53E-02	8.53E-02	2.93E-02	7.78E-03	0.00007
<sup>137</sup> Cs	8/72	3.82E-02	5.51E-02	1.40E-03	8.21E-03	0.00001
<sup>238</sup> Pu	15/72	1.77E-03	2.84E-03	4.00E-04	3.45E-04	0.0059
<sup>239</sup> Pu	11/72	9.66E-04	1.32E-03	3.59E-04	1.51E-04	0.0048
<sup>228</sup> Th	69/72	7.86E-03	1.05E-02	5.17E-03	5.58E-04	0.01964
<sup>230</sup> Th	68/72	5.41E-03	6.71E-03	4.15E-03	3.34E-04	0.01353
<sup>232</sup> Th	67/72	6.40E-03	8.10E-03	3.72E-03	5.18E-04	0.0914
Total Sr	35/72	4.79E-02	6.53E-02	3.00E-02	3.69E-03	0.00053
<sup>3</sup> H	49/99	4.53E+04	7.38E+05	1.56E+03	1.58E+04	0.0453
<sup>234</sup> U	71/72	5.75E-02	1.09E-01	2.48E-02	1.08E-02	0.064
<sup>235</sup> U	55/72	9.63E-03	1.48E-02	3.29E-03	1.21E-03	0.0096
<sup>238</sup> U	67/72	1.93E-02	2.24E-02	1.61E-02	8.53E-04	0.0193
<i>RAMs</i>						
<sup>241</sup> Am	6/18	3.09E-03	4.25E-03	1.92E-03	1.17E-03	0.01544
<sup>7</sup> Be	18/18	9.11E+01	9.78E+01	8.44E+01	6.68E+00	0.00018
<sup>244</sup> Cm	3/18	2.82E-03	3.56E-03	2.05E-03	7.68E-04	0.0074
<sup>60</sup> Co	1/18	7.09E-03	7.09E-03	7.09E-03	0.00E+00	0.00001
<sup>137</sup> Cs	4/18	3.15E-02	4.14E-02	2.18E-02	9.79E-03	0.00001
<sup>238</sup> Pu	4/18	1.36E-03	1.37E-03	1.32E-03	2.25E-05	0.0045
<sup>228</sup> Th	16/18	7.99E-03	8.08E-03	7.88E-03	9.96E-05	0.02
<sup>230</sup> Th	18/18	5.52E-03	5.82E-03	5.22E-03	3.00E-04	0.0138
<sup>232</sup> Th	17/18	6.74E-03	7.06E-03	6.41E-03	3.23E-04	0.096
Total Sr	8/18	5.85E-02	7.14E-02	4.57E-09	1.28E-02	0.00065
<sup>3</sup> H	12/26	2.36E+04	8.19E+04	5.73E+03	6.81E+03	0.0236
<sup>234</sup> U	17/18	3.80E-02	4.33E-02	3.28E-02	5.24E-03	0.0422
<sup>235</sup> U	11/18	8.08E-03	9.15E-03	7.00E-03	1.07E-03	0.0081
<sup>238</sup> U	15/18	1.41E-02	1.56E-02	1.40E-02	7.80E-04	0.01481

<sup>a</sup>1 μCi = 3.7E+4 Bq.

<sup>b</sup>Average concentration is the average of significant values only; this average is divided by the derived concentration guide (DCG) for inhalation of that isotope, multiplied by 100, and presented in the table as the percentage of the DCG, unless the percentage is less than 0.01; in that case, the percentage is reported as less than 0.01.

Table 5.4. Uranium in ambient air at the Y-12 Plant, 1993

Station No.	No. of samples	7-day concentration ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>		
		Max	Min	Av
1	51	0.00028	<0.00001	0.00008
2	51	0.00019	<0.00001	0.00006
3	43	0.00058	0.00003	0.00008
4	51	0.06333	<0.00001	0.00151
5	51	0.00033	<0.00001	0.00007
6	51	0.00017	<0.00001	0.00006
7	51	0.0002	<0.00001	0.00007
8	51	0.01621	<0.00001	0.00039
9	51	0.00042	<0.00001	0.00008
10	50	0.00015	<0.00001	0.00006
11	51	0.00047	<0.00001	0.00009
12	51	0.00015	<0.00001	0.00006

<sup>a</sup>Because of the low level of uranium on the filters, the <sup>235</sup>U measurements were not always attainable. When they were, the results varied such that activity values could not be assigned.

Table 5.5. Fluorides in ambient air at the Y-12 Plant, 1993

Station No.	No. of samples	7-day concentration ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>			Tenn. std <sup>a</sup>	Percentage of standard <sup>b</sup>
		Max	Min	Av		
1	46	0.0186	0.0072	0.0094	1.6	<2
2	51	0.0236	0.0066	0.0104	1.6	<2
3	47	0.0148	0.0041	0.0081	1.6	<1
4	51	0.0168	0.0058	0.0102	1.6	<2
5	51	0.0127	0.0055	0.0070	1.6	<1
6	51	0.0376	0.0042	0.0089	1.6	<3
7	51	0.0217	0.0047	0.0094	1.6	<2
8	51	0.0144	0.0040	0.0084	1.6	<1
9	51	0.0264	0.0047	0.0083	1.6	<2
10	51	0.0210	0.0042	0.0087	1.6	<2
11	51	0.0219	0.0044	0.0091	1.6	<2

<sup>a</sup>Tennessee standard 7-day average = 1.6  $\mu\text{g}/\text{m}^3$ .

<sup>b</sup>Percentage of standard calculated using the annual 7-day average fluoride concentration.

**Table 5.6. Total suspended particulates in ambient air at the Y-12 Plant, 1993**

TSP station	No. of samples	Concentration ( $\mu\text{g}/\text{m}^3$ )			Tenn. std	Max % of std <sup>a</sup>
		Max	Min	Av		
East	53	128.25	3.15	38.14	260	49.33
West	39	57.14	7.79	25.09	260	21.98

<sup>a</sup>TSP is no longer regulated; however, the maximum measurements are still compared with the previous Tennessee 24-hour primary air quality standard of  $260 \mu\text{g}/\text{m}^3$ . There were no exceedences at either TSP station.

**Table 5.7. PM10 concentrations in ambient air at the Y-12 Plant, 1993**

PM10 station	No. of samples	Concentration ( $\mu\text{g}/\text{m}^3$ )			Tenn. std	Max % of std
		Max <sup>a</sup>	Min	Av		
West	54	64.74	1.39	18.09	150	43.16
East	58	58.91	0.30	17.88	150	39.27
East collocated	60	64.92	0.59	21.30	150	43.28

<sup>a</sup>Maximum measurements are compared with the Tennessee primary air quality standard of  $150 \mu\text{g}/\text{m}^3$  per 24 hours. There were no exceedences at any of the PM10 stations.

**Table 5.8. Annual results of the Y-12 Plant ambient air mercury monitoring program, 1993**

Site	No. of samples	Mercury vapor concentration ( $\mu\text{g}/\text{m}^3$ )		
		Max	Min	Av <sup>a</sup>
Station No. 2 (east end of Y-12 Plant)	45	0.026	0.003	0.008
Station No. 8 (west end of Y-12 Plant)	45	0.031	0.004	0.012
Bldg. 9404-13 (SW of Bldg. 9201-4)	45	0.250	0.017	0.078
Bldg. 9805-1 (SE of Bldg. 9201-4)	45	0.314	0.010	0.088
Reference site, Rain Gage No. 2	47	0.016	0.002	0.006
(Chestnut Ridge) <sup>b</sup>	47	0.015	<0.001	0.005

<sup>a</sup>National Emission Standards for Hazardous Air Pollutants 30-day average standard =  $1 \mu\text{g}/\text{m}^3$ . American Conference of Governmental Industrial Hygienists 8-hour day, 40-hour work week standard =  $50 \mu\text{g}/\text{m}^3$ .

<sup>b</sup>Data for this site are for February–December 1988 (first line) and January–October 1989 (second line); monitoring was discontinued on October 31, 1989.

**Table 5.9. Summary of collection and analysis frequencies for low-volume samples<sup>a</sup> at ORNL ambient air monitoring stations**

Parameter	Collection frequency	Analysis frequency
<i>Stations 1, 2, 3, and 7</i>		
U, Pu, Th, Be, Am, and Cm	Biweekly	Annual
Total rad Sr	Biweekly	Annual
Gamma scan (filter)	Biweekly	Annual
Gamma scan (charcoal)	Biweekly	Biweekly
<i>Station 3 only</i>		
Tritium	Biweekly	Monthly

<sup>a</sup>Type of sampling = continuous.

**Table 5.10. ORNL radionuclide concentrations in air, 1993**

Determination	No. detected/ No. sampled	Concentration (10 <sup>-15</sup> μCi/mL) <sup>a</sup>				DCG %
		Average <sup>b</sup>	Max	Min	Standard error	
<sup>241</sup> Am	2/4	3.57E-03	3.88E-03	3.29E-03	2.82E-04	0.01787
<sup>7</sup> Be	4/4	2.60E+01	3.53E+01	1.80E+01	3.73E+00	0.00005
<sup>244</sup> Cm	3/4	4.58E-03	6.15E-03	3.24E-03	8.48E-04	0.001145
<sup>137</sup> Cs	2/4	9.15E-02	1.04E-01	7.87E-02	1.28E-02	0.00002
<sup>131</sup> I	2/103	5.26E+00	5.16E+00	5.16E+00	0.00E+00	0.0013
<sup>133</sup> I	7/103	7.81E+00	9.70E+00	6.09E+00	8.17E-01	0.00039
<sup>135</sup> I	4/103	6.48E+00	8.78E+00	4.89E+00	1.18E+00	0.00065
<sup>191</sup> Os	1/103	3.10E-01	3.10E-01	3.10E-01	0.00E+00	0.001
<sup>212</sup> Pb	12/103	3.68E+01	7.16E+01	1.77E+01	1.20E+01	0.046
<sup>238</sup> Pu	2/4	4.05E-03	6.97E-03	1.14E-03	2.91E-03	0.0136
<sup>228</sup> Th	4/4	1.23E-02	1.69E-02	8.24E-03	1.93E-03	0.0309
<sup>230</sup> Th	4/4	8.85E-03	1.23E-02	5.11E-03	1.47E-03	0.02212
<sup>232</sup> Th	4/4	1.09E-02	1.46E-02	8.45E-03	1.33E-03	0.1554
Total Sr	2/4	3.68E-02	3.76E-02	3.60E-02	8.01E-04	0.00041
<sup>3</sup> H	11/13	2.84E+03	1.36E+04	1.12E+02	1.27E+03	0.00284
<sup>234</sup> U	4/4	7.91E-02	9.53E-02	6.97E-02	5.61E-03	0.088
<sup>235</sup> U	4/4	2.15E-02	2.82E-02	1.25E-02	3.30E-03	0.0215
<sup>238</sup> U	4/4	4.61E-02	5.52E-02	3.96E-02	3.81E-03	0.0461

<sup>a</sup>1 μCi = 3.7E+4 Bq.

<sup>b</sup>Average concentration is the average of significant values only; this average is divided by the derived concentration guide (DCG) for inhalation of that isotope, multiplied by 100, and presented in the table as the percentage of the DCG, unless the percentage is less than 0.01; in that case, the percentage is reported as less than 0.01.

**Table 5.11. Summary of ambient air pollutants measured by the K-25 Site network, 1993**

Parameter <sup>a</sup>	Station No.						
	K1	K2	K3	K4	K5	TSCA1	TSCA2
TSP	X	X	X	X	X		
PM10				X			
Arsenic <sup>b</sup>	X	X	X	X	X		
Beryllium <sup>b</sup>	X	X	X	X	X		
Cadmium <sup>b</sup>	X	X	X	X	X		
Chromium (total)	X	X	X	X	X		
Lead	X	X	X	X	X		
Nickel <sup>c</sup>	X	X	X	X	X		
Uranium (total)	X	X	X	X	X	X	X
PCBs						X	X
Furan						X	X
Hexachlorobenzene						X	X
Dioxin						X	X

<sup>a</sup>All parameters are reported as mass per unit volume of air.

<sup>b</sup>Measurement of these pollutants began on October 1, 1993.

<sup>c</sup>Measurement of this pollutant was discontinued on September 30, 1993.

**Table 5.12. Results of ambient air sampling for lead at the K-25 Site, 1993**

Station No.	No. of samples	Average concentrations <sup>a</sup> ( $\mu\text{g}/\text{m}^3$ )				Individual measurements ( $\mu\text{g}/\text{m}^3$ )		Percentage of standard per qtr. <sup>b</sup>
		Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Min	Max	
K1	59	0.02482	0.01297	0.00502	0.00710	0.00357	0.04023	1.7
K2	56	0.02411	0.01186	0.00441	0.00874	0.00304	0.03641	1.6
K3	55	0.02360	0.00997	0.00397	0.00441	0.00289	0.03019	1.6
K4	59	0.02414	0.01304	0.00567	0.00714	0.00317	0.03652	1.6
K5	56	0.02242	0.01562	0.00421	0.00546	0.00317	0.02997	1.5

<sup>a</sup>Lead concentration averages are the quarterly arithmetic mean of 24-hour results for the first quarter and of monthly composite results for the second, third, and fourth quarters.

<sup>b</sup>Based on the maximum quarterly average compared with the standard for lead equal to 1.5  $\mu\text{g}/\text{m}^3$  quarterly arithmetic mean.

**Table 5.13. Surface water sampling measurements exceeding Tennessee water quality criteria at the Y-12 Plant, 1993**

Parameter	Location	No. of samples	Concentration (mg/L)			Water quality criteria (mg/L)	No. of measurements exceeding criteria
			Detection limit	Max	Av		
Silver	Station 17	203	0.006	<0.006	<0.006	0.004	203
Mercury	Station 17	203	0.0002	0.0093	<0.0016	0.00015 <sup>a</sup>	203
Mercury	Rogers Quarry (Outfall 302)	52	0.0002	0.0006	<0.0002	0.00015	52
Chromium	Station 17	203	0.006	0.028	<0.006	0.016	1
Cadmium	Station 17	94	0.0005	0.0082	<0.0019	0.004	1

<sup>a</sup>The Tennessee water quality standard for recreation is 0.00015 mg/L. The freshwater fish and aquatic life standards are 0.0024 and 0.000012 mg/L for the maximum and continuous concentrations, respectively.

**Table 5.14. Results of radiological analysis of ORR soil samples, 1993**

Parameter	Station Concentration (pCi/g) <sup>a</sup>								
	35	37	38	39	40	42	46	48	51
<sup>241</sup> Am		0.01		0.01					
<sup>60</sup> Co						0.06			
<sup>137</sup> Cs		0.09							
Gross alpha	1.27	1.06	1.04	1.18	0.81	1.19	0.80	1.16	0.95
Gross beta	3.1	2.35	2.28	2.22	2.39	2.5	2.19	2.42	2.38
<sup>238</sup> Pu								0.01	
<sup>228</sup> Th	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.04	0.03
<sup>230</sup> Th	0.04	0.03	0.03	0.03	0.02	0.37	0.01	0.04	0.03
<sup>232</sup> Th	0.03	0.03	0.02	0.02	0.02	0.03	0.01	0.04	
Total Rad Sr	0.35	0.45	0.42	0.46	0.65	0.62	0.45	0.62	
<sup>234</sup> U	0.05	0.05	0.05	0.05	0.05	0.04	0.03	0.06	
<sup>235</sup> U	0.01	0.01	0.01	0.01	0.004	0.01	0.01	0.01	
<sup>238</sup> U	0.04	0.03	0.02	0.04	0.04	0.03	0.02	0.03	

<sup>a</sup>1 pCi = 3.7E-02 Bq.

**Table 5.15. Concentrations of radionuclides and fluoride in hay from the ORR, 1993**

Area	Isotope (Ci/kg) <sup>a</sup>					Fluoride (µg/g)
	<sup>7</sup> Be	<sup>60</sup> Co	<sup>40</sup> K	Gross alpha	Gross beta	
1, 2, and 3	3.1E-09	3.0E-11	1.3E-08	2.8E-10	7.0E-09	1.1
2, 4, and 5	5.5E-09	3.6E-11	1.4E-08	1.0E-09	6.4E-09	1.6
6	1.1E-08	<i>b</i>	8.5E-09	3.4E-10	1.3E-08	1.1

<sup>a</sup>1 Ci = 3.7E+10 Bq.

<sup>b</sup>Not significant.

**Table 5.16. Results of radiological analysis of tomatoes grown on the ORR, 1993**

Parameter	Station Concentration (pCi/g) <sup>a</sup>								
	35	37	38	39	40	42	46	48	51
<sup>60</sup> Co								4.9E-03	
Gross alpha	8.7E-01								
Gross beta		1.8E+00	2.0E+00	1.7E+00	1.3E+00	8.7E-01	1.3E+00	1.5E+00	1.1E+00
<sup>239</sup> Pu		1.6E-04		1.7E-04				1.4E-04	9.0E-05
<sup>228</sup> Th	1.3E-04	1.5E-04				1.3E-04			
<sup>230</sup> Th	1.5E-04	1.7E-04		1.3E-04			1.3E-04	1.5E-04	1.9E-04
<sup>232</sup> Th					1.1E-03				
Total rad Sr				2.3E-02	1.8E-02				
<sup>234</sup> U	3.0E-04	6.4E-04	1.1E-03	1.1E-03	5.3E-04	4.0E-04	3.4E-04	1.0E-03	9.5E-04
<sup>235</sup> U		2.7E-04				1.8E-04		2.6E-04	2.8E-04
<sup>238</sup> U	4.5E-04	4.1E-04	4.3E-04		2.4E-04	2.4E-04		3.6E-04	6.8E-04

<sup>a</sup>1 pCi = 3.7E-02 Bq.



**Table 5.17. Results of radiological analysis of turnip greens  
grown on the ORR, 1993**

Parameter	Station Concentration (pCi/g) <sup>a</sup>								
	35	37	38	39	40	42	46	48	5i
<sup>241</sup> Am		2.8E-03	6.5E-03		1.6E-03		2.8E-03	2.3E-03	2.8E-03
<sup>7</sup> Be	8.2E-01	1.4E+00	7.0E-01	6.4E-01	6.6E-01	6.4E-01	9.3E-01	8.9E-01	6.1E-01
<sup>137</sup> Cs					1.2E-02		2.1E-02		
Gross alpha	2.1E-01	2.6E-01	3.1E-01	1.1E-01	6.5E-01	1.1E-01	4.6E-01	2.2E-01	1.6E-01
Gross beta 0	3.8E+0	4.1E+00	4.7E+00	3.6E+00	3.9E+00	4.1E+00	4.2E+00	3.7E+00	4.5E+00
<sup>40</sup> K 0	5.1E+0	5.0E+00	5.0E+00	4.6E+00	4.5E+00	5.4E+00	5.5E+00	5.4E+00	4.2E+00
<sup>239</sup> Pu							3.7E-03		
<sup>228</sup> Th	1.0E-02		6.4E-03		8.9E-03	5.1E-03	1.2E-02	8.5E-03	3.8E-03
<sup>230</sup> Th	1.3E-02	1.1E-02	8.1E-03	3.1E-03	1.0E-02	1.8E-03	1.5E-02	1.3E-02	5.3E-03
<sup>232</sup> Th	6.3E-04		3.5E-03		7.3E-03	2.4E-03	1.3E-02	4.9E-03	2.7E-03
Total rad Sr	2.1E-01	2.3E-01	1.7E-01		2.1E-01		3.1E-01	2.0E-01	2.2E-01
<sup>234</sup> U	2.7E-02	1.6E-02	1.4E-02	7.6E-03	2.2E-02	7.6E-03	1.8E-02	1.3E-02	5.6E-03
<sup>235</sup> U	3.0E-03	3.2E-03	3.7E-03	2.8E-03			1.8E-03	1.5E-03	2.4E-03
<sup>238</sup> U	1.2E-02	9.2E-03	9.7E-03	2.7E-03	8.8E-03	2.2E-03	1.1E-02	1.0E-02	6.0E-03

<sup>a</sup>1 pCi = 3.7E-02 Bq.

**Table 5.18. Results of radiological analysis of  
turnips grown in private gardens  
on the ORR, 1993**

Parameter	Station Concentration (pCi/g) <sup>a</sup>		
	39	40	42
<sup>7</sup> Be	8.7E-02	5.0E-02	
Gross alpha	8.2E-02	7.2E-02	
Gross beta	2.3E+00	2.0E+00	2.1E+00
<sup>40</sup> K	2.8E+00	2.7E+00	3.5E+00
<sup>230</sup> Th	3.1E-03	1.4E-02	1.2E-02
<sup>232</sup> Th	3.1E-03		
<sup>234</sup> U	1.3E-02	2.1E-02	1.1E-02
<sup>235</sup> U		1.3E-02	
<sup>238</sup> U		8.4E-03	5.0E-03

<sup>a</sup>1 pCi = 3.7E-02 Bq.

Table 5.19. Concentrations of total radioactive strontium (<sup>89</sup>Sr + <sup>90</sup>Sr) in raw milk, 1993

Station	No. detected/ No. of samples	Detected concentration (pCi/L) <sup>a</sup>			Standard error <sup>b</sup>
		Max	Min	Av	
Buttermilk Road	9/12	2.03	0.68	1.16 <sup>c</sup>	0.14
Powell	11/12	2.54	0.70	1.41 <sup>c</sup>	0.18
Clinton	11/11	3.78	0.59	1.55 <sup>c</sup>	0.28
Frost Bottom	12/12	3.24	1.05	1.79 <sup>c</sup>	0.17
Solway	6/6	5.67	2.11	3.64 <sup>c</sup>	0.39
Network summary	49/53	5.67	0.59	1.76	0.15

<sup>a</sup>1 pCi = 3.7E-2 Bq.

<sup>b</sup>Standard error of the mean.

<sup>c</sup>Average is significantly greater than zero at the 95% confidence level. The average value for EPA Region IV is 1.8 pCi/L (U.S. EPA 1993a).

Table 5.20. Parameters detected in sunfish from Poplar Creek and Clinch River locations, 1993

	PCK 2.2	CRK 16	CRK 32	CRK 66	CRK 80	CRK 84
<i>Metals</i>						
Arsenic	X	X				
Chromium	X	X	X	X	X	X
Copper	X	X	X	X	X	X
Lead	X					
Mercury	X	X	X	X	X	X
Selenium	X	X	X	X	X	X
Silver	X					X
Uranium	X	X	X	X	X	X
Zinc	X	X	X	X	X	X
<i>Pesticides</i>						
4,4'-DDE	X		X			
<i>PCBs</i>						
Aroclor-1254	X	X	X			
<i>Radionuclides</i>						
<sup>137</sup> Cs	X	X	X			X
<sup>60</sup> Co			X			
Total rad Sr	X	X	X	X	X	X

Table 5.21. Parameters detected in catfish  
from two Clinch River locations, 1993

	CRK 16	CRK 32
<i>Metals</i>		
Arsenic	X	
Mercury	X	X
Nickel		X
Thallium	X	
Uranium	X	
Zinc		X
<i>Pesticides</i>		
4,4'-DDD		X
4,4'-DDE	X	X
Alpha-Chlordane	X	X
<i>Radionuclides</i>		
<sup>137</sup> Cs	X	X
Total rad Sr		X

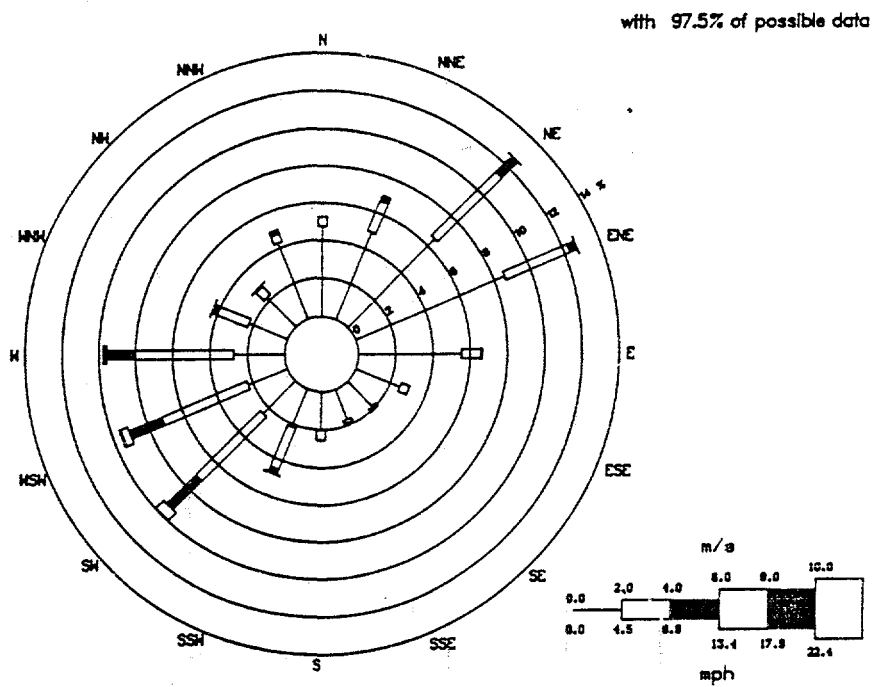


Fig. 5.1. Wind rose for Y-12 tower MTE (@10m) for 1993.

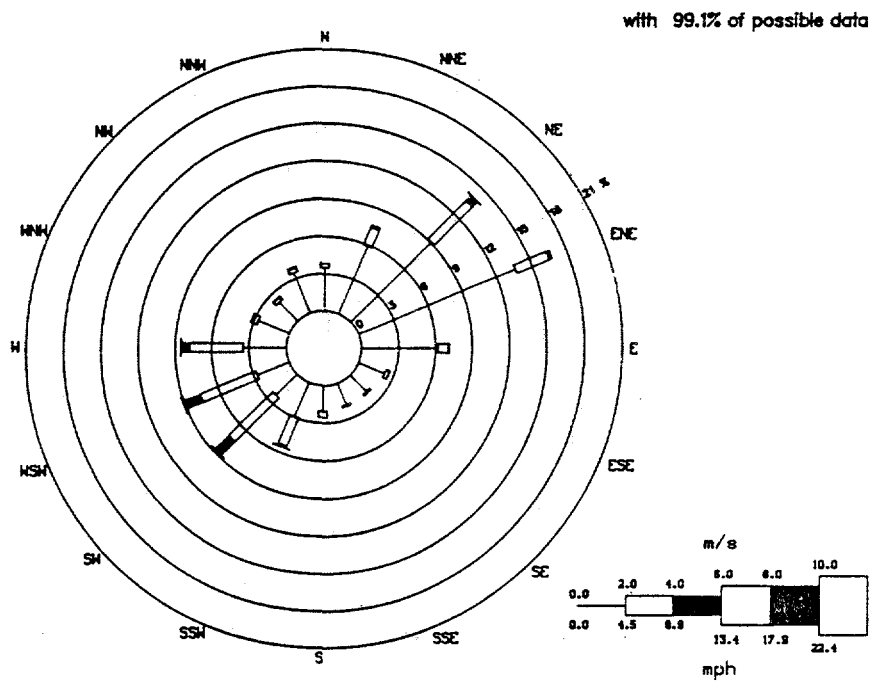


Fig. 5.2. Wind rose for Y-12 tower MTE (@30m) for 1993.

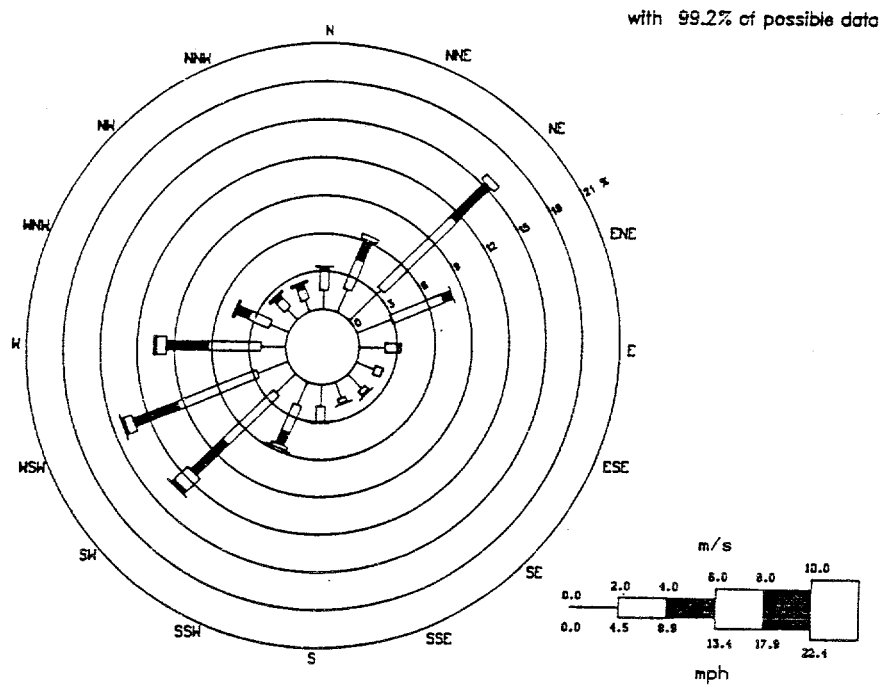


Fig. 5.3. Wind rose for Y-12 tower MTE (@100m) for 1993.

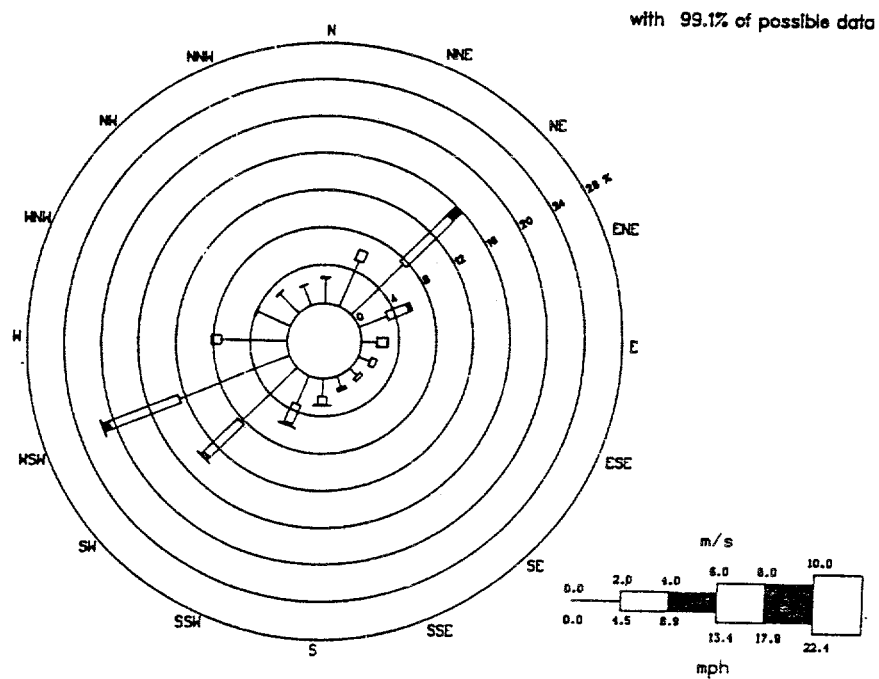


Fig. 5.4. Wind rose for Y-12 tower MTW (@10m) for 1993.

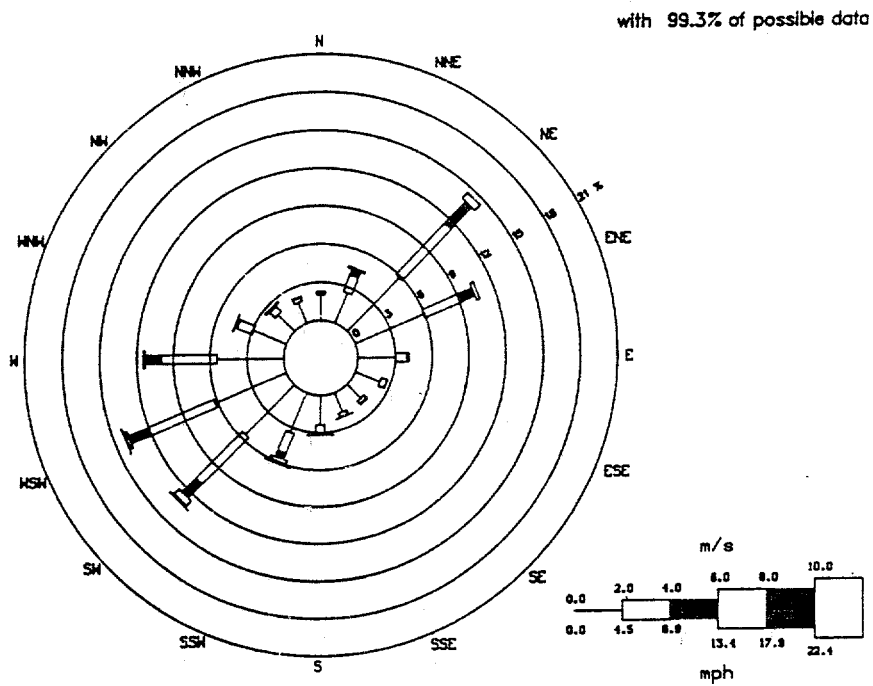


Fig. 5.5. Wind rose for Y-12 tower MTW (@60m) for 1993.

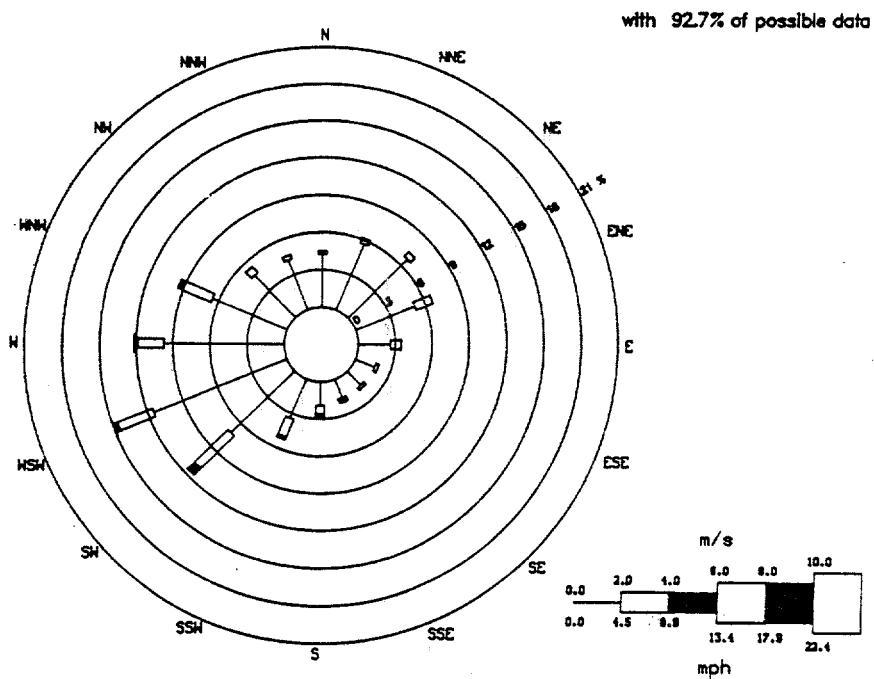


Fig. 5.6. Wind rose for CRNL tower MT2 (@10m) for 1993.

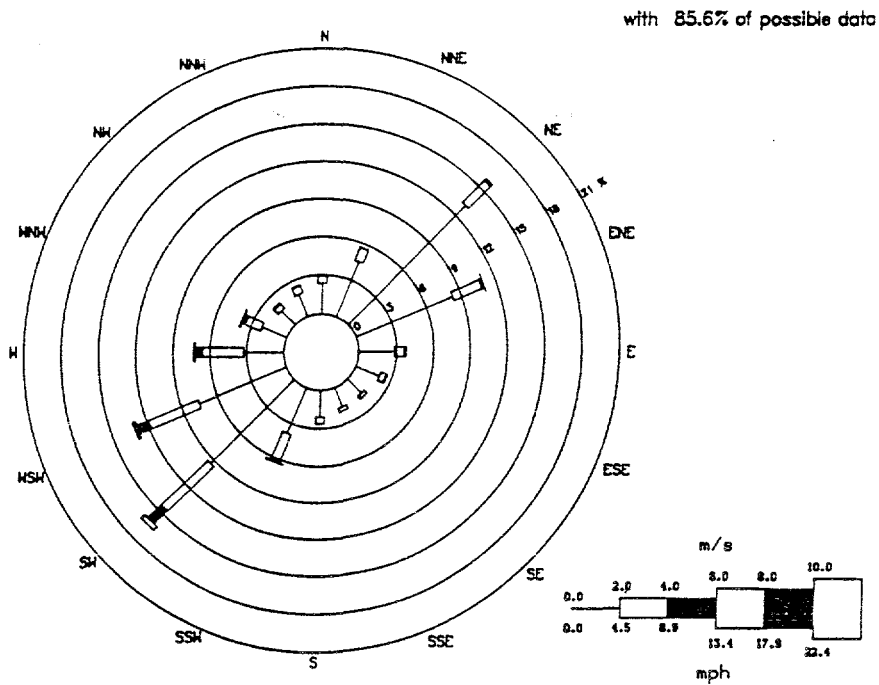


Fig. 5.7. Wind rose for ORNL tower MT2 (@30m) for 1993.

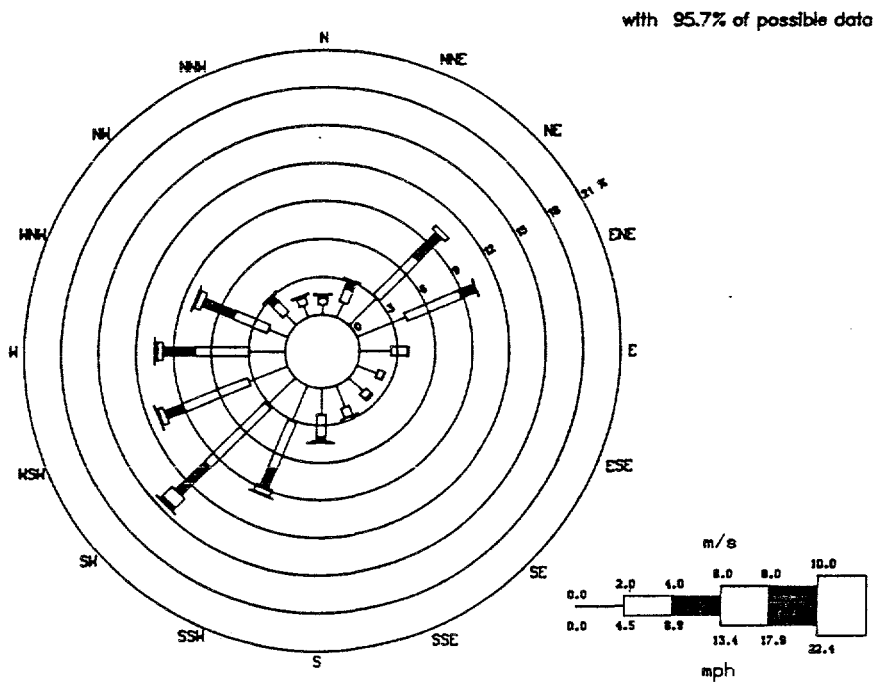


Fig. 5.8. Wind rose for ORNL tower MT2 (@100m) for 1993.

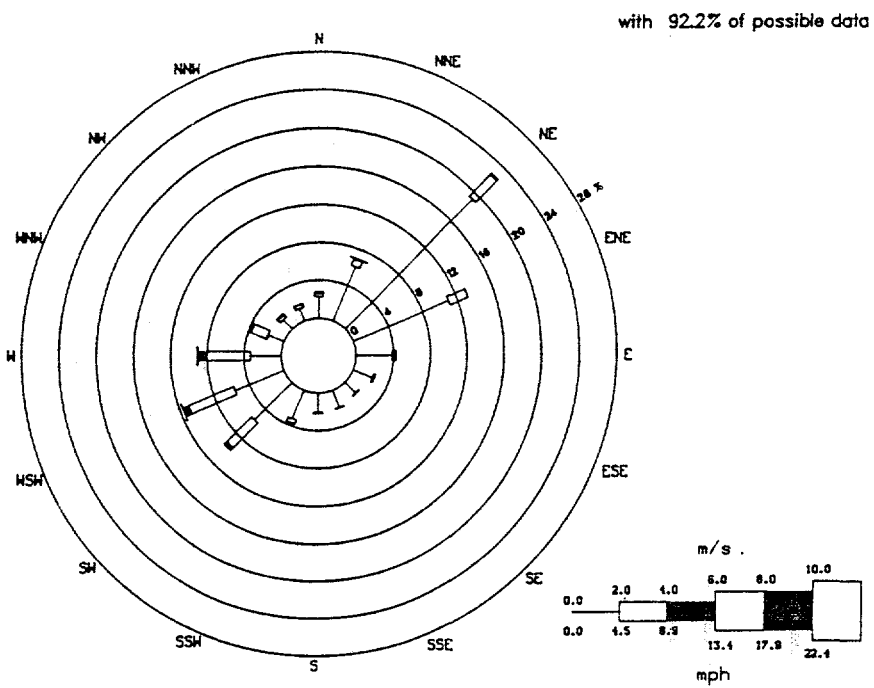


Fig. 5.9. Wind rose for ORNL tower MT3 (@10m) for 1993.

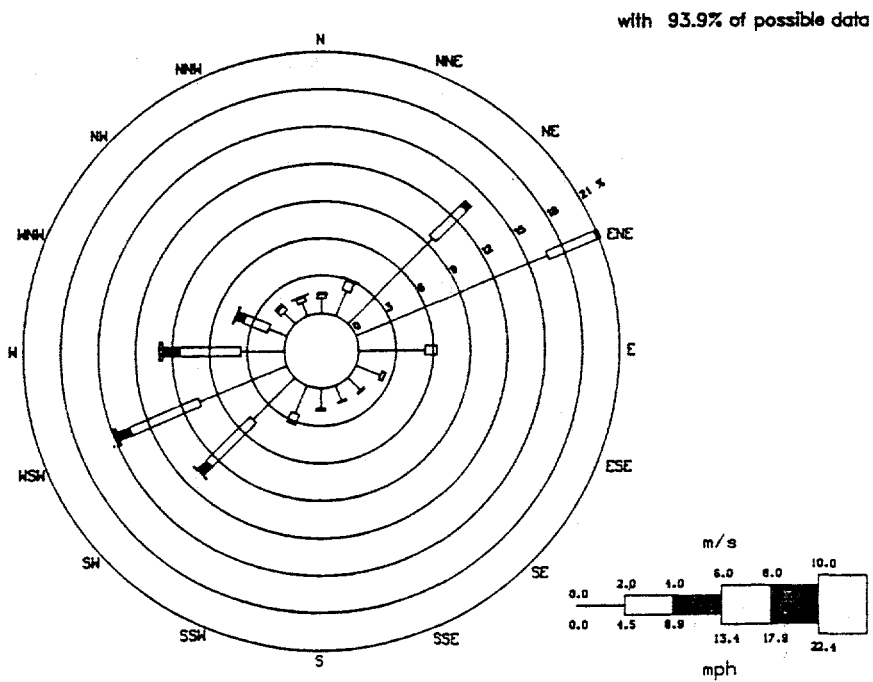


Fig. 5.10. Wind rose for ORNL tower MT3 (@30m) for 1993.



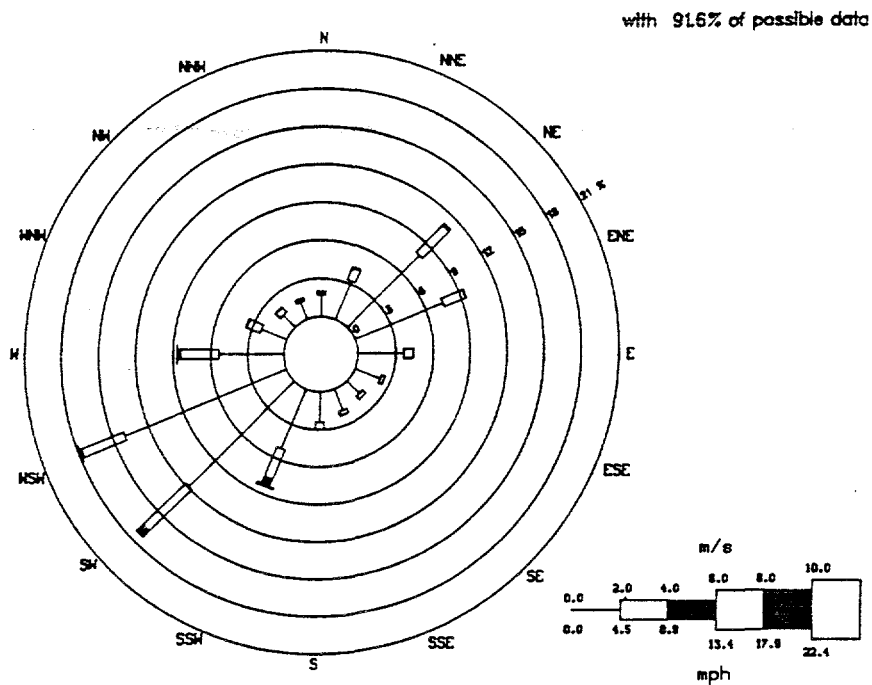


Fig. 5.11. Wind rose for ORNL tower MT4 (@10m) for 1993.

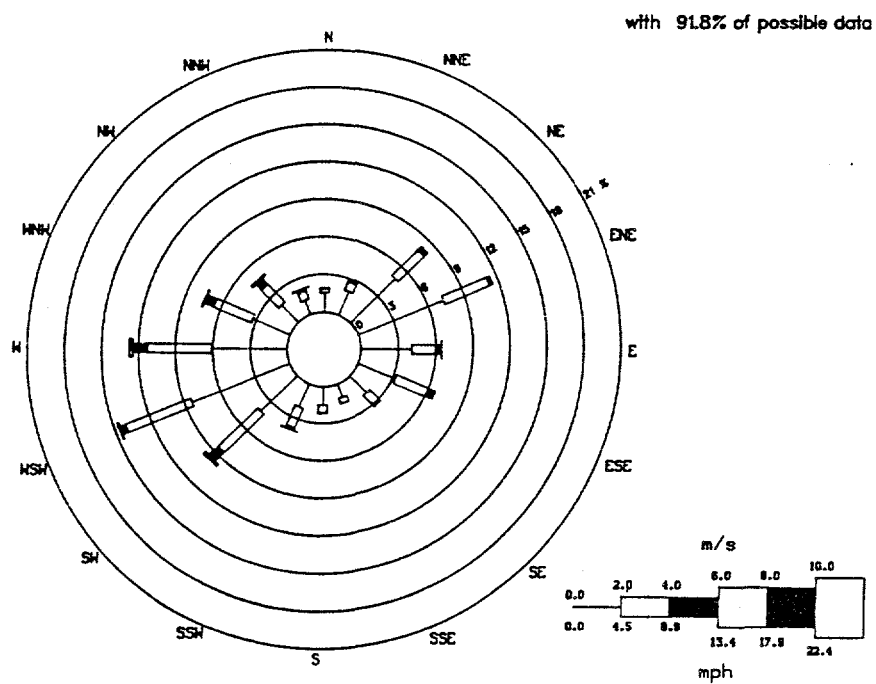


Fig. 5.12. Wind rose for ORNL tower MT4 (@30m) for 1993.

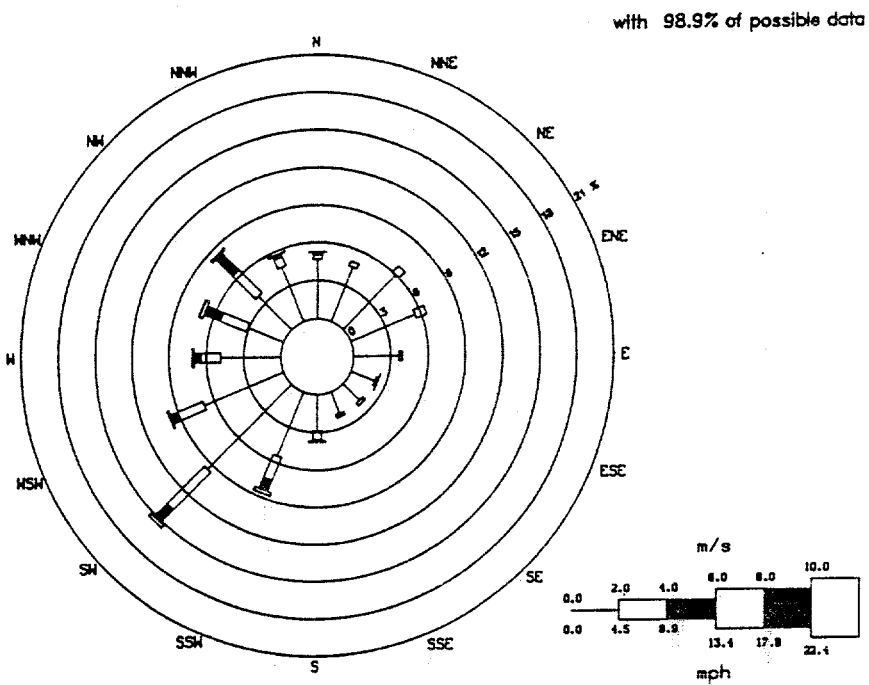


Fig. 5.13. Wind rose for K-25 tower MT1 (@10m) for 1993.

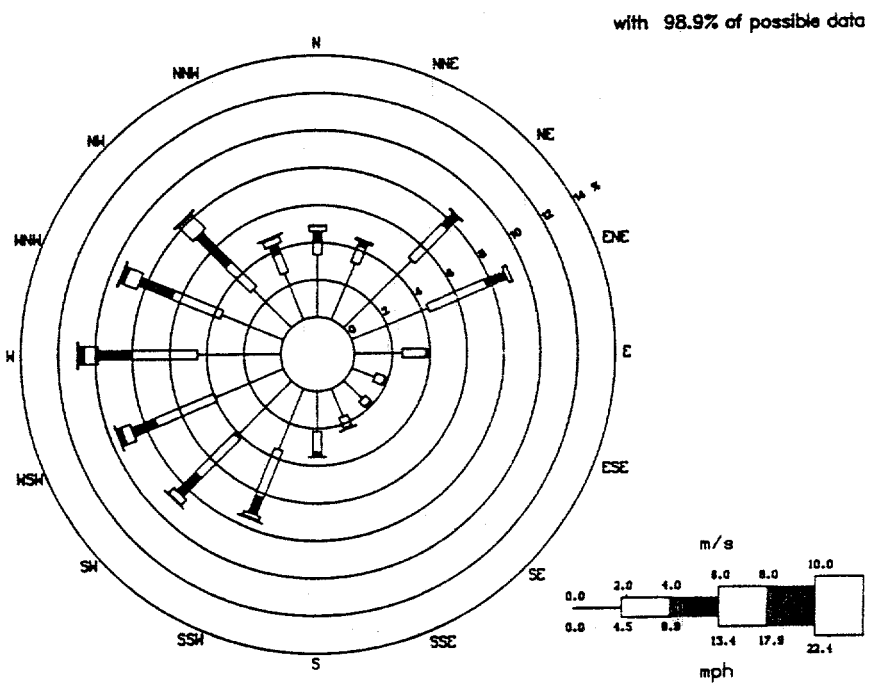


Fig. 5.14. Wind rose for K-25 tower MT1 (@60m) for 1993.

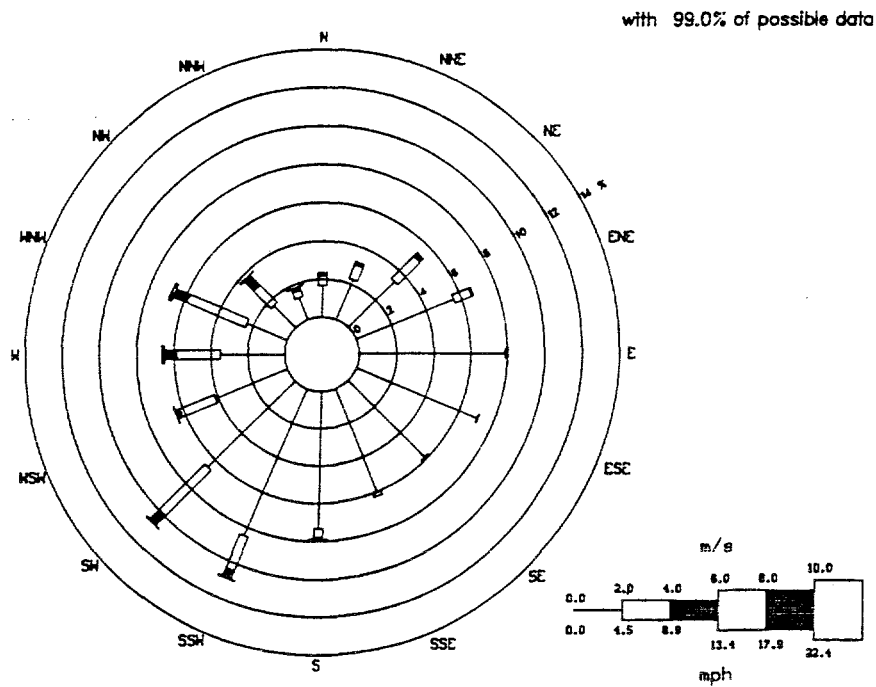


Fig. 5.15. Wind rose for K-25 tower MT7 (@10m) for 1993.

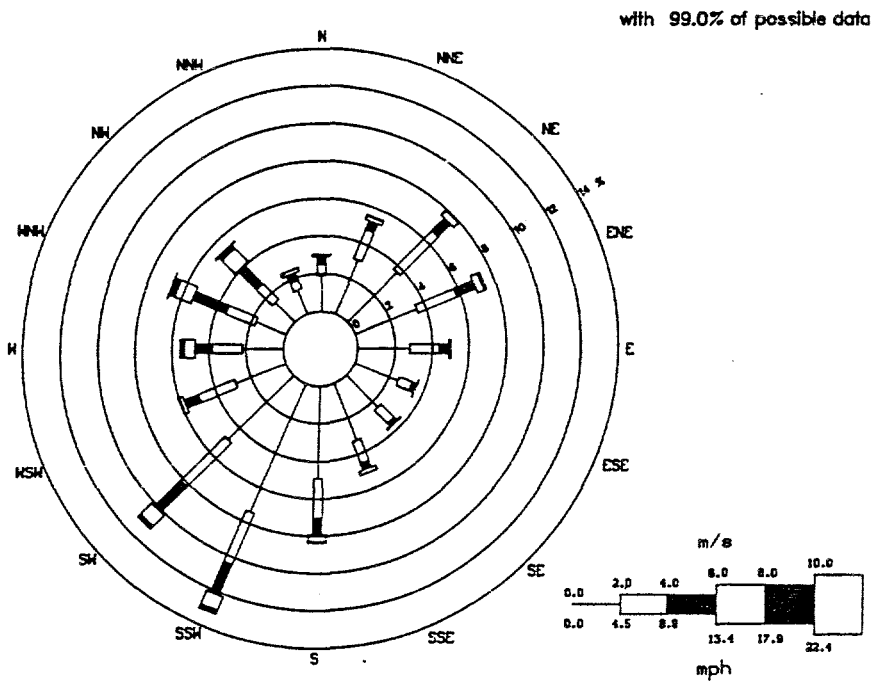


Fig. 5.16. Wind rose for K-25 tower MT7 (@30m) for 1993.

Table 5.22. 1993 Total uranium averages in ambient air at the Y-12 Plant

Station	Average monthly concentrations (ug/m3)					
	Jan	Feb	Mar	Apr	May	Jun
1	* <0.00008	<0.00008	<0.00011	<0.00007	0.00018	<0.00006
2	<0.00007	<0.00007	<0.00009	0.00006	0.00005	<0.00008
3	<0.00008	<0.00008	<0.00009	0.00006	0.00008	<0.00005
4	<0.00023	<0.00024	<0.00023	<0.00018	0.00008	0.00009
5	<0.00007	<0.00007	<0.00008	0.00014	0.00008	0.00006
6	<0.00080	<0.00008	<0.00010	<0.00006	0.00012	<0.00006
7	<0.00009	<0.00009	<0.00010	0.00009	0.00011	<0.00006
8	<0.00008	<0.00015	<0.00333	<0.00010	0.00009	<0.00007
9	<0.00008	<0.00022	<0.00011	<0.00004	0.00009	<0.00005
10	<0.00007	<0.00007	<0.00009	<0.00004	0.00009	<0.00004
11	<0.00007	<0.00007	<0.00009	0.00009	0.00034	<0.00007
12	<0.00008	<0.00007	<0.00009	<0.00006	0.00007	<0.00005
	Jul	Aug	Sept	Oct	Nov	Dec
1	0.00013	0.00006	<0.00005	<0.00004	<0.00006	a
2	0.00006	0.00003	0.00004	<0.00007	0.00007	0.00005
3	0.00025	a	0.00007	<0.00004	0.00006	0.00004
4	0.00017	0.00006	<0.00005	0.00006	0.00162	0.00005
5	0.00008	0.00004	0.00007	<0.00004	0.00007	0.00006
6	0.00003	0.00005	<0.00004	<0.00004	<0.00005	<0.00004
7	0.00005	0.00005	<0.00007	<0.00003	<0.00005	<0.00005
8	<0.00006	0.00006	0.00006	<0.00005	<0.00006	<0.00006
9	0.00005	0.00004	0.00006	<0.00006	0.00008	<0.00009
10	<0.00005	0.00004	<0.00005	<0.00004	0.00006	<0.00004
11	0.00004	0.00008	<0.00009	<0.00004	<0.00004	0.00005
12	0.00005	0.00003	<0.00005	<0.00004	<0.00006	0.00006

\* < Indicates that total U concentration for the samples was less than detectable.  
 For those values the detection limit is used to calculate the concentration in air.  
 In March the analytical sample size increased which resulted in more data for uranium.

(a) Indicates invalid sample or no sample (downtime).

Table 5.23. 1993 Y-12 Plant ambient air %U235 in total uranium

Station	Monthly Average					
	Jan	Feb	Mar	Apr	May	Jun
1	* NA	NA	2.32	2.03	3.83	1.72
2	1.28	0.73	7.14	6.18	3.05	4.18
3	2.50	NA	8.30	21.00	10.10	8.38
4	NA	NA	3.00	9.20	11.75	14.80
5	NA	NA	14.26	21.03	20.28	16.00
6	NA	NA	3.22	12.80	7.03	2.78
7	NA	NA	5.00	11.55	8.43	2.66
8	NA	2.33	4.79	2.28	2.50	1.74
9	NA	1.90	4.44	2.90	4.13	1.58
10	NA	NA	1.10	3.58	2.43	0.24
11	NA	NA	2.30	3.35	1.72	0.68
12	NA	1.27	4.32	4.55	2.50	1.76

	Jul	Aug	Sept	Oct	Nov	Dec
1	3.18	2.80	1.33	NA	6.73	NA
2	4.00	5.06	4.13	3.00	4.64	5.18
3	9.03	a	15.95	1.75	8.48	7.75
4	14.80	20.80	5.03	11.98	8.00	12.65
5	15.08	28.80	20.50	19.75	10.38	8.43
6	3.20	25.80	7.88	27.00	7.28	4.93
7	3.08	13.40	3.95	13.25	7.12	2.75
8	1.45	3.44	3.28	2.58	1.80	0.55
9	2.73	4.56	2.78	7.33	4.52	1.40
10	1.00	0.76	1.50	NA	2.82	0.82
11	1.68	3.12	1.05	NA	2.72	2.45
12	3.28	2.80	2.45	NA	5.00	3.08

\* NA = Not analyzed. Total U concentration for these samples were less than detectable. In March the analytical sample size increased which resulted in more data for uranium.

(a)- Indicates invalid sample or no sample (downtime).

Table 5.24. 1993 Monthly fluoride averages in ambient air - Y-12 Plant (a)

Station	Average concentrations (ug/m <sup>3</sup> )					
	Jan	Feb	Mar	Apr	May	Jun
1	< 0.0085	< 0.0097	< 0.0086	< 0.0095	0.0100	< 0.0095
2	< 0.0103	< 0.0118	< 0.0097	< 0.0108	< 0.0128	< 0.0090
3	< 0.0082	< 0.0076	< 0.0068	< 0.0079	< 0.0107	< 0.0081
4	< 0.0132	< 0.0129	< 0.0106	< 0.0123	< 0.0091	< 0.0091
5	< 0.0064	< 0.0066	< 0.0070	< 0.0064	< 0.0071	< 0.0061
6	< 0.0079	< 0.0076	< 0.0068	< 0.0076	< 0.0095	< 0.0079
7	< 0.0087	< 0.0088	< 0.0074	< 0.0095	< 0.0133	< 0.0093
8	< 0.0080	< 0.0070	< 0.0068	< 0.0083	< 0.0085	< 0.0099
9	< 0.0073	< 0.0075	< 0.0068	< 0.0073	< 0.0097	< 0.0079
10	< 0.0072	< 0.0074	< 0.0071	< 0.0081	< 0.0089	< 0.0077
11	< 0.0070	< 0.0079	< 0.0077	< 0.0086	< 0.0122	< 0.0081
	Jul	Aug	Sept	Oct	Nov	Dec
1	< 0.0099	< 0.0097	< 0.0090	< 0.0075	< 0.0099	b
2	< 0.0108	< 0.0099	< 0.0117	< 0.0095	< 0.0109	< 0.0089
3	< 0.0086	b	< 0.0087	< 0.0071	< 0.0082	< 0.0071
4	< 0.0107	< 0.0087	0.0128	< 0.0079	< 0.0088	< 0.0081
5	< 0.0067	< 0.0064	< 0.0105	< 0.0066	< 0.0076	< 0.0067
6	< 0.0100	< 0.0107	< 0.0155	< 0.0076	< 0.0085	< 0.0073
7	< 0.0097	< 0.0083	< 0.0106	< 0.0108	< 0.0083	< 0.0091
8	< 0.0094	< 0.0083	< 0.0099	< 0.0080	< 0.0082	< 0.0075
9	< 0.0086	< 0.0080	< 0.0075	< 0.0086	< 0.0129	< 0.0073
10	< 0.0086	< 0.0114	< 0.0107	< 0.0082	< 0.0108	< 0.0080
11	< 0.0082	< 0.0094	< 0.0110	< 0.0086	< 0.0118	< 0.0080

(a) Tennessee standard for 30-day average = 1.2 ug/m<sup>3</sup>

(b) Indicates no sample or downtime

Table 5.25. Total suspended particulates in air at the Y-12 Plant

Sample Date	Concentration (a) (ug/m3)		Sample date	Concentration (a) (ug/m3)	
	East	West		East	West
01/02/93	16.12	10.41 c	07/06/93	66.96	53.39
01/08/93	9.48	8.10	07/12/93	41.63	26.17 c
01/14/93	22.99	14.53 c	07/18/93	48.78	39.26 c
01/20/93	31.25	20.88 c	07/24/93	55.14	32.61 c
01/26/93	24.07	11.43 c	07/30/93	47.07	30.06
02/01/93	20.60	b	08/05/93	3.15	24.54
02/07/93	38.34	22.71 c	08/11/93	38.85	b
02/13/93	12.03	10.62	08/17/93	67.96	51.03
02/19/93	18.19	15.16	08/23/93	65.96	57.14
02/25/93	15.21	15.30	08/29/93	50.17	43.15
03/03/93	24.76	19.91 c	09/04/93	16.48	17.67
03/09/93	25.98	b	09/10/93	40.13	b
03/15/93	27.04	b	09/16/93	13.17	b
03/21/93	41.02	b	09/22/93	80.85	b
*03/26/93	24.58	b	09/28/93	b	14.47
04/01/93	9.76	b	10/04/93	26.85	b
04/07/93	29.77	b	10/10/93	b	b
04/13/93	50.36	b	10/16/93	b	28.12
04/19/93	68.43	b	10/22/93	22.64	12.19 c
04/25/93	35.19	b	10/28/93	61.17	18.34 c
05/01/93	66.06	b	11/03/93	27.43	24.61
05/07/93	74.12	b	11/09/93	128.25	29.56 c
05/13/93	38.90	b	11/15/93	b	7.79
05/19/93	35.75	b	11/21/93	b	8.88 c
05/25/93	55.58	b	11/27/93	b	2.87 c
05/31/93	26.72	20.09	12/03/93	42.59	36.01
06/06/93	27.44	26.51	12/09/93	34.39	23.67
06/12/93	35.76	32.22	12/15/93	b	5.33 c
06/18/93	b	44.43	12/21/93	11.24	8.03
06/24/93	54.94	b	12/27/93	18.04 c	14.82
06/30/93	31.98	23.43			

\* Schedule changed to match Tennessee Dept. of Environment and Conservation run dates.

a - Previous Tennessee primary air quality standard = 260 ug/(m3/24h).

Previous Tennessee secondary air quality standard = 150 ug/(m3/24h).

b - Invalid sample or no sample (downtime)

c - Sampler exceeded 60 cfm

Table 5.26. 1993 PM-10 concentrations in air at the Y-12 Plant

Sample Date	Concentration (a) (ug/m3)			Sample Date	Concentration (a) (ug/m3)		
	West	East	East Collected		West	East	East Collocated
01/02/93	9.55	9.75	4.19 c	07/06/93	44.36	45.76	48.39
01/08/93	5.24	b	1.21 c	07/12/93	23.59	24.17	25.39
01/14/93	9.99	12.17	4.59 c	07/18/93	44.25	31.30	40.23
01/20/93	15.66	18.29	5.80 c	07/24/93	32.44	33.25	35.27
01/26/93	5.13	8.00	3.84 c	07/30/93	19.14	20.55	21.42
02/01/93	5.71	6.26	2.23 c	08/05/93	26.64	27.08	28.50
02/07/93	18.66	20.39	9.13 c	08/11/93	35.00	34.69	36.25
02/13/93	6.45	6.34	2.16 c	08/17/93	64.74	58.91	64.92
02/19/93	b	7.77	3.04 c	08/23/93	49.09	48.08	45.77
02/25/93	b	8.39	2.64 c	08/29/93	37.09	37.24	40.86
03/03/93	b	17.98	8.32 c	09/04/93	12.06	11.07	12.07
03/09/93	7.02	10.07	5.90 c	09/10/93	13.83	17.10	17.29
03/15/93	11.36	15.25	7.12 c	09/16/93	11.34	9.03	9.44
03/21/93	22.13	23.05	10.64 c	09/22/93	17.88	25.15	26.80
03/26/93*	14.82	14.52	5.68 c	09/28/93	10.13	11.56	12.29
04/01/93	6.85	7.14	3.10 c	10/04/93	b	10.07	10.47
04/07/93	15.74	17.52	8.08 c	10/10/93	b	4.06	3.59
04/13/93	19.51	23.73	11.92 c	10/16/93	b	16.00	16.43
04/19/93	19.17	26.62	12.57 c	10/22/93	4.27	7.05	8.03
04/25/93	14.01	3.85	0.46 c	10/28/93	8.95	17.60	17.09
05/01/93	23.03	25.26	25.74	11/03/93	9.79	11.79	13.58
05/07/93	31.20	31.20	27.45	11/09/93	14.98	27.81	27.96
05/13/93	15.78	17.19	16.91	11/15/93	2.89	0.64	0.91
05/19/93	16.81	15.93	b	11/21/93	2.77	4.59	5.18
05/25/93	22.22	28.31	27.01	11/27/93	b	0.30	0.59
05/31/93	14.60	17.04	16.33	12/03/93	17.11	18.01	17.72
06/06/93	20.46	19.71	19.22	12/09/93	8.64	10.50	9.16
06/12/93	21.86	b	22.61	12/15/93	1.57	2.69	0.71
06/18/93	35.91	b	37.88	12/21/93	1.39	2.66	2.06
06/24/93	31.02	30.95	32.76	12/27/93	3.27	4.25	3.77
06/30/93	19.89	21.63	23.86				

\* Schedule changed to match Tennessee Dept. of Environment and Conservation run dates.

a - Tennessee primary air quality standard = 150 ug/m3/24h

b - Invalid sample or no sample (down time)

c - Evasive monitor malfunction on collocated sampler from Jan. thru April, solved April 30, 1993.



Table 5.27. Annual results of the Y-12 Plant airborne mercury monitoring program, 1986-1993.

Site	Year	Number of samples	Mercury vapor concentration ( $\mu\text{g}/\text{m}^3$ )		
			Max	Min	Av <sup>a</sup>
Ambient No. 2 (east end of Y-12 Plant)	1986	34	0.058	0.003	0.011
	1987	52	0.033	0.001	0.009
	1988	52	0.036	0.003	0.010
	1989	52	0.012	0.003	0.006
	1990	52	0.018	<.001	0.006
	1991	51	0.073	<.001	0.008
	1992	36	0.015	0.002	0.005
	1993	45	0.026	0.003	0.008
Ambient No. 8 (west end of Y-12 Plant)	1986	27	0.034	<.001	0.017
	1987	52	0.067	0.007	0.032
	1988	52	0.407	0.007	0.041
	1989	52	1.187	0.006	0.143
	1990	51	0.025	0.002	0.011
	1991	51	0.067	0.005	0.016
	1992	49	0.022	0.001	0.007
	1993	45	0.031	0.004	0.012
Bldg. 9404-13 (SW of Bldg. 9201-4)	1986	31	0.197	0.033	0.108
	1987	52	0.465	0.044	0.174
	1988	51	0.340	0.028	0.137
	1989	52	0.250	0.024	0.101
	1990	52	0.277	0.001	0.067
	1991	51	0.181	0.018	0.070
	1992	45	0.137	0.010	0.056
	1993	45	0.250	0.017	0.078
Bldg. 9805-1 (SE of Bldg. 9201-4)	1986	15	0.137	0.026	0.070
	1987	52	0.226	0.036	0.109
	1988	52	0.384	0.017	0.097
	1989	51	0.206	0.017	0.072
	1990	52	0.162	0.018	0.070
	1991	48	0.275	0.003	0.058
	1992	49	0.125	0.001	0.038
	1993	45	0.314	0.010	0.088
New Hope Pond <sup>b</sup>	1987	20	0.039	0.006	0.016
	1988	52	0.412	0.004	0.046
	1989	37	0.009	0.002	0.004
Rain Gage No. 2 <sup>c</sup> (Chestnut Ridge)	1988	47	0.016	0.002	0.006
	1989	47	0.015	<.001	0.005

<sup>a</sup> NESHAP 30-day average standard =  $1 \mu\text{g}/\text{m}^3$

ACGIH 8-hour day, 40-hour work week standard =  $50 \mu\text{g}/\text{m}^3$

<sup>b</sup> Site discontinued September 19, 1989.

<sup>c</sup> Site discontinued October 31, 1989.

Table 5.28. 1993 EMP surface water sampling locations

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BCK 0.6	Bear Creek downstream from all DOE inputs
BCK 9.4	Bear Creek downstream from the Y-12 Plant burial grounds
CRK 16	Clinch River downstream from all DOE inputs
CRK 23	Water supply intake for the K-25 Site
CRK 32	Clinch River downstream from ORNL
CRK 58	Water supply intake for Knox County
CRK 66	Melton Hill Reservoir above City of Oak Ridge water intake
CRK 80	Melton Hill Reservoir—Oak Ridge Marina
CRK 84	Melton Hill Reservoir above all DOE inputs—Anderson County Filtration Plant
EFK 5.4	East Fork Poplar Creek downstream from floodplain
EFK 23.4	East Fork Poplar Creek downstream from the Y-12 Plant
HC	Hinds Creek (reference site for East Fork Poplar Creek)
MEK 0.2	Melton Branch downstream from ORNL
MEK 2.1	Melton Branch upstream from ORNL
MIK 0.1	Mitchell Branch downstream from the K-25 Site
MIK 1.4	Mitchell Branch upstream from the K-25 Site
PCK 2.2	Poplar Creek downstream from the K-25 Site
PCK 22	Poplar Creek upstream from the K-25 Site and East Fork Poplar Creek
TRK 915	Water supply intake for City of Kingston
WCK 1.0	White Oak Lake at White Oak Dam
WCK 2.6	White Oak Creek downstream from ORNL
WCK 6.8	White Oak Creek upstream from ORNL

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Table 5.29. 1993 sampling and analysis plan for EMP surface water locations

**Parameters:**

Anions

Chloride  
Fluoride  
Nitrate  
Sulfate, as SO<sub>4</sub>

Metals

Aluminum  
Antimony  
Arsenic  
Barium  
Beryllium  
Cadmium  
Calcium  
Chromium  
Cobalt  
Copper  
Iron  
Lead  
Magnesium  
Manganese  
Mercury  
Nickel  
Phosphorus  
Potassium  
Selenium  
Silver  
Sodium  
Thallium  
Uranium  
Vanadium  
Zinc

Others

Alkalinity  
Ammonia, as N  
Biochemical oxygen demand  
Chemical oxygen demand  
Color  
Cyanide, total  
Total dissolved solids  
Total hardness  
Total suspended solids

Radionuclides

Co-60  
Cs-137  
Gross alpha<sup>a</sup>  
Gross beta  
H-3  
Tc-99  
Total Uranium  
Total rad Sr

Field Measurements

Chlorine, total residual  
Conductivity  
Dissolved oxygen  
pH  
Temperature

Volatile Organics

1,1,1-Trichloroethane  
1,1,2,2-Tetrachloroethane  
1,1,2-Trichloroethane  
1,1-Dichloroethane  
1,1-Dichloroethene  
1,2-Dichloroethane, total  
1,2-Dichloropropane  
2-Butanone  
2-Hexanone  
4-Methyl-2-pentanone  
Acetone  
Benzene  
Bromodichloromethane  
Bromoform  
Bromomethane  
Carbon disulfide  
Carbon tetrachloride  
Chlorobenzene  
Chloroethane  
Chloroform  
Chloromethane  
cis-1,3-Dichloropropene  
Dibromochloromethane  
Ethylbenzene  
Methylene chloride  
Styrene  
Tetrachloroethene  
Toluene  
trans-1,3-Dichloropropene  
Trichloroethene  
Vinyl chloride  
Xylene, total

**Sample type:**

Field Measurements - Grab, instant read  
Anions, Metals, Radionuclides, Others, and Volatile Organics - Grab

**Collection frequency:**

Bi-monthly

**Analysis frequency:**

Bi-monthly

<sup>a</sup>If Gross alpha > 3 pCi/L (20% of EPA drinking water limit), report U-234, U-235, and U-238 from the Total Uranium sample results and do isotopic analysis for Th-228, Th-230, Th-232, Pu-238, Pu-239, Np-237, Am-241, and Cm-244, as needed to identify cause.

Table 5.30. 1993 concentrations at EMP surface water locations<sup>a</sup>

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
Bear Creek downstream from all DOE inputs (BCK 0.6)						
Anions (mg/L)						
Chloride	5/5	9.3	4.5	5.9	0.87	f
Fluoride	2/5	0.30	<0.10	-0.16	0.040	f
Nitrate	5/5	23	3.4	9.5	3.5	f
Sulfate, as SO <sub>4</sub>	5/5	51	15	32	6.4	f
Field Measurements						
Conductivity (mS/cm)	5/5	0.45	0.30	0.37	0.025	f
Dissolved oxygen (ppm)	5/5	11	7.4	8.9	0.62	5
pH (SU)	5/5	8.1	7.6	7.8	0.097	f
Temperature (°C)	5/5	21	9.4	16	2.1	f
Metals (mg/L)						
Aluminum, total	5/5	0.48	0.061	0.20	0.076	f
Barium, total	5/5	0.14	0.059	0.087	0.014	f
Calcium, total	5/5	57	30	46	4.8	f
Chromium, total	2/5	0.014	<0.0040	-0.0078	0.0023	0.016
Iron, total	5/5	0.37	0.082	0.17	0.052	f
Magnesium, total	5/5	18	8.5	14	1.6	f
Manganese, total	5/5	0.054	0.0078	0.026	0.0080	f
Phosphorus, total	2/5	0.50	<0.20	-0.26	0.060	f
Potassium, total	3/4	2.4	1.8	-2.1	0.13	f
Sodium, total	5/5	5.4	2.8	4.0	0.41	f
Uranium, total	3/4	0.027	<0.00010	-0.015	0.0056	f
Zinc, total	2/5	0.060	<0.0050	-0.022	0.011	0.117
Others						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	160	98	140	12	f
Ammonia, as N (mg/L)	5/5	0.080	0.030	0.048	0.0097	f
Biochemical oxygen demand (mg/L)	1/5	5.0	<5.0	-5.0	0	f
Chemical oxygen demand (mg/L)	1/5	5.0	<5.0	-5.0	0	f
Color (CFU)	4/5	11	<1.0	-5.6	1.7	f
Total dissolved solids (mg/L)	5/5	290	170	240	20	f
Total hardness (mg/L)	5/5	210	120	170	18	f
Radionuclides (pCi/L) <sup>g</sup>						
Co-60	1/5	5.1*	0.27	1.8	0.87	f
Gross alpha	5/5	12*	7.8*	10*	0.75	f
Gross beta	5/5	19*	6.2*	13*	2.5	f
H-3	1/5	1,300*	0	370	230	f
Pu-238	1/2	0.54*	-0.11	0.22	0.32	f
Tc-99	5/5	25*	6.2*	13*	3.4	f
Total rad Sr	3/5	3.0*	-0.68	1.4	0.67	f
Total uranium	5/5	12*	8.1*	9.4*	0.66	f
U-234	4/4	4.6*	3.2*	3.6*	0.32	f
U-235	3/4	0.59*	0.027	0.29*	0.12	f
U-238	4/4	7.0*	4.6*	5.4*	0.57	f
Volatile Organics (µg/L)						
Methylene chloride	1/5	U5.0	JB2.6	-4.5	0.48	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<i>Bear Creek downstream from the Y-12 Plant burial grounds (BCK 9.4)</i>						
<b>Anions (mg/L)</b>						
Chloride	5/5	38	17	31	3.6	f
Fluoride	5/5	0.80	0.30	0.56	0.093	f
Nitrate	5/5	220	65	140	31	f
Sulfate, as SO <sub>4</sub>	5/5	45	21	32	4.5	f
<b>Field Measurements</b>						
Conductivity (mS/cm)	5/5	1.0	0.61	0.84	0.072	f
Dissolved oxygen (ppm)	5/5	9.4	6.1	8.1	0.66	5
pH (SU)	5/5	7.9	7.7	7.8	0.037	f
Temperature (°C)	5/5	20	11	16	1.7	f
<b>Metals (mg/L)</b>						
Aluminum, total	4/5	0.41	<0.050	-0.18	0.066	f
Arsenic, total	1/5	0.062	<0.050	-0.052	0.0024	0.36
Barium, total	5/5	0.20	0.13	0.16	0.012	f
Calcium, total	5/5	140	66	110	13	f
Chromium, total	2/5	0.018	<0.0040	-0.0096	0.0034	0.016
Iron, total	5/5	0.17	0.064	0.14	0.020	f
Magnesium, total	5/5	26	12	21	2.5	f
Manganese, total	5/5	0.035	0.0092	0.023	0.0043	f
Mercury, total	1/5	0.000052	<0.000050	-0.000050	0.00000040	0.0024
Phosphorus, total	3/5	0.40	<0.20	-0.26	0.040	f
Potassium, total	4/4	4.4	2.7	3.6	0.38	f
Sodium, total	5/5	21	9.4	17	2.1	f
Uranium, total	3/4	0.23	<0.00010	-0.12	0.048	f
Vanadium, total	2/5	0.0028	<0.0020	-0.0023	0.00017	f
Zinc, total	2/5	0.0078	<0.0050	-0.0058	0.00056	0.117
<b>Others</b>						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	260	140	210	21	f
Ammonia, as N (mg/L)	5/5	0.34	0.040	0.12	0.057	f
Color (CPU)	4/5	7.0	<1.0	-4.4	0.98	f
Total dissolved solids (mg/L)	5/5	920	310	590	100	f
Total hardness (mg/L)	5/5	460	210	360	43	f
Total suspended solids (mg/L)	2/5	43	<5.0	-13	7.5	f
<b>Radionuclides (pCi/L)<sup>g</sup></b>						
Co-60	1/5	11*	-1.9	2.2	2.3	f
Gross alpha	5/5	100*	38*	59*	11	f
Gross beta	5/5	140*	41*	77*	18	f
H-3	2/5	1,100*	-110	510*	220	f
Pu-239	1/2	0.16*	-0.25	-0.043	0.21	f
Tc-99	5/5	210*	38*	110*	30	f
Total rad Sr	2/5	2.7*	0.27	1.4*	0.39	f
Total uranium	5/5	95*	54*	71*	8.1	f
U-234	4/4	32*	16*	26*	3.3	f
U-235	4/4	5.9*	1.2*	2.9*	1.1	f
U-238	4/4	62*	38*	51*	5.0	f
<b>Volatile Organics (µg/L)</b>						
1,2-Dichloroethene	4/5	6.0	J2.0	-3.7	0.75	f
Trichloroethene	2/5	U5.0	J1.2	-3.6	0.84	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<i>Clinch River downstream from all DOE inputs (CRK 16)</i>						
Anions (mg/L)						
Chloride	5/5	5.3	3.4	3.9	0.36	f
Fluoride	1/5	0.10	<0.10	-0.10	0	f
Nitrate	5/5	10	1.5	3.3	1.7	f
Sulfate, as SO <sub>4</sub>	5/5	27	15	21	1.9	f
Field Measurements						
Conductivity (mS/cm)	5/5	0.30	0.24	0.27	0.0091	f
Dissolved oxygen (ppm)	5/5	9.9	8.5	9.3	0.28	f
pH (SU)	5/5	8.2	7.8	8.0	0.073	f
Temperature (°C)	5/5	24	9.7	17	2.9	f
Metals (mg/L)						
Aluminum, total	5/5	0.59	0.093	0.28	0.087	f
Barium, total	4/5	0.037	<0.0010	-0.026	0.0063	f
Calcium, total	5/5	33	29	32	0.81	f
Iron, total	4/5	0.63	<0.050	-0.26	0.11	f
Magnesium, total	5/5	9.3	8.0	8.7	0.21	f
Manganese, total	5/5	0.068	0.0031	0.036	0.011	f
Phosphorus, total	4/5	0.41	0.16	-0.29	0.047	f
Potassium, total	1/4	<2.0	<1.0	-1.5	0.27	f
Sodium, total	5/5	4.9	3.3	4.1	0.27	f
Uranium, total	3/4	0.0010	<0.00010	-0.00044	0.00019	f
Vanadium, total	1/5	0.0020	<0.0020	-0.0020	0	f
Others						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	110	93	100	2.9	f
Ammonia, as N (mg/L)	5/5	0.090	0.030	0.058	0.0097	f
Chemical oxygen demand (mg/L)	1/5	21	<5.0	-8.2	3.2	f
Color (CPU)	5/5	17	2.0	7.0	2.6	f
Total dissolved solids (mg/L)	5/5	170	150	150	4.2	500
Total hardness (mg/L)	5/5	130	110	120	4.2	f
Total suspended solids (mg/L)	2/5	29	<5.0	-11	4.7	f
Radionuclides (pCi/L) <sup>g</sup>						
Cs-137	1/5	4.1*	-2.4	0.65	1.2	f
Gross alpha	2/5	1.6*	-0.14	0.85*	0.30	f
Gross beta	5/5	6.8*	3.8*	4.8*	0.54	f
H-3	1/5	540*	-570	-86	190	f
Tc-99	3/5	5.9*	-0.54	2.9*	1.1	f
Total rad Sr	2/5	2.5*	-1.1	0.70	0.67	f
Total uranium	5/5	5.4*	0.35*	1.6	0.97	f
<i>Water supply intake for the K-25 Site (CRK 23)</i>						
Anions (mg/L)						
Chloride	5/5	5.1	3.3	3.9	0.32	f
Nitrate	5/5	5.3	1.0	2.7	0.71	f
Sulfate, as SO <sub>4</sub>	5/5	26	20	22	1.1	f
Field Measurements						
Conductivity (mS/cm)	5/5	0.36	0.28	0.31	0.015	f
Dissolved oxygen (ppm)	5/5	10	7.0	8.7	0.66	f
pH (SU)	5/5	8.1	7.8	8.0	0.055	f
Temperature (°C)	5/5	21	7.7	15	2.7	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<b>Metals (mg/L)</b>						
Aluminum, total	5/5	0.41	0.19	0.27	0.037	f
Barium, total	4/5	0.031	<0.0010	-0.024	0.0058	f
Calcium, total	5/5	36	31	33	1.1	f
Iron, total	4/5	0.52	<0.050	-0.28	0.076	f
Magnesium, total	5/5	9.9	8.3	9.1	0.33	f
Manganese, total	5/5	0.11	0.020	0.054	0.015	f
Phosphorus, total	3/5	0.40	<0.20	-0.28	0.043	f
Potassium, total	1/4	<2.0	<1.0	-1.6	0.25	f
Sodium, total	5/5	4.9	3.8	4.4	0.20	f
Uranium, total	2/4	0.00020	<0.00010	-0.00015	0.000029	f
Vanadium, total	1/5	0.0024	<0.0020	-0.0021	0.000080	f
Zinc, total	1/5	0.0056	<0.0050	-0.0051	0.00012	f
<b>Others</b>						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	120	98	110	3.2	f
Ammonia, as N (mg/L)	5/5	0.090	0.020	0.048	0.012	f
Chemical oxygen demand (mg/L)	3/5	6.0	<5.0	-5.4	0.24	f
Color (CPU)	4/5	7.0	<1.0	-3.6	1.0	f
Total dissolved solids (mg/L)	5/5	170	140	150	4.4	500
Total hardness (mg/L)	5/5	130	120	120	2.2	f
Total suspended solids (mg/L)	4/5	40	<5.0	-14	6.5	f
<b>Radionuclides (pCi/L)<sup>g</sup></b>						
Cs-137	2/5	5.7*	0.27	3.1*	0.96	f
Gross alpha	2/5	2.7*	-0.027	1.1*	0.48	f
Gross beta	4/5	6.2*	2.4	4.2*	0.64	f
H-3	1/5	620*	54	360*	93	f
Tc-99	1/5	3.8	-1.9	1.5	0.93	f
Total rad Sr	3/5	3.0*	-0.32	1.3*	0.61	f
Total uranium	4/5	1.6*	0.14	0.76*	0.24	f
<b>Volatile Organics (µg/L)</b>						
Carbon disulfide	1/5	10	U5.0	-6.0	1.0	f
<i>Clinch River downstream from ORNL (CRK 32)</i>						
<b>Anions (mg/L)</b>						
Chloride	5/5	5.3	3.4	4.0	0.34	f
Fluoride	1/5	0.10	<0.10	-0.10	0	f
Nitrate	5/5	4.3	1.0	2.5	0.57	f
Sulfate, as SO <sub>4</sub>	5/5	27	20	22	1.3	f
<b>Field Measurements</b>						
Conductivity (mS/cm)	5/5	0.35	0.23	0.29	0.022	f
Dissolved oxygen (ppm)	5/5	10	7.0	8.4	0.61	f
pH (SU)	5/5	8.0	7.7	7.9	0.058	f
Temperature (°C)	5/5	20	9.6	15	2.2	f
<b>Metals (mg/L)</b>						
Aluminum, total	5/5	1.2	0.11	0.35	0.21	f
Barium, total	5/5	0.031	0.029	0.030	0.00039	f
Calcium, total	5/5	38	30	34	1.2	f
Chromium, total	1/5	0.032	<0.0040	-0.0096	0.0056	0.05
Iron, total	3/5	1.1	<0.050	-0.29	0.20	f
Magnesium, total	5/5	9.8	8.7	9.2	0.19	f
Manganese, total	5/5	0.091	0.0098	0.041	0.014	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration				Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>			
Nickel, total	1/5	0.014	<0.010	-0.011	0.00080	f	
Phosphorus, total	3/5	0.31	0.18	-0.24	0.028	f	
Potassium, total	2/4	2.3	<1.0	-1.7	0.29	f	
Sodium, total	5/5	5.1	3.9	4.7	0.21	f	
Uranium, total	2/4	0.0030	<0.00010	-0.0013	0.00072	f	
Vanadium, total	3/5	0.0030	<0.0020	-0.0024	0.00023	f	
Zinc, total	1/5	0.0058	<0.0050	-0.0052	0.00016	f	
Others							
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	120	98	110	3.7	f	
Ammonia, as N (mg/L)	5/5	0.070	0.030	0.044	0.0075	f	
Chemical oxygen demand (mg/L)	2/5	11	<5.0	-6.2	1.2	f	
Color (CPU)	5/5	7.0	3.0	5.0	0.71	f	
Total dissolved solids (mg/L)	5/5	170	110	140	11	500	
Total hardness (mg/L)	5/5	130	110	120	4.6	f	
Total suspended solids (mg/L)	4/5	25	<5.0	-11	3.6	f	
Radionuclides (pCi/L) <sup>g</sup>							
Gross alpha	1/5	1.5*	-0.16	0.58	0.29	f	
Gross beta	5/5	13*	2.2*	8.1*	1.9	f	
H-3	3/5	3,000*	410	1,300*	510	f	
Tc-99	1/5	8.9*	-1.6	3.5	1.8	f	
Total rad Sr	4/5	4.9*	0.11	2.4*	0.75	f	
Total uranium	4/5	1.4*	0.41*	0.83*	0.17	f	
Volatile Organics (µg/L)							
Acetone	1/5	14	U10	-11	0.80	f	
Trichloroethene	1/5	U5.0	J3.0	-4.6	0.40	5	
Water supply intake for Knox County (CRK 58)							
Anions (mg/L)							
Chloride	5/5	5.3	3.0	3.7	0.40	f	
Nitrate	5/5	3.4	1.0	2.2	0.39	f	
Sulfate, as SO <sub>4</sub>	5/5	30	21	24	1.7	f	
Field Measurements							
Conductivity (mS/cm)	5/5	0.35	0.25	0.28	0.018	f	
Dissolved oxygen (ppm)	5/5	16	7.5	11	1.4	f	
pH (SU)	5/5	8.7	7.8	8.2	0.19	f	
Temperature (°C)	5/5	28	8.7	18	3.5	f	
Metals (mg/L)							
Aluminum, total	5/5	0.44	0.071	0.18	0.068	f	
Barium, total	5/5	0.041	0.027	0.034	0.0025	f	
Calcium, total	5/5	38	32	35	1.3	f	
Iron, total	4/5	0.51	<0.050	-0.16	0.088	f	
Magnesium, total	5/5	11	8.9	9.7	0.36	f	
Manganese, total	5/5	0.066	0.019	0.040	0.0080	f	
Phosphorus, total	4/5	0.42	0.13	-0.27	0.049	f	
Potassium, total	2/4	2.2	<1.0	-1.6	0.28	f	
Sodium, total	5/5	6.1	4.4	4.9	0.31	f	
Uranium, total	2/4	0.0010	<0.00010	-0.00040	0.00021	f	
Zinc, total	2/5	0.017	<0.0050	-0.0092	0.0026	f	



Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<b>Others</b>						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	120	100	110	2.7	f
Ammonia, as N (mg/L)	4/5	0.060	<0.030	-0.038	0.0058	f
Chemical oxygen demand (mg/L)	1/5	12	<5.0	-6.4	1.4	f
Color (CPU)	4/5	7.0	<1.0	-4.0	1.1	f
Total dissolved solids (mg/L)	5/5	160	150	150	2.0	500
Total hardness (mg/L)	5/5	130	120	120	2.4	f
Total suspended solids (mg/L)	2/5	10	<5.0	-6.6	1.0	f
<b>Radionuclides (pCi/L)<sup>g</sup></b>						
Co-60	1/5	15*	-1.4	3.0	3.0	f
Gross alpha	3/5	3.0*	0.35	1.3*	0.47	f
Gross beta	4/5	4.6*	1.7*	2.7*	0.51	f
H-3	1/5	620*	-460	110	170	f
Tc-99	2/5	7.6*	-0.65	3.1	1.6	f
Total rad Sr	1/5	1.5*	0.35	0.98*	0.22	f
Total uranium	3/5	1.1*	0.32	0.64*	0.14	f
<b>Melton Hill Reservoir above City of Oak Ridge water intake (CRK 66)</b>						
<b>Anions (mg/L)</b>						
Chloride	5/5	5.0	3.2	3.9	0.32	f
Nitrate	5/5	3.9	1.9	2.7	0.39	f
Sulfate, as SO <sub>4</sub>	5/5	26	21	24	0.93	f
<b>Field Measurements</b>						
Conductivity (mS/cm)	5/5	0.33	0.25	0.28	0.015	f
Dissolved oxygen (ppm)	5/5	11	7.0	9.2	0.64	f
pH (SU)	5/5	8.5	7.9	8.0	0.12	f
Temperature (°C)	5/5	28	8.6	18	3.3	f
<b>Metals (mg/L)</b>						
Aluminum, total	5/5	0.79	0.073	0.26	0.14	f
Barium, total	5/5	0.040	0.030	0.034	0.0019	f
Calcium, total	5/5	39	33	35	1.1	f
Chromium, total	1/5	0.0053	<0.0040	-0.0043	0.00026	0.05
Iron, total	3/5	0.83	<0.050	-0.23	0.15	f
Magnesium, total	5/5	9.9	8.6	9.2	0.27	f
Manganese, total	4/5	0.073	<0.0010	-0.035	0.011	f
Mercury, total	1/5	0.000083	<0.000050	-0.000057	0.0000066	0.002
Phosphorus, total	4/5	0.43	0.17	-0.30	0.051	f
Potassium, total	2/4	2.5	<1.0	-1.7	0.33	f
Sodium, total	5/5	5.4	4.0	4.7	0.27	f
Uranium, total	3/4	0.0010	<0.00010	-0.00058	0.00023	f
Vanadium, total	1/5	0.0028	<0.0020	-0.0022	0.00016	f
Zinc, total	1/5	0.0059	<0.0050	-0.0052	0.00018	f
<b>Others</b>						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	120	95	100	4.3	f
Ammonia, as N (mg/L)	5/5	0.080	0.030	0.042	0.0097	f
Color (CPU)	4/5	9.0	<1.0	-4.4	1.3	f
Total dissolved solids (mg/L)	5/5	190	150	170	6.2	500
Total hardness (mg/L)	5/5	130	120	120	2.8	f
Total suspended solids (mg/L)	2/5	14	<5.0	-7.0	1.8	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
Radionuclides (pCi/L) <sup>g</sup>						
Co-60	1/5	4.3*	-0.27	1.3	0.82	f
Gross alpha	2/5	1.6*	0.27	0.83*	0.26	f
Gross beta	5/5	5.1*	2.1*	4.0*	0.56	f
H-3	1/5	3,000*	-430	560	620	f
Tc-99	2/5	23*	0.19	6.6	4.3	f
Total rad Sr	1/5	2.7*	-0.41	1.1*	0.49	f
Total uranium	3/5	2.1*	0.081	1.1*	0.39	f
Melton Hill Reservoir-Oak Ridge Marina (CRK 80)						
Anions (mg/L)						
Chloride	5/5	3.8	3.2	3.4	0.11	f
Nitrate	5/5	25	1.6	6.9	4.5	f
Sulfate, as SO <sub>4</sub>	5/5	24	16	21	1.3	f
Field Measurements						
Conductivity (mS/cm)	5/5	0.35	0.26	0.29	0.017	f
Dissolved oxygen (ppm)	5/5	11	7.5	9.4	0.78	f
pH (SU)	5/5	8.1	7.8	7.9	0.058	f
Temperature (°C)	5/5	23	8.0	15	2.3	f
Metals (mg/L)						
Aluminum, total	4/5	0.35	<0.050	-0.14	0.054	f
Barium, total	5/5	0.092	0.028	0.045	0.012	f
Calcium, total	5/5	36	31	34	0.89	f
Chromium, total	2/5	0.012	<0.0040	-0.0066	0.0017	0.05
Iron, total	5/5	0.32	0.073	0.14	0.046	f
Magnesium, total	5/5	10	8.8	9.5	0.26	f
Manganese, total	5/5	0.10	0.026	0.066	0.014	f
Phosphorus, total	4/5	0.40	<0.20	-0.28	0.038	f
Potassium, total	2/4	<2.0	<1.0	-1.6	0.22	f
Sodium, total	5/5	5.6	4.0	4.8	0.31	f
Uranium, total	3/4	0.00040	<0.00010	-0.00023	0.000063	f
Vanadium, total	1/5	0.0027	<0.0020	-0.0021	0.00014	f
Zinc, total	3/5	0.020	<0.0050	-0.0084	0.0029	f
Others						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	110	100	110	1.4	f
Ammonia, as N (mg/L)	5/5	0.090	0.030	0.063	0.011	f
Chemical oxygen demand (mg/L)	1/5	7.0	<5.0	-5.4	0.40	f
Color (CPU)	4/5	8.0	<1.0	-4.2	1.2	f
Total dissolved solids (mg/L)	5/5	180	150	170	4.7	500
Total hardness (mg/L)	5/5	130	120	130	2.2	f
Total suspended solids (mg/L)	2/5	10	<5.0	-6.2	0.97	f
Radionuclides (pCi/L) <sup>g</sup>						
Co-60	1/5	3.2*	-1.4	1.8	0.87	f
Gross alpha	2/5	1.3*	-0.65	0.67	0.37	f
Gross beta	4/5	7.6*	0.81	4.4*	1.2	f
Tc-99	1/5	4.9*	-3.8	2.2	1.6	f
Total rad Sr	2/5	3.2*	0.73	1.4*	0.46	f
Total uranium	4/5	3.5*	0.46	1.3*	0.57	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<i>Melton Hill Reservoir above all DOE inputs-Anderson County Filtration Plant (CRK 84)</i>						
Anions (mg/L)						
Chloride	5/5	3.8	3.1	3.4	0.12	f
Nitrate	5/5	3.8	1.3	2.4	0.43	f
Sulfate, as SO <sub>4</sub>	5/5	25	20	22	0.81	f
Field Measurements						
Conductivity (mS/cm)	5/5	0.35	0.26	0.28	0.017	f
Dissolved oxygen (ppm)	5/5	12	7.9	10	0.58	f
pH (SU)	5/5	8.1	7.9	8.0	0.037	f
Temperature (°C)	5/5	18	9.8	15	1.4	f
Metals (mg/L)						
Aluminum, total	5/5	0.34	0.20	0.27	0.023	f
Arsenic, total	1/5	0.050	<0.050	-0.050	0	0.05
Barium, total	5/5	0.19	0.027	0.070	0.030	f
Calcium, total	5/5	36	32	34	0.67	f
Chromium, total	2/5	0.012	<0.0040	-0.0067	0.0017	0.05
Iron, total	5/5	0.41	0.21	0.30	0.032	f
Magnesium, total	5/5	10	8.9	9.6	0.23	f
Manganese, total	5/5	0.16	0.041	0.091	0.020	f
Phosphorus, total	4/5	0.40	<0.20	-0.28	0.037	f
Potassium, total	2/4	<2.0	<1.0	-1.5	0.21	f
Sodium, total	5/5	5.5	3.9	4.8	0.31	f
Uranium, total	3/4	0.00058	<0.00010	-0.00025	0.00011	f
Vanadium, total	1/5	0.0028	<0.0020	-0.0022	0.00016	f
Zinc, total	2/5	0.038	<0.0050	-0.012	0.0063	f
Others						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	110	100	110	2.5	f
Ammonia, as N (mg/L)	5/5	0.080	0.040	0.059	0.0088	f
Color (CPU)	4/5	10	<1.0	-4.8	1.7	f
Total dissolved solids (mg/L)	5/5	180	150	170	5.6	500
Total hardness (mg/L)	5/5	130	120	120	2.8	f
Total suspended solids (mg/L)	3/5	11	<5.0	-6.6	1.2	f
Radionuclides (pCi/L) <sup>g</sup>						
Gross alpha	4/5	2.7*	0.43	1.7*	0.46	f
Gross beta	4/5	4.1*	2.2	2.9*	0.32	f
Total uranium	3/5	3.0*	0.32	1.0	0.50	f
<i>East Fork Poplar Creek downstream from floodplain (EFK 5.4)</i>						
Anions (mg/L)						
Chloride	5/5	23	8.2	16	2.8	f
Fluoride	5/5	19	0.30	4.3	3.7	f
Nitrate	5/5	37	7.0	21	5.3	f
Sulfate, as SO <sub>4</sub>	5/5	41	20	33	4.4	f
Field Measurements						
Conductivity (mS/cm)	5/5	0.43	0.34	0.39	0.019	f
Dissolved oxygen (ppm)	5/5	9.5	7.8	8.7	0.32	5
pH (SU)	5/5	7.9	7.5	7.7	0.071	f
Temperature (°C)	5/5	22	11	16	2.4	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration				Standard error <sup>d</sup>	TWQCE
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>			
<b>Metals (mg/L)</b>							
Aluminum, total	4/5	0.71	<0.050	-0.28	0.12	f	
Arsenic, total	1/5	0.055	<0.050	-0.051	0.00090	0.36	
Barium, total	4/5	0.036	<0.0010	-0.026	0.0064	f	
Calcium, total	5/5	50	38	45	1.9	f	
Iron, total	4/5	0.61	<0.050	-0.20	0.10	f	
Magnesium, total	5/5	11	6.0	8.7	0.96	f	
Manganese, total	4/5	0.065	<0.0010	-0.021	0.011	f	
Mercury, total	3/5	0.00012	<0.000050	-0.000074	0.000013	0.0024	
Phosphorus, total	4/5	0.92	<0.20	-0.48	0.14	f	
Potassium, total	3/4	6.0	<1.0	-3.4	1.1	f	
Sodium, total	5/5	22	6.3	15	3.2	f	
Uranium, total	3/4	0.015	<0.00010	-0.0073	0.0031	f	
Vanadium, total	1/5	0.0020	<0.0020	-0.0020	0	f	
Zinc, total	4/5	0.021	<0.0050	-0.014	0.0028	0.117	
<b>Others</b>							
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	130	98	120	4.9	f	
Ammonia, as N (mg/L)	5/5	0.060	0.040	0.048	0.0049	f	
Biochemical oxygen demand (mg/L)	1/5	8.0	<5.0	-5.6	0.60	f	
Chemical oxygen demand (mg/L)	2/5	12	<5.0	-7.4	1.5	f	
Color (CPU)	5/5	15	3.0	9.0	2.2	f	
Total dissolved solids (mg/L)	5/5	280	150	230	24	f	
Total hardness (mg/L)	5/5	170	110	150	9.5	f	
Total suspended solids (mg/L)	3/5	33	<5.0	-11	5.5	f	
<b>Radionuclides (pCi/L)<sup>g</sup></b>							
Am-241	1/1	0.38*	0.38*	0.38	f	f	
Cm-244	1/1	0.54*	0.54*	0.54	f	f	
Gross alpha	5/5	5.7*	2.0*	4.0*	0.63	f	
Gross beta	4/5	8.6*	0.81	6.6*	1.5	f	
H-3	2/5	3,000*	-320	630	610	f	
Tc-99	4/5	10*	0.54	5.9*	1.8	f	
Total rad Sr	2/5	2.2*	0.54	1.6*	0.30	f	
Total uranium	4/5	5.4*	0.00059	3.6*	0.93	f	
U-234	4/4	2.2*	1.5*	1.9*	0.17	f	
U-235	2/4	0.43*	0.059	0.24*	0.077	f	
U-238	4/4	2.7*	2.2*	2.5*	0.11	f	
<b>East Fork Poplar Creek downstream from the Y-12 Plant (EFK 23.4)</b>							
<b>Anions (mg/L)</b>							
Chloride	5/5	32	21	24	2.2	f	
Fluoride	5/5	1.7	1.0	1.3	0.12	f	
Nitrate	5/5	26	14	19	2.0	f	
Sulfate, as SO <sub>4</sub>	5/5	150	75	98	13	f	
<b>Field Measurements</b>							
Conductivity (mS/cm)	5/5	0.70	0.46	0.57	0.048	f	
Dissolved oxygen (ppm)	5/5	10	8.3	9.0	0.33	5	
pH (SU)	5/5	8.9	7.7	8.2	0.20	f	
Temperature (°C)	5/5	27	16	21	2.4	f	
<b>Metals (mg/L)</b>							
Aluminum, total	5/5	0.27	0.068	0.16	0.040	f	
Barium, total	5/5	0.060	0.043	0.051	0.0030	f	
Calcium, total	5/5	70	50	62	3.4	f	

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
Chromium, total	2/5	0.013	<0.0040	-0.0070	0.0019	0.016
Iron, total	5/5	0.18	0.10	0.14	0.014	f
Magnesium, total	5/5	13	11	11	0.41	f
Manganese, total	5/5	0.082	0.025	0.059	0.011	f
Mercury, total	5/5	0.00092	0.00030	0.00058	0.00010	0.0024
Phosphorus, total	5/5	0.50	0.20	0.35	0.050	f
Potassium, total	3/4	2.5	<1.0	-1.9	0.31	f
Sodium, total	5/5	46	14	22	6.0	f
Uranium, total	4/4	0.020	0.00020	0.012	0.0047	f
Vanadium, total	1/5	0.0047	<0.0020	-0.0025	0.00054	f
Zinc, total	5/5	0.048	0.031	0.041	0.0029	0.117
Others						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	120	95	110	3.9	f
Ammonia, as N (mg/L)	5/5	1.2	0.060	0.30	0.22	f
Biochemical oxygen demand (mg/L)	1/5	6.0	<5.0	-5.2	0.20	f
Chemical oxygen demand (mg/L)	1/5	7.0	<5.0	-5.4	0.40	f
Color (CPU)	4/5	11	<1.0	-6.4	1.7	f
Total dissolved solids (mg/L)	5/5	410	280	340	22	f
Total hardness (mg/L)	5/5	230	180	210	7.4	f
Total suspended solids (mg/L)	1/5	5.0	<5.0	-5.0	0	f
Radionuclides (pCi/L) <sup>g</sup>						
Am-241	1/1	0.86*	0.86*	0.86	f	f
Gross alpha	5/5	16*	5.4*	8.7*	2.0	f
Gross beta	5/5	18*	6.5*	11*	2.2	f
H-3	1/5	620	110	340*	87	f
Pu-238	1/2	0.22	0.18*	0.20*	0.019	f
Pu-239	1/2	0.84*	0.19	0.51	0.32	f
Tc-99	4/5	19*	1.6	8.4*	2.9	f
Total rad Sr	2/5	8.9*	-0.65	2.6	1.6	f
Total uranium	5/5	17*	5.7*	9.4*	2.0	f
U-234	4/4	3.5*	2.7*	3.2*	0.19	f
U-235	3/4	0.46*	-0.054	0.23	0.11	f
U-238	4/4	5.1*	3.0*	3.7*	0.51	f
Volatile Organics (µg/L)						
Chloroform	1/5	U5.0	J1.2	-4.2	0.76	f
<i>Hinds Creek (reference site for East Fork Poplar Creek) (HC)</i>						
Anions (mg/L)						
Chloride	5/5	5.0	3.2	3.9	0.33	f
Fluoride	2/5	0.30	<0.10	-0.16	0.040	f
Nitrate	5/5	3.0	1.4	2.3	0.29	f
Sulfate, as SO <sub>4</sub>	5/5	21	11	14	2.0	f
Field Measurements						
Conductivity (mS/cm)	5/5	0.37	0.30	0.34	0.014	f
Dissolved oxygen (ppm)	5/5	12	6.6	9.2	1.1	5
pH (SU)	5/5	8.1	7.6	7.9	0.097	f
Temperature (°C)	5/5	25	8.0	18	3.3	f
Metals (mg/L)						
Aluminum, total	5/5	0.49	0.13	0.31	0.071	f
Barium, total	5/5	0.054	0.034	0.046	0.0037	f
Calcium, total	5/5	49	42	45	1.2	f
Chromium, total	2/5	0.014	<0.0040	-0.0074	0.0021	0.016

Table 5.30 (continued)

Parameter	N det/ N total	Concentration				Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>			
Iron, total	5/5	0.59	0.16	0.34	0.075	f	
Magnesium, total	5/5	15	9.3	13	0.97	f	
Manganese, total	4/5	0.064	<0.0010	-0.039	0.012	f	
Phosphorus, total	4/5	0.40	<0.20	-0.29	0.039	f	
Potassium, total	3/4	3.4	<1.0	-2.2	0.49	f	
Sodium, total	5/5	3.3	2.0	2.5	0.23	f	
Uranium, total	4/4	0.00057	0.00020	0.00034	0.000079	f	
Vanadium, total	2/5	0.0029	<0.0020	-0.0022	0.00017	f	
Zinc, total	3/5	0.026	<0.0050	-0.0097	0.0042	0.117	
<b>Others</b>							
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	180	130	150	8.2	f	
Ammonia, as N (mg/L)	5/5	0.090	0.040	0.059	0.0093	f	
Chemical oxygen demand (mg/L)	2/5	8.0	<5.0	-6.0	0.63	f	
Color (CPU)	5/5	11	5.0	8.6	1.0	f	
Total dissolved solids (mg/L)	5/5	220	170	200	9.7	f	
Total hardness (mg/L)	5/5	180	140	170	7.2	f	
Total suspended solids (mg/L)	4/5	23	<5.0	-11	3.3	f	
<b>Radionuclides (pCi/L)<sup>g</sup></b>							
Co-60	1/5	4.9*	0.27	2.1*	0.78	f	
Gross alpha	1/5	1.6*	-0.14	0.57	0.29	f	
Gross beta	3/5	6.5*	0.27	2.9*	1.0	f	
H-3	1/5	1,000*	-190	86	230	f	
Total rad Sr	1/5	1.1*	-0.70	0.027	0.31	f	
Total uranium	5/5	3.2*	0.84*	1.4*	0.46	f	
<b>Melton Branch downstream from ORNL (MEK 0.2)</b>							
<b>Anions (mg/L)</b>							
Chloride	5/5	16	8.5	13	1.3	f	
Fluoride	5/5	1.9	0.50	1.2	0.27	f	
Nitrate	4/5	5.0	<1.0	-2.6	0.80	f	
Sulfate, as SO <sub>4</sub>	5/5	210	37	120	28	f	
<b>Field Measurements</b>							
Conductivity (mS/cm)	5/5	0.71	0.043	0.45	0.12	f	
Dissolved oxygen (ppm)	5/5	12	7.4	9.3	1.1	5	
pH (SU)	5/5	8.0	7.5	7.8	0.086	f	
Temperature (°C)	5/5	23	7.6	16	3.1	f	
<b>Metals (mg/L)</b>							
Aluminum, total	5/5	4.1	0.30	1.1	0.75	f	
Arsenic, total	1/5	0.058	<0.050	-0.052	0.0016	0.36	
Barium, total	5/5	1.1	0.043	0.26	0.21	f	
Calcium, total	5/5	93	47	69	8.2	f	
Chromium, total	2/5	0.023	<0.0040	-0.0089	0.0037	0.016	
Copper, total	1/5	0.0081	<0.0070	-0.0072	0.00022	0.018	
Iron, total	5/5	0.46	0.32	0.42	0.025	f	
Magnesium, total	5/5	20	9.0	14	2.0	f	
Manganese, total	5/5	0.27	0.060	0.17	0.037	f	
Phosphorus, total	5/5	0.90	0.20	0.60	0.14	f	
Potassium, total	3/4	4.0	<2.0	-2.9	0.41	f	
Sodium, total	5/5	17	6.3	10	1.9	f	
Uranium, total	4/4	0.0016	0.00030	0.00078	0.00030	f	
Vanadium, total	2/5	0.0024	<0.0020	-0.0021	0.000087	f	
Zinc, total	4/5	1.1	<0.0050	-0.24	0.22	0.117	

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<b>Others</b>						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	140	110	120	5.5	f
Ammonia, as N (mg/L)	5/5	0.080	0.030	0.053	0.0086	f
Chemical oxygen demand (mg/L)	1/5	6.0	<5.0	~5.2	0.20	f
Color (CPU)	4/5	11	<1.0	~6.6	1.7	f
Total dissolved solids (mg/L)	5/5	500	220	360	54	f
Total hardness (mg/L)	5/5	330	170	260	26	f
Total suspended solids (mg/L)	5/5	15	6.0	11	1.7	f
<b>Radionuclides (pCi/L)<sup>g</sup></b>						
Cs-137	1/5	3.0*	-0.27	1.2*	0.56	f
Gross alpha	5/5	6.2*	1.5*	3.5*	0.84	f
Gross beta	5/5	2,500*	1,100*	1,900*	260	f
H-3	5/5	3,000,000*	1,000,000*	1,600,000*	350,000	f
Pu-238	1/1	4.6*	4.6*	4.6	f	f
Tc-99	1/5	2.1*	-3.8	-0.82	1.0	f
Total rad Sr	5/5	1,200*	540*	830*	110	f
Total uranium	5/5	1.6*	0.59*	1.1*	0.20	f
U-234	1/1	0.95*	0.95*	0.95	f	f
U-235	1/1	0.35*	0.35*	0.35	f	f
U-238	1/1	0.32*	0.32*	0.32	f	f
<b>Volatile Organics (µg/L)</b>						
1,2-Dichloroethene	1/5	U5.0	J1.4	-4.3	0.72	f
Trichloroethene	1/5	U5.0	J1.2	-4.2	0.76	f
<b>Melton Branch upstream from ORNL (MEK 2.1)</b>						
<b>Anions (mg/L)</b>						
Chloride	5/5	2.4	1.1	1.6	0.24	f
Fluoride	1/5	0.20	<0.10	-0.12	0.020	f
Nitrate	2/5	2.1	<1.0	-1.2	0.22	f
Sulfate, as SO <sub>4</sub>	5/5	35	6.2	20	6.2	f
<b>Field Measurements</b>						
Conductivity (mS/cm)	5/5	0.37	0.19	0.31	0.034	f
Dissolved oxygen (ppm)	5/5	12	6.1	8.0	0.99	5
pH (SU)	5/5	7.9	7.5	7.8	0.080	f
Temperature (°C)	5/5	23	11	17	2.0	f
<b>Metals (mg/L)</b>						
Aluminum, total	5/5	1.7	0.63	1.0	0.23	f
Arsenic, total	1/5	0.066	<0.050	-0.053	0.0032	0.36
Barium, total	5/5	0.15	0.029	0.065	0.021	f
Beryllium, total	1/5	0.0010	<0.0010	~0.0010	0	f
Calcium, total	5/5	61	28	48	6.2	f
Chromium, total	3/5	0.012	<0.0040	~0.0068	0.0015	0.016
Cobalt, total	1/5	0.0040	<0.0040	-0.0040	0	f
Iron, total	5/5	1.5	0.39	0.82	0.21	f
Magnesium, total	5/5	6.5	3.2	5.2	0.58	f
Manganese, total	5/5	0.13	0.014	0.059	0.020	f
Phosphorus, total	3/5	0.40	<0.20	-0.27	0.037	f
Potassium, total	3/4	2.5	1.6	-1.9	0.19	f
Sodium, total	5/5	6.4	1.3	3.1	0.93	f
Uranium, total	2/4	0.0020	<0.00010	-0.00068	0.00045	f
Vanadium, total	2/5	0.0043	<0.0020	-0.0025	0.00045	f
Zinc, total	4/5	0.018	<0.0050	-0.013	0.0025	0.117

Table 5.30 (continued)

Parameter	N det/ N total	Concentration				Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>			
<b>Others</b>							
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	190	83	140	20	f	
Ammonia, as N (mg/L)	5/5	0.070	0.030	0.044	0.0068	f	
Chemical oxygen demand (mg/L)	3/5	22	<5.0	-9.4	3.2	f	
Color (CPU)	5/5	23	6.0	12	3.2	f	
Total dissolved solids (mg/L)	5/5	230	160	200	13	f	
Total hardness (mg/L)	5/5	190	79	130	21	f	
Total suspended solids (mg/L)	5/5	110	6.0	44	18	f	
<b>Radionuclides (pCi/L)<sup>g</sup></b>							
Gross alpha	3/5	5.1*	-0.054	1.9	0.95	f	
Gross beta	3/5	5.7*	1.4*	2.9*	0.72	f	
H-3	5/5	1,200*	650*	890*	98	f	
Total rad Sr	2/5	2.4	-0.22	1.1	0.51	f	
Total uranium	5/5	3.8*	0.27*	1.8*	0.60	f	
<b>Volatile Organics (µg/L)</b>							
Carbon disulfide	1/5	5.0	U5.0	-5.0	0	f	
<i>Mitchell Branch downstream from the K-25 Site (MIK 0.1)</i>							
<b>Anions (mg/L)</b>							
Chloride	5/5	26	3.1	15	4.1	f	
Fluoride	5/5	0.50	0.20	0.30	0.055	f	
Nitrate	4/5	2.1	<1.0	-1.4	0.21	f	
Sulfate, as SO <sub>4</sub>	5/5	46	16	32	4.9	f	
<b>Field Measurements</b>							
Conductivity (mS/cm)	5/5	0.44	0.25	0.36	0.034	f	
Dissolved oxygen (ppm)	5/5	11	8.4	9.7	0.57	f	
pH (SU)	5/5	8.1	7.5	7.7	0.10	f	
Temperature (°C)	5/5	25	11	18	3.0	f	
<b>Metals (mg/L)</b>							
Aluminum, total	4/5	1.2	<0.050	-0.37	0.21	f	
Barium, total	4/5	0.044	<0.0010	-0.032	0.0081	f	
Calcium, total	5/5	59	29	48	5.9	f	
Chromium, total	3/5	0.0096	<0.0040	-0.0061	0.0011	f	
Copper, total	1/5	0.013	<0.0070	-0.0081	0.0011	f	
Iron, total	4/5	1.7	0.021	-0.55	0.30	f	
Magnesium, total	5/5	11	5.4	9.1	0.97	f	
Manganese, total	5/5	0.20	0.14	0.15	0.011	f	
Mercury, total	1/5	0.000065	<0.000050	-0.000053	0.000030	f	
Nickel, total	3/5	0.016	<0.010	-0.013	0.0013	f	
Phosphorus, total	4/5	0.46	<0.20	-0.31	0.051	f	
Potassium, total	2/4	2.2	<1.0	-1.8	0.27	f	
Sodium, total	5/5	9.2	3.2	6.8	1.1	f	
Uranium, total	4/4	0.016	0.0050	0.012	0.0024	f	
Vanadium, total	1/5	0.0028	<0.0020	-0.0022	0.00016	f	
Zinc, total	2/5	0.032	<0.0050	-0.011	0.0053	f	
<b>Others</b>							
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	150	48	120	20	f	
Ammonia, as N (mg/L)	5/5	0.080	0.060	0.068	0.0037	f	
Chemical oxygen demand (mg/L)	2/5	9.0	<5.0	-6.6	0.98	f	
Color (CPU)	5/5	34	4.0	12	5.6	f	
Total dissolved solids (mg/L)	5/5	300	140	220	28	f	
Total hardness (mg/L)	5/5	190	89	160	20	f	
Total suspended solids (mg/L)	2/5	39	<5.0	-12	6.8	f	



Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<b>Radionuclides (pCi/L)<sup>g</sup></b>						
Gross alpha	5/5	15*	10*	12*	1.1	f
Gross beta	5/5	35*	13*	23*	3.6	f
H-3	2/5	540*	-240	140	140	f
Tc-99	5/5	32*	15*	23*	3.1	f
Total rad Sr	1/5	1.7*	-0.11	0.95*	0.31	f
Total uranium	5/5	14*	4.1*	11*	1.9	f
U-234	4/4	10*	7.3*	8.5*	0.60	f
U-235	3/4	0.65*	0.12	0.37*	0.11	f
U-238	4/4	4.6*	3.0*	3.7*	0.37	f
<b>Volatile Organics (µg/L)</b>						
1,1-Dichloroethane	2/5	U5.0	J1.2	-3.5	0.93	f
1,2-Dichloroethene	5/5	40	6.0	28	6.6	f
Chloroform	2/5	U5.0	J2.9	-4.2	0.48	f
Tetrachloroethene	2/5	U5.0	J1.2	-3.5	0.92	f
Trichloroethene	4/5	50	U5.0	-31	9.6	f
Vinyl chloride	1/5	U10	J4.9	-9.0	1.0	f
cis-1,3-Dichloropropene	1/5	25	U5.0	-9.0	4.0	f
<b>Mitchell Branch upstream from the K-25 Site (MIK 1.4)</b>						
<b>Anions (mg/L)</b>						
Chloride	5/5	2.5	1.5	2.0	0.18	f
Fluoride	4/5	0.40	<0.10	-0.24	0.060	f
Nitrate	3/5	9.5	<1.0	-3.1	1.6	f
Sulfate, as SO <sub>4</sub>	5/5	40	16	26	5.0	f
<b>Field Measurements</b>						
Conductivity (mS/cm)	5/5	0.29	0.17	0.22	0.024	f
Dissolved oxygen (ppm)	5/5	9.2	5.3	7.3	0.72	f
pH (SU)	5/5	7.6	7.0	7.4	0.12	f
Temperature (°C)	5/5	22	8.8	15	2.8	f
<b>Metals (mg/L)</b>						
Aluminum, total	5/5	11	0.24	2.7	2.1	f
Barium, total	4/5	0.18	<0.0010	-0.064	0.030	f
Calcium, total	5/5	34	18	25	3.1	f
Chromium, total	2/5	0.019	<0.0040	-0.0072	0.0030	f
Cobalt, total	1/5	0.015	<0.0040	-0.0063	0.0023	f
Copper, total	2/5	0.020	<0.0070	-0.011	0.0026	f
Iron, total	5/5	17	0.37	4.1	3.2	f
Magnesium, total	5/5	11	5.1	7.7	1.1	f
Manganese, total	5/5	1.7	0.047	0.46	0.32	f
Nickel, total	1/5	0.064	<0.010	-0.021	0.011	f
Phosphorus, total	4/5	0.43	<0.20	-0.31	0.037	f
Potassium, total	3/4	5.8	<1.0	-3.0	1.0	f
Sodium, total	5/5	8.5	2.7	5.5	1.1	f
Uranium, total	1/4	0.0020	<0.00010	-0.00058	0.00048	f
Vanadium, total	2/5	0.019	<0.0020	-0.0056	0.0033	f
Zinc, total	2/5	0.048	<0.0050	-0.014	0.0084	f
<b>Others</b>						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	100	45	74	11	f
Ammonia, as N (mg/L)	4/5	0.070	<0.030	-0.050	0.0089	f
Chemical oxygen demand (mg/L)	3/5	15	<5.0	-8.4	1.8	f
Color (CPU)	5/5	25	6.0	14	3.3	f
Total dissolved solids (mg/L)	5/5	180	71	130	20	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
Total hardness (mg/L)	5/5	180	63	110	21	f
Total suspended solids (mg/L)	2/5	420	<5.0	-100	80	f
Radionuclides (pCi/L) <sup>g</sup>						
Cs-137	2/5	4.3*	0.27	2.5*	0.87	f
Gross alpha	3/5	2.5*	0.054	1.4*	0.50	f
Gross beta	5/5	7.8*	3.2*	5.5*	0.94	f
H-3	1/5	270	-810	-100	220	f
Tc-99	2/5	8.1*	0.73	3.8*	1.5	f
Total rad Sr	1/5	1.8	0.054	1.0*	0.31	f
Total uranium	5/5	6.8*	0.27*	2.2	1.2	f
Poplar Creek downstream from the K-25 Site (PCK 2.2)						
Anions (mg/L)						
Chloride	5/5	11	2.8	6.9	1.6	f
Fluoride	3/5	0.40	<0.10	-0.20	0.055	f
Nitrate	5/5	9.6	2.3	4.2	1.4	f
Sulfate, as SO <sub>4</sub>	5/5	35	24	30	1.7	f
Field Measurements						
Conductivity (mS/cm)	5/5	0.33	0.16	0.27	0.030	f
Dissolved oxygen (ppm)	5/5	12	8.0	9.7	0.75	S
pH (SU)	5/5	8.7	7.8	8.2	0.16	f
Temperature (°C)	5/5	24	9.8	17	3.0	f
Metals (mg/L)						
Aluminum, total	5/5	1.5	0.18	0.76	0.26	f
Barium, total	4/5	0.047	<0.0010	-0.030	0.0077	f
Calcium, total	5/5	41	31	4.1	0.1	f
Chromium, total	1/5	0.0046	<0.0040	-0.0041	0.00012	0.016
Iron, total	5/5	1.6	0.27	0.85	0.24	f
Magnesium, total	5/5	9.8	4.8	8.1	0.95	f
Manganese, total	5/5	0.12	0.058	0.094	0.011	f
Mercury, total	1/5	0.000051	<0.000050	-0.000050	0.0000020	0.0024
Phosphorus, total	4/5	0.48	<0.20	-0.30	0.050	f
Potassium, total	3/4	2.8	<1.0	-2.1	0.38	f
Sodium, total	5/5	9.1	2.0	5.9	1.3	f
Thallium, total	1/4	0.0070	<0.0050	-0.0055	0.00050	f
Uranium, total	3/4	0.0031	<0.00010	-0.0020	0.00070	f
Vanadium, total	2/5	0.0031	<0.0020	-0.0023	0.00021	f
Zinc, total	4/5	0.013	<0.0050	-0.0090	0.0013	0.117
Others						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	110	50	87	12	f
Ammonia, as N (mg/L)	5/5	0.060	0.030	0.048	0.0049	f
Chemical oxygen demand (mg/L)	2/5	16	<5.0	-8.6	2.3	f
Color (CFU)	5/5	14	7.0	10	1.3	f
Total dissolved solids (mg/L)	5/5	200	110	150	19	f
Total hardness (mg/L)	5/5	150	68	110	14	f
Total suspended solids (mg/L)	5/5	23	15	19	1.4	f
Radionuclides (pCi/L) <sup>g</sup>						
Gross alpha	2/5	3.2*	0.92	1.6*	0.45	f
Gross beta	5/5	8.6*	3.0*	5.8*	0.91	f
H-3	2/5	3,000*	-540	560	630	f
Tc-99	1/5	8.4*	-4.1	2.6	2.0	f
Total uranium	4/5	2.2*	0.00022	1.2*	0.39	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
Total rad Sr	1/5	2.2*	-0.81	0.92	0.51	f
U-234	1/1	1.9*	1.9*	1.9	f	f
U-238	1/1	1.6*	1.6*	1.6	f	f
Volatile Organics (µg/L)						
Carbon disulfide	1/5	U5.0	J4.0	-4.8	0.20	f
Poplar Creek upstream from the K-25 Site and East Fork Poplar Creek (PCK 22)						
Anions (mg/L)						
Chloride	5/5	5.9	2.0	4.0	0.72	f
Fluoride	1/5	0.20	<0.10	-0.12	0.020	f
Nitrate	5/5	3.3	1.1	2.2	0.45	f
Sulfate, as SO <sub>4</sub>	5/5	47	32	38	3.1	f
Field Measurements						
Conductivity (mS/cm)	5/5	0.34	0.22	0.28	0.023	f
Dissolved oxygen (ppm)	5/5	11	4.2	7.7	1.1	5
pH (SU)	5/5	8.0	7.4	7.6	0.10	f
Temperature (°C)	5/5	22	10	16	2.5	f
Metals (mg/L)						
Aluminum, total	4/5	0.46	<0.050	-0.31	0.072	f
Arsenic, total	1/5	0.053	<0.050	-0.051	0.00062	0.36
Barium, total	5/5	0.058	0.031	0.046	0.0055	f
Calcium, total	5/5	40	20	32	3.9	f
Chromium, total	1/5	0.010	<0.0040	-0.0052	0.0012	0.016
Iron, total	4/5	0.62	<0.050	-0.38	0.11	f
Magnesium, total	5/5	12	7.0	10	1.1	f
Manganese, total	5/5	0.28	0.13	0.16	0.029	f
Nickel, total	1/5	0.010	<0.010	-0.010	0	1.4
Phosphorus, total	3/5	0.37	<0.20	-0.26	0.034	f
Potassium, total	2/4	2.6	<1.0	-1.9	0.32	f
Sodium, total	5/5	5.7	2.5	4.4	0.63	f
Uranium, total	1/4	0.0020	<0.00010	-0.00058	0.00048	f
Zinc, total	2/5	0.011	<0.0050	-0.0069	0.0012	0.117
Others						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	140	50	94	18	f
Ammonia, as N (mg/L)	5/5	0.28	0.050	0.15	0.041	f
Chemical oxygen demand (mg/L)	2/5	6.0	<5.0	-5.2	0.20	f
Color (CPU)	4/5	15	<1.0	-8.8	2.3	f
Total dissolved solids (mg/L)	5/5	240	97	180	25	f
Total hardness (mg/L)	5/5	160	78	130	17	f
Total suspended solids (mg/L)	4/5	24	<5.0	-13	3.6	f
Radionuclides (pCi/L) <sup>g</sup>						
Co-60	2/5	5.1*	-0.81	1.5	1.2	f
Gross alpha	3/5	1.5*	0.27	1.1*	0.22	f
Gross beta	5/5	5.9*	3.2*	4.2*	0.46	f
H-3	2/5	2,700*	-54	840	530	f
Tc-99	1/5	8.4*	-2.7	2.0	1.8	f
Total rad Sr	1/5	1.7*	-0.89	0.78	0.46	f
Total uranium	3/5	1.2*	0.22	0.54*	0.18	f
Volatile Organics (µg/L)						
Acetone	1/5	45	U10	-17	7.0	f
Carbon disulfide	1/5	24	U5.0	-8.8	3.8	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<i>Water supply intake for City of Kingston (TRK 915)</i>						
<b>Anions (mg/L)</b>						
Chloride	5/5	11	4.0	7.6	1.4	f
Fluoride	4/5	0.40	<0.10	-0.28	0.058	f
Nitrate	5/5	9.6	1.0	3.7	1.6	f
Sulfate, as SO <sub>4</sub>	5/5	18	9.0	13	1.6	f
<b>Field Measurements</b>						
Conductivity (mS/cm)	5/5	0.20	0.14	0.18	0.011	f
Dissolved oxygen (ppm)	5/5	11	6.6	8.6	0.74	f
pH (SU)	5/5	7.9	7.7	7.8	0.037	f
Temperature (°C)	5/5	25	10	18	3.1	f
<b>Metals (mg/L)</b>						
Aluminum, total	5/5	0.42	0.21	0.28	0.037	f
Barium, total	5/5	0.036	0.021	0.025	0.0026	f
Calcium, total	5/5	23	16	19	1.3	f
Chromium, total	1/5	0.0058	<0.0040	-0.0044	0.00036	0.05
Iron, total	4/5	0.58	<0.050	-0.28	0.084	f
Magnesium, total	5/5	5.2	3.6	4.3	0.28	f
Manganese, total	5/5	0.053	0.011	0.043	0.0081	f
Phosphorus, total	4/5	0.39	0.17	-0.28	0.040	f
Potassium, total	1/4	<2.0	<1.0	-1.6	0.24	f
Sodium, total	5/5	12	4.3	7.2	1.4	f
Uranium, total	2/4	0.0010	<0.00010	-0.00035	0.00022	f
<b>Others</b>						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	80	48	58	6.0	f
Ammonia, as N (mg/L)	5/5	0.070	0.040	0.050	0.0055	f
Chemical oxygen demand (mg/L)	1/5	18	<5.0	-7.6	2.6	f
Color (CPU)	5/5	20	3.0	10	3.0	f
Total dissolved solids (mg/L)	5/5	140	77	100	10	500
Total hardness (mg/L)	5/5	84	55	64	5.5	f
Total suspended solids (mg/L)	4/5	12	<5.0	-7.2	1.2	f
<b>Radionuclides (pCi/L)<sup>g</sup></b>						
Cs-137	1/5	3.0*	-0.27	0.70	0.60	f
Gross alpha	2/5	1.6*	-0.46	0.73	0.35	f
Gross beta	5/5	7.0*	2.4*	3.9*	0.82	f
H-3	1/5	2,700*	-380	530	560	f
Tc-99	1/5	7.3*	-1.9	2.4	1.6	f
Total uranium	5/5	5.9*	0.30*	1.9	1.1	f

*White Oak Lake at White Oak Dam (WCK 1.0)*

<b>Anions (mg/L)</b>						
Chloride	5/5	11	2.5	7.1	1.6	f
Fluoride	5/5	1.0	0.40	0.72	0.12	f
Nitrate	4/5	2.6	<1.0	-1.9	0.34	f
Sulfate, as SO <sub>4</sub>	5/5	62	25	49	7.1	f
<b>Field Measurements</b>						
Conductivity (mS/cm)	5/5	0.44	0.32	0.37	0.022	f
Dissolved oxygen (ppm)	5/5	11	7.0	8.3	0.74	S
pH (SU)	5/5	8.4	7.5	8.0	0.20	f
Temperature (°C)	5/5	27	6.0	19	3.8	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<b>Metals (mg/L)</b>						
Aluminum, total	5/5	2.2	0.31	1.1	0.35	f
Barium, total	5/5	0.17	0.032	0.067	0.027	f
Calcium, total	5/5	50	36	41	2.4	f
Chromium, total	5/5	0.023	0.0068	0.015	0.0032	0.016
Cobalt, total	1/5	0.0077	<0.0040	-0.0047	0.00074	f
Iron, total	5/5	1.4	0.37	0.86	0.20	f
Magnesium, total	5/5	11	6.5	8.6	0.89	f
Manganese, total	5/5	0.22	0.069	0.14	0.025	f
Mercury, total	1/5	0.000095	<0.000050	-0.000059	0.0000090	0.0024
Phosphorus, total	4/5	0.50	<0.20	-0.36	0.051	f
Potassium, total	3/4	2.7	<1.0	-2.0	0.38	f
Sodium, total	5/5	19	6.8	13	2.6	f
Uranium, total	4/4	0.010	0.00093	0.0041	0.0020	f
Vanadium, total	4/5	0.0037	<0.0020	-0.0029	0.00032	f
Zinc, total	5/5	0.030	0.017	0.024	0.0024	0.117
<b>Others</b>						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	120	95	110	4.6	f
Ammonia, as N (mg/L)	5/5	0.11	0.051	0.074	0.010	f
Biochemical oxygen demand (mg/L)	1/5	7.0	<5.0	-5.4	0.40	f
Chemical oxygen demand (mg/L)	3/5	10	<5.0	-7.0	0.95	f
Color (CPU)	5/5	17	4.0	-11	2.5	f
Total dissolved solids (mg/L)	5/5	270	160	220	19	f
Total hardness (mg/L)	5/5	170	120	140	8.5	f
Total suspended solids (mg/L)	5/5	38	6.0	18	5.5	f
<b>Radionuclides (pCi/L)<sup>g</sup></b>						
Co-60	3/5	5.9*	0.81	3.8*	0.92	f
Cs-137	5/5	100*	30*	64*	12	f
Gross alpha	5/5	12*	3.2*	6.1*	1.6	f
Gross beta	5/5	510*	320*	410*	33	f
H-3	5/5	160,000*	38,000*	100,000*	26,000	f
Pu-239	1/2	0.27*	0.14	0.20	0.068	f
Tc-99	5/5	35*	14*	20*	3.7	f
Total rad Sr	5/5	200*	110*	170*	17	f
Total uranium	5/5	5.7*	3.2*	4.5*	0.45	f
U-234	4/4	3.8*	3.0*	3.3*	0.17	f
U-235	2/4	0.32*	0.057	0.20*	0.067	f
U-238	4/4	1.1*	0.54*	0.83*	0.15	f
<b>Volatile Organics (µg/L)</b>						
Acetone	1/6	U10	J7.8	-9.6	0.37	f

## White Oak Creek downstream from ORNL (WCK 2.6)

<b>Anions (mg/L)</b>						
Chloride	5/5	15	4.7	11	1.7	f
Fluoride	5/5	1.2	0.50	0.88	0.16	f
Nitrate	5/5	11	3.0	6.1	1.4	f
Sulfate, as SO <sub>4</sub>	5/5	62	28	44	5.6	f
<b>Field Measurements</b>						
Conductivity (mS/cm)	5/5	0.42	0.21	0.34	0.037	f
Dissolved oxygen (ppm)	5/5	11	8.0	9.1	0.57	5
pH (SU)	5/5	8.2	7.6	8.0	0.11	f
Temperature (°C)	5/5	26	11	19	2.7	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
<b>Metals (mg/L)</b>						
Aluminum, total	5/5	0.96	0.069	0.30	0.17	f
Barium, total	5/5	0.039	0.031	0.033	0.0016	f
Calcium, total	5/5	47	26	38	3.5	f
Chromium, total	2/5	0.011	<0.0040	-0.0063	0.0014	0.016
Copper, total	2/5	0.017	<0.0070	-0.0090	0.0019	0.018
Iron, total	5/5	1.2	0.070	0.34	0.22	f
Magnesium, total	5/5	9.8	4.9	8.3	0.89	f
Manganese, total	5/5	0.17	0.0035	0.055	0.030	f
Mercury, total	1/5	0.00017	<0.000050	-0.000074	0.000024	0.0024
Phosphorus, total	4/5	0.50	<0.20	-0.38	0.057	f
Potassium, total	3/4	2.2	<1.0	-1.9	0.30	f
Sodium, total	5/5	20	8.4	15	2.0	f
Uranium, total	4/4	0.0016	0.00030	0.00093	0.00031	f
Vanadium, total	1/5	0.0021	<0.0020	-0.0020	0.000020	f
Zinc, total	5/5	0.14	0.015	0.045	0.024	0.117
<b>Others</b>						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	120	55	100	11	f
Ammonia, as N (mg/L)	5/5	0.17	0.030	0.076	0.025	f
Chemical oxygen demand (mg/L)	1/5	21	<5.0	-8.2	3.2	f
Color (CPU)	4/5	13	<1.0	-5.4	2.1	f
Total dissolved solids (mg/L)	5/5	260	150	210	19	f
Total hardness (mg/L)	5/5	150	79	130	13	f
Total suspended solids (mg/L)	2/5	53	<5.0	-17	9.3	f
<b>Radionuclides (pCi/L)<sup>g</sup></b>						
Am-241	1/1	0.30*	0.30*	0.30	f	f
Co-60	1/5	5.7*	0.27	2.7*	0.90	f
Cs-137	5/5	490*	51*	150	85	f
Gross alpha	5/5	9.5*	1.3*	4.3*	1.4	f
Gross beta	5/5	320*	160*	230*	30	f
H-3	5/5	43,000*	2,700*	16,000*	7,100	f
Tc-99	2/5	7.0*	-2.2	2.4	1.6	f
Total rad Sr	5/5	140*	35*	70*	19	f
Total uranium	5/5	4.3*	2.3*	3.3*	0.37	f
U-234	2/2	3.2*	2.4*	2.8*	0.41	f
U-238	2/2	1.1*	0.46*	0.78	0.32	f
<b>Volatile Organics (µg/L)</b>						
Chloroform	3/5	US.0	JI.7	-3.1	0.76	f
<b>White Oak Creek upstream from ORNL (WCK 6.8)</b>						
<b>Anions (mg/L)</b>						
Chloride	3/5	1.2	<0.10	-0.68	0.24	f
Sulfate, as SO <sub>4</sub>	5/5	4.1	1.8	3.0	0.47	f
<b>Field Measurements</b>						
Conductivity (mS/cm)	5/5	0.29	0.15	0.24	0.024	f
Dissolved oxygen (ppm)	5/5	11	8.9	9.7	0.40	5
pH (SU)	5/5	8.1	7.5	7.9	0.13	f
Temperature (°C)	5/5	21	13	17	1.6	f
<b>Metals (mg/L)</b>						
Aluminum, total	3/5	0.30	<0.050	-0.14	0.051	f
Barium, total	5/5	0.10	0.033	0.075	0.013	f
Calcium, total	5/5	32	14	26	3.2	f

Table 5.30 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>	TWQC <sup>e</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>		
Chromium, total	2/5	0.014	<0.0040	-0.0076	0.0022	0.016
Iron, total	3/5	0.22	<0.050	-0.11	0.034	f
Magnesium, total	5/5	16	6.1	13	1.8	f
Manganese, total	5/5	0.029	0.0058	0.012	0.0044	f
Phosphorus, total	3/5	0.30	<0.20	-0.23	0.022	f
Sodium, total	5/5	0.51	0.37	0.46	0.025	f
Uranium, total	4/4	0.00040	0.00020	0.00033	0.000048	f
Vanadium, total	1/5	0.0051	<0.0020	-0.0026	0.00062	f
Zinc, total	4/5	0.023	<0.0050	-0.015	0.0035	0.117
Others						
Alkalinity (mg CaCO <sub>3</sub> /L)	5/5	150	63	120	16	f
Ammonia, as N (mg/L)	5/5	0.060	0.020	0.035	0.0067	f
Chemical oxygen demand (mg/L)	1/5	5.0	<5.0	-5.0	0	f
Color (CPU)	4/5	7.0	<1.0	-3.8	1.2	f
Total dissolved solids (mg/L)	5/5	170	67	130	17	f
Total hardness (mg/L)	5/5	150	63	120	15	f
Radionuclides (pCi/L) <sup>g</sup>						
Co-60	1/5	8.9*	-2.7	2.6	1.9	f
Gross alpha	3/5	2.7*	-0.84	1.1	0.70	f
Gross beta	2/5	8.1*	-1.6	2.3	1.6	f
Tc-99	1/5	3.2	-0.81	1.7*	0.73	f
Total rad Sr	1/5	3.8*	0.97	1.8*	0.51	f
Total uranium	5/5	2.2*	0.38*	1.2*	0.31	f

<sup>a</sup>All values were included in the calculations. Only parameters that have detections in one or more samples are listed in the table. The sampling and analysis plan contains a complete list of analyses performed.

<sup>b</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; "U" indicates the value for an organic parameter was undetected at the analytical detection limit; "JB" indicates the value was estimated at or below the analytical detection limit and was found in the laboratory blank; and "J" indicates the value was estimated at or below the analytical detection limit by the laboratory.

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

<sup>d</sup>Standard error of the mean.

<sup>e</sup>Tennessee General Water Quality Criteria (TWQC) for Domestic Water Supplies, as amended, are shown at locations CRK 16, CRK 23, CRK 32, CRK 58, CRK 66, CRK 80, CRK 84, and TRK 915. Tennessee General Water Quality Criteria (TWQC) for Freshwater Fish and Aquatic Life, as amended, are shown at locations BCK 0.6, BCK 9.4, EFK 23.4, EFK 5.4, HC, MEK 0.2, MEK 2.1, PCK 2.2, PCK 22, WCK 1.0, WCK 2.6, and WCK 6.8.

<sup>f</sup>Not applicable.

<sup>g</sup>Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

Table 5.31. 1993 K-25 Site surface water parameters detected at K-901-A

Parameter	Number detected/ number of samples	Detected results <sup>b</sup>			Reference value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
Alkalinity	c/4	140	110	120	c	c
Calcium hardness	c/4	97	78	85	c	c
Chemical oxygen demand	3/4	14	<5	<10	c	c
Chloride	4/4	6.4	1.9	3.2	c	c
Chlorine	3/3	0.1	0.06	0.087	c	c
Color hue	c/4	500	490	500	c	c
Conductivity µmho/cm	c/4	270	250	260	c	c
Dissolved oxygen	c/4	9.8	3.4	5.8	5.0 min	2
Dissolved solids	4/4	200	120	160	c	c
Fluoride	4/4	0.2	0.1	0.15	c	c
Iron	4/4	1.6	0.24	1.1	c	c
Manganese	4/4	0.13	0.031	0.084	c	c
Mercury	1/4	0.0002	<0.00020	<0.00020	0.0024	0
Nitrate	2/4	0.41	<0.1	<0.23	c	c
pH (standard units)	c/4	8.7	7.2	7.9	c	1
Potassium	4/4	2.9	1.2	2.3	c	c
Sodium	4/4	1.7	1.1	1.3	c	c
Sulfate	4/4	19	6.1	10	c	c
Suspended solids	4/4	32	7	18	c	c
Temperature °C	c/4	29	5.3	18	30.5	0
Total phosphate as phosphorus	4/4	0.22	0.06	0.11	c	c

<sup>a</sup>Reference values are Tennessee Water Quality Criteria for Fish and Aquatic Life.

<sup>b</sup>Units in mg/L unless otherwise noted.

<sup>c</sup>Not applicable.



Table 5.32. 1993 K-25 Site surface water parameters detected at K-716

Parameter	Number detected/ number of samples	Detected results <sup>b</sup>			Reference value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
Alkalinity	c/4	130	51	97	c	c
Biological oxygen demand	c/4	5.3	5	5.1	c	c
Calcium hardness	c/4	91	49	73	c	c
Chemical oxygen demand	2/4	14	<5	<7.8	c	c
Chloride	4/4	10	7	8.7	c	c
Chlorine	3/3	0.09	0.02	0.067	c	c
Color hue	c/4	590	490	520	c	c
Conductivity µmho/cm	c/4	300	170	260	c	c
Dissolved oxygen	c/4	12	9.3	10	5.0 min	0
Dissolved solids	4/4	210	110	170	c	c
Fluoride	2/4	0.2	<0.1	<0.15	c	c
Iron	4/4	1.7	0.46	1.1	c	c
Manganese	4/4	0.11	0.048	0.086	c	c
Mercury	2/4	0.00025	<0.0002	<0.0002	0.0024	0
Nitrate	4/4	0.9	<0.64	<0.80	c	c
pH (standard units)	c/4	8.9	7	8.1	c	c
Potassium	4/4	3.1	1.6	2.2	c	c
Sodium	4/4	7.7	4.5	6.7	c	c
Sulfate	4/4	44	23	30	c	c
Suspended solids	4/4	49	12	29	c	c
Temperature °C	c/4	25	5	17	30.5	0
Total phosphate as phosphorus	4/4	0.22	0.12	0.16	c	c
Zinc	1/4	<0.02	0.011	<0.018	0.117	0

<sup>a</sup>Reference values are Tennessee Water Quality Criteria for Fish and Aquatic Life.

<sup>b</sup>Units in mg/L unless otherwise noted.

<sup>c</sup>Not applicable.

Table 5.33. 1993 K-25 Site surface water parameters detected at K-1007-B

Parameter	Number detected/ number of samples	Detected results <sup>b</sup>			Reference value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
Alkalinity	c/4	108	75	96	c	c
Calcium hardness	c/4	91	48	74	c	c
Chemical oxygen demand	3/4	40	<5	<17	c	c
Chloride	4/4	11	9.4	10	c	c
Chlorine	3/3	0.12	0.04	0.08	c	c
Color hue	c/4	500	490	500	c	c
Conductivity µmho/cm	c/4	590	220	340	c	c
Dissolved oxygen	4/4	12	7.5	9.9	5.0 min	0
Dissolved solids	4/4	190	140	160	c	c
Fluoride	4/4	0.10	0.10	0.10	c	c
Iron	4/4	0.61	0.12	0.33	c	c
Manganese	4/4	0.11	0.04	0.06	c	c
Nickel	1/4	<0.05	0.012	<0.04	1.4	0
Nitrate	3/4	0.45	<0.10	<0.23	c	c
pH (standard units)	c/4	9.00	7.80	8.6	c	c
Potassium	4/4	2.90	1.90	2.2	c	c
Sodium	4/4	4.9	4	4.6	c	c
Sulfate	4/4	28	20	23	c	c
Suspended solids	4/4	24	5	13	c	c
Temperature °C	c/4	30	6.30	19	30.5	0
Total phosphate as phosphorus	4/4	0.17	0.06	0.12	c	c
Zinc	2/4	0.03	<0.02	<0.02	0.12	0

<sup>a</sup>Reference values are Tennessee Water Quality Criteria for Fish and Aquatic Life.

<sup>b</sup>Units in mg/L unless otherwise noted.

<sup>c</sup>Not applicable.

Table 5.34. 1993 K-25 Site surface water parameters detected at K-1700

Parameter	Number detected/ number of samples	Detected results <sup>b</sup>			Reference value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
1,2 Dichloroethene	4/4	0.022	0.006	0.011	c	c
Alkalinity	c/4	160	64	92	c	c
Calcium hardness	c/4	130	59	82	c	c
Chemical oxygen demand	2/4	14	<5	<8.5	c	c
Chloride	4/4	39	4	17	c	c
Chlorine	4/4	0.1	0.01	0.045	c	c
Color hue	c/4	500	490	500	c	c
Conductivity µmho/cm	c/4	400	180	270	c	c
Dissolved oxygen	c/5	12	7.6	8.8	5.0 min	0
Dissolved solids	4/4	260	130	200	c	c
Fluoride	4/4	0.2	0.1	0.15	c	c
Iron	4/4	0.82	0.39	0.68	c	c
Lead	2/4	0.011	<0.004	<0.0058	0.082	0
Manganese	4/4	0.27	0.11	0.19	c	c
Mercury	1/4	0.00022	<0.00020	<0.00020	0.0024	0
Nickel	1/4	<0.05	0.028	<0.045	1.4	0
Nitrate	4/4	0.62	0.29	0.48	c	c
pH (standard units)	c/5	8	7.3	7.7	c	c
Phosphate	4/4	0.17	0.1	0.14	c	c
Potassium	4/4	2.4	1.5	2.0	c	c
Sodium	4/4	40	2.8	14	c	c
Sulfate	4/4	39	16	25	c	c
Suspended solids	3/4	12	<1	<7.8	c	c
Temperature °C	c/4	23	8.2	16	30.5	0
Trichloroethene	4/4	0.027	0.007	0.014	0.807	0
Zinc	3/4	0.056	<0.02	<0.035	0.117	0

<sup>a</sup>Reference values are Tennessee Water Quality Criteria for Fish and Aquatic Life.

<sup>b</sup>Units in mg/L unless otherwise noted.

<sup>c</sup>Not applicable.

Table 5.35. 1993 K-25 Site surface water parameters detected at K-1710

Parameter	Number detected/ number of samples	Detected results <sup>b</sup>			Reference value <sup>d</sup>	Number of values exceeding reference
		Max	Min	Avg		
Alkalinity	c/4	130	47	87	c	c
Calcium hardness	c/4	92	48	73	c	c
Chemical oxygen demand	1/4	7	<5	<5.5	c	c
Chloride	4/4	10	5	8.2	c	c
Chlorine	3/3	0.1	0.03	0.077	c	c
Color hue	c/4	590	490	520	c	c
Conductivity µmho/cm	c/4	340	170	260	c	c
Dissolved oxygen	c/4	12	4.6	7.7	5.0 min	1
Dissolved solids	4/4	200	110	170	c	c
Fluoride	4/4	0.3	0.1	0.2	c	c
Iron	4/4	2.8	0.38	1.1	c	c
Lead	1/4	0.0063	<0.004	<0.0046	0.082	0
Manganese	4/4	0.17	0.075	0.11	c	c
Mercury	2/4	0.00034	<0.0002	<0.00024	0.0024	0
Nitrate	4/4	1.6	0.59	1.1	c	c
pH (standard units)	c/4	8	7	7.5	c	c
Potassium	4/4	3.9	1.6	2.8	c	c
Sodium	4/4	8.4	4.8	6.5	c	c
Sulfate	4/4	49	22	31	c	c
Suspended solids	4/4	36	7	19	c	c
Temperature °C	c/4	26	7.2	18	30.5	0
Total phosphate as phosphorus	4/4	0.26	0.12	0.18	c	c
Zinc	1/4	<0.02	0.01	<0.018	0.117	0

<sup>a</sup>Reference values are Tennessee Water Quality Criteria for Fish and Aquatic Life.

<sup>b</sup>Units in mg/L unless otherwise noted.

<sup>c</sup>Not applicable.

Table 5.36. 1993 K-25 Site surface water parameters detected at WFPC

Parameter	Number detected/ number of samples	Detected results <sup>b</sup>			Reference value <sup>a</sup>	Number of values exceeding reference
		Max	Min	Avg		
Alkalinity	c/4	140	27	81	c	c
Calcium hardness	c/4	90	30	66	c	c
Chemical oxygen demand	2/4	7	<5	<6	c	c
Chloride	4/4	6.9	2	4.8	c	c
Chlorine	3/3	0.12	0.05	0.077	c	c
Color hue	c/4	590	490	520	c	c
Conductivity µmho/cm	c/4	320	120	240	c	c
Dissolved oxygen	c/4	12	4.3	7.4	5.0 min	1
Dissolved solids	4/4	190	82	160	c	c
Fluoride	2/4	0.2	<0.1	<0.13	c	c
Iron	4/4	2.4	0.22	1.1	c	c
Manganese	4/4	0.22	0.11	0.16	c	c
Nitrate	4/4	0.62	0.28	0.43	c	c
pH (standard units)	c/4	7.8	7	7.4	c	c
Potassium	4/4	3.6	1.3	2.5	c	c
Sodium	4/4	5.7	2.1	4.1	c	c
Sulfate	4/4	60	18	32	c	c
Suspended solids	4/4	41	10	31	c	c
Temperature °C	c/4	26	6.2	17	30.5	0
Total phosphate as phosphorus	4/4	0.12	0.06	0.1	c	c
Zinc	1/4	<0.02	0.0097	<0.017	0.117	0

<sup>a</sup>Reference values are Tennessee Water Quality Criteria for Fish and Aquatic Life.

<sup>b</sup>Units in mg/L unless otherwise noted.

<sup>c</sup>Not applicable.

Table 5.37. Summary of constituents detected in off-site residential groundwater during 1993

Parameter	Number detected/ number total	Detected results			Reference value	Number of values exceeding reference [ref] <sup>f</sup>
		Max	Min <sup>d</sup>	Avg <sup>b</sup>		
<b>Anions, Unfiltered (mg/L)</b>						
Chloride	35/35	68	1.0	7.7	250	0 [3]
Fluoride	15/35	7.0	0.10	1.3	4	2 [2]
Nitrate	23/35	14	1.1	3.9	10	2 [2]
Sulfate, as SO <sub>4</sub>	34/35	62	1.0	12	250	0 [3]
<b>Field measurements, unfiltered</b>						
Conductivity (mS/cm)	35/35	1.9	0.12	0.48	<i>d</i>	[ <i>d</i> ]
Temperature (°C)	35/35	25	7.1	16	30.5	0 [1]
pH (SU)	35/35	8.6	6.9	7.4	(6.5, 8.5)	1 [3]
<b>Metals, unfiltered (mg/L)</b>						
Barium total	35/35	0.14	0.0025	0.072	2	0 [2]
Calcium, total	35/35	110	1.0	45	<i>d</i>	[ <i>d</i> ]
Chromium, total	1/35	0.011	0.011	0.011	0.05	0 [1]
Cobalt, total	1/35	0.0044	0.0044	0.0044	<i>d</i>	[ <i>d</i> ]
Copper, total	22/35	0.071	0.0081	0.020	1.3	0 [2]
Iron, total	10/35	0.34	0.052	0.17	0.3	1 [3]
Lead, total	4/35	0.025	0.0043	0.011	0.015	1 [2]
Magnesium, total	35/35	35	0.42	13	<i>d</i>	[ <i>d</i> ]
Manganese, total	13/35	0.31	0.0013	0.031	0.05	1 [3]
Mercury, total	3/35	0.000055	0.000051	0.000053	0.002	0 [1]
Sodium, total	35/35	470	0.50	41	<i>d</i>	[ <i>d</i> ]
Uranium, total	24/35	0.0015	0.00010	0.00044	<i>d</i>	[ <i>d</i> ]
Vanadium, total	3/35	0.0023	0.0020	0.0021	<i>d</i>	[ <i>d</i> ]
Zinc, total	28/35	0.66	0.0050	0.14	5	0 [3]
<b>Radionuclides, unfiltered (pCi/L)<sup>e</sup></b>						
<sup>60</sup> Co	2/35	4.3*	2.3*	3.3	200	0 [4]
<sup>137</sup> Cs	2/35	4.3*	3.5*	3.9	120	0 [4]
Gross alpha	20/35	18*	1.2*	3.3	15	1 [2]
Gross beta	27/35	17*	1.8*	6.3	50	0 [2]
<sup>3</sup> H	1/35	1,200*	1,200*	1,200	20,000	0 [2]
<sup>99</sup> Tc	9/35	12*	4.1*	6.4	4,000	0 [4]
Total rad Sr	10/35	2.7*	1.4*	2.0	8	0 [2]
<b>Volatile organics, unfiltered (µg/L)</b>						
Bromodichloromethane	1/35	5.6	5.6	5.6	100	0 [2]
Chloroform	3/35	13	B6.0	-10	100	0 [2]

<sup>a</sup>Prefix "B" indicates the compound was found in the laboratory blank.

<sup>b</sup>A tilde (~) indicates that estimated values and/or detection limits were used in the calculation of the average.

<sup>c</sup>If a reference limit exists, the source is coded as: (1) Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended. (2) 40 CFR Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended. (3) 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended. (4) DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

<sup>d</sup>Not applicable.

<sup>e</sup>Individual radionuclide concentrations significantly greater than zero are identified by an \*.

Table 5.38. Concentration of radioactivity in soil samples taken in the vicinity of the K-25 Site (pCi/g)<sup>a</sup>

Parameter	S1	S2	S3	S4	S5	S6	S7	Max	Min	Median	Average
Alpha	2.14E+00	4.13E+00	3.41E-01	1.74E+00	3.98E+00	1.20E+00	2.69E+00	4.13E+00	3.41E-01	2.14E+00	2.32E+00
Beta	5.28E+00	-3.52E+00	-6.20E+00	-4.93E+00	-2.67E+00	-5.15E+00	-3.42E+00	5.28E+00	-6.20E+00	-3.52E+00	-2.94E+00
<sup>137</sup> Cs	1.67E+00	-9.62E+00	1.08E+00	-3.79E+00	3.40E+00	-1.63E+00	3.63E+00	3.63E+00	-9.62E+00	1.08E+00	-7.51E-01
<sup>237</sup> Np	6.07E-01	1.64E+01	0.00E+00	0.00E+00	6.21E-01	1.56E+00	0.00E+00	1.64E+01	0.00E+00	6.07E-01	2.74E+00
<sup>239</sup> Pu	0.00E+00	-1.23E-01	-1.23E-01	1.40E-01	2.61E-01	-1.05E-01	-1.21E-01	2.61E-01	-1.23E-01	-1.05E-01	-1.01E-02
<sup>239</sup> Pu	1.29E-01	-1.23E-01	0.00E+00	4.20E-01	1.31E-01	-1.05E-01	1.21E-01	4.20E-01	-1.23E-01	1.21E-01	8.19E-02
<sup>240m</sup> Pa	b	b	b	b	b	1.06E+03	b	1.06E+03	0.00E+00	0.00E+00	1.51E+02
<sup>99</sup> Tc	-3.27E-02	4.80E+00	-1.74E+00	-4.70E-01	4.86E+00	8.16E+00	4.49E+00	8.16E+00	-1.74E+00	4.49E+00	2.87E+00
<sup>232</sup> Th	b	b	7.62E+01	b	b	b	b	7.62E+01	0.00E+00	0.00E+00	1.09E+01
<sup>234</sup> U	-2.45E-01	1.93E+01	b	2.33E-01	2.24E-01	8.84E-01	0.00E+00	1.93E+01	-2.45E-01	2.24E-01	2.91E+00
<sup>235</sup> U	2.01E+00	1.70E+00	7.62E+01	-9.00E-01	5.00E+00	-3.43E-01	8.60E-01	7.62E+01	-9.00E-01	1.70E+00	1.21E+01
<sup>238</sup> U	2.45E-01	1.78E+01	2.08E-01	2.33E-01	1.12E+00	5.30E-01	1.94E-01	1.78E+01	1.94E-01	2.45E-01	2.90E+00
<sup>106</sup> Ru	b	b	b	2.30E+01	b	3.11E+01	b	3.11E+01	0.00E+00	0.00E+00	1.17E+01
<sup>40</sup> K	6.74E+01	b	b	b	b	b	4.53E+01	6.74E+01	0.00E+00	0.00E+00	1.61E+01

<sup>a</sup>1 pCi/g = 3.7E-02 Bq/g.

<sup>b</sup>Not detected.

Table 5.39. 1993 EMP sediment sampling locations

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BCK 0.6	Bear Creek downstream from all DOE inputs
BCK 9.4	Bear Creek downstream from Y-12 Plant burial grounds
CRK 16	Clinch River downstream from all DOE inputs
CRK 32	Clinch River downstream from ORNL
CRK 80	Melton Hill Reservoir—Oak Ridge Marina
CRK 84	Melton Hill Reservoir above all DOE inputs—Anderson County Filtration Plant
EFK 5.4	East Fork Poplar Creek downstream from floodplain
EFK 23.4	East Fork Poplar Creek downstream from the Y-12 Plant
HC	Hinds Creek (reference site for East Fork Poplar Creek)
MEK 2.1	Melton Branch upstream from ORNL
MIK 0.1	Mitchell Branch downstream from the K-25 Site
MIK 1.4	Mitchell Branch upstream from the K-25 Site
PCK 2.2	Poplar Creek downstream from the K-25 Site
PCK 22	Poplar Creek upstream from the K-25 Site and East Fork Poplar Creek
WCK 1.0	White Oak Lake at White Oak Dam
WCK 6.8	White Oak Creek upstream from ORNL

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Table 5.40. 1993 sampling and analysis plan for EMP sediment locations

Collection frequency: Annually

Sample Type: Grab

Analysis frequency: Annually

Metals/Inorganics

Aluminum  
Antimony  
Arsenic  
Barium  
Beryllium  
Cadmium  
Calcium  
Chromium  
Cobalt  
Copper  
Iron  
Lead  
Magnesium  
Manganese  
Mercury  
Nickel  
Potassium  
Selenium  
Silver  
Sodium  
Thallium  
Uranium  
Vanadium  
Zinc

Pesticides/PCBs

Aldrin  
Alpha-BHC  
Beta-BHC  
Delta-BHC  
Gamma-BHC (Lindane)  
Chlordane (technical)  
4,4'-DDD  
4,4'-DDE  
4,4'-DDT  
Dieldrin  
Endosulfan I  
Endosulfan II  
Endosulfan sulfate  
Endrin  
Endrin aldehyde  
Heptachlor  
Heptachlor epoxide  
Methoxychlor  
Toxaphene  
PCB-1016  
PCB-1221  
PCB-1232  
PCB-1242  
PCB-1248  
PCB-1254  
PCB-1260  
2,4-D  
2,4,5-TP (Silvex)

Radionuclides

Am-241  
Cm-244  
Gross alpha  
Gross beta  
Co-60  
Cs-137  
K-40  
Np-237  
Pu-238  
Pu-239  
Sr-90  
Tc-99  
Th-230  
Th-232  
U-234  
U-235  
U-238

Semi-Volatile Organics

1,2-Dichlorobenzene  
1,2,4-Trichlorobenzene  
1,3-Dichlorobenzene  
1,4-Dichlorobenzene  
2-Chloronaphthalene  
2-Chlorophenol  
2-Methylnaphthalene  
2-Methylphenol  
2-Nitroaniline  
2-Nitrophenol  
2,4-Dimethylphenol  
2,4-Dinitrophenol  
2,4-Dinitrotoluene  
2,4,5-Trichlorophenol  
2,4,6-Trichlorophenol  
2,6-Dinitrotoluene  
3-Nitroaniline  
3,3'-Dichlorobenzidine  
4-Bromophenyl-phenylether  
4-Chloroaniline  
4-Chlorophenyl-phenylether

4-Methylphenol  
4-Nitroaniline  
4-Nitrophenol  
4-Chloro-3-methylphenol  
4,6-Dinitro-2-methylphenol  
Acenaphthene  
Acenaphthylene  
Anthracene  
Benzo(a)anthracene  
Benzo(a)pyrene  
Benzo(b)fluoranthene  
Benzo(g,h,i)perylene  
Benzo(k)fluoranthene  
bis(2-Chloroethyl)ether  
bis(2-Chloroisopropyl)ether  
bis(2-Ethylhexyl)phthalate  
Butylbenzylphthalate  
Carbazole  
Chrysene  
Di-n-octylphthalate  
Dibenz(a,h)anthracene

Dibenzofuran  
Diethylphthalate  
Dimethylphthalate  
Fluoranthene  
Fluorene  
Hexachlorobenzene  
Hexachlorobutadiene  
Hexachlorocyclopentadiene  
Hexachloroethane  
Indeno(1,2,3-cd)pyrene  
Isoporone  
N-nitroso-di-n-propylamine  
N-Nitrosodiphenylamine  
Naphthalene  
Nitrobenzene  
Pentachlorophenol  
Phenanthrene  
Phenol  
Pyrene

Table 5.41. 1993 concentrations at EMP sediment locations<sup>a</sup>

Parameter	Concentration <sup>b</sup>
<i>Bear Creek downstream from all DOE inputs (BCK 0.6)</i>	
Metals (g/kg)	
Aluminum, total	8.7
Arsenic, total	0.011
Barium, total	0.050
Beryllium, total	0.00060
Calcium, total	1.6
Chromium, total	0.015
Cobalt, total	0.0069
Copper, total	0.0064
Iron, total	12
Lead, total	0.010
Magnesium, total	1.4
Manganese, total	0.42
Mercury, total	0.000069
Nickel, total	0.010
Potassium, total	1.6
Selenium, total	0.0015
Sodium, total	0.024
Uranium, total	0.0058
Vanadium, total	0.018
Zinc, total	0.021
Radionuclides (pCi/g) <sup>c</sup>	
Gross alpha	5.4*
Gross beta	8.4*
K-40	13*
Np-237	0.020*
Tc-99	2.0*
Th-230	0.073*
Th-232	0.14*
U-234	1.3*
U-235	0.12*
U-238	2.1*
<i>Bear Creek downstream from Y-12 Plant burial grounds (BCK 9.4)</i>	
Base Neutral/Acid Extractable Organic (µg/kg)	
Diethyl phthalate	J180
Metals (g/kg)	
Aluminum, total	7.0
Arsenic, total	0.014
Barium, total	0.087
Beryllium, total	0.00059
Cadmium, total	0.00049
Calcium, total	2.6
Chromium, total	0.013
Cobalt, total	0.012
Copper, total	0.0070
Iron, total	13

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
Lead, total	0.015
Magnesium, total	0.80
Manganese, total	1.2
Mercury, total	0.00026
Nickel, total	0.014
Potassium, total	0.82
Selenium, total	0.0018
Sodium, total	0.026
Uranium, total	0.0089
Vanadium, total	0.015
Zinc, total	0.024
PCBs ( $\mu\text{g}/\text{kg}$ )	
Aroclor-1254	J13
Aroclor-1260	J5.0
Radionuclides (pCi/g) <sup>c</sup>	
Cs-137	0.11*
Gross alpha	4.6*
Gross beta	9.5*
K-40	6.8*
Np-237	0.032*
Tc-99	1.0*
Th-230	0.089*
Th-232	0.19*
U-234	1.9*
U-235	0.15*
U-238	2.5*
<i>Clinch River downstream from all DOE inputs (CRK 16)</i>	
Metals (g/kg)	
Aluminum, total	18
Barium, total	0.090
Beryllium, total	0.00056
Calcium, total	0.95
Chromium, total	0.017
Cobalt, total	0.0087
Copper, total	0.0095
Iron, total	18
Lead, total	0.013
Magnesium, total	1.2
Manganese, total	0.88
Mercury, total	0.000090
Nickel, total	0.011
Potassium, total	1.4
Selenium, total	0.0011
Sodium, total	0.037
Uranium, total	0.00076
Vanadium, total	0.027
Zinc, total	0.038

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
Radionuclides (pCi/g) <sup>c</sup>	
Am-241	0.19*
Cs-137	0.043*
Gross alpha	3.2*
Gross beta	4.1*
K-40	7.3*
Np-237	0.0062*
Tc-99	0.092*
Th-230	0.17*
Th-232	0.22*
U-234	0.35*
U-235	0.022*
U-238	0.12*
<i>Clinch River downstream from ORNL (CRK 32)</i>	
Metals (g/kg)	
Aluminum, total	23
Arsenic, total	0.0070
Barium, total	0.094
Beryllium, total	0.00061
Calcium, total	0.38
Chromium, total	0.017
Cobalt, total	0.010
Copper, total	0.011
Iron, total	18
Lead, total	0.026
Magnesium, total	1.4
Manganese, total	1.9
Mercury, total	0.000066
Nickel, total	0.014
Potassium, total	1.6
Selenium, total	0.0016
Sodium, total	0.053
Uranium, total	0.00072
Vanadium, total	0.029
Zinc, total	0.046
Radionuclides (pCi/g) <sup>c</sup>	
Am-241	0.0065*
Co-60	0.043*
Cs-137	1.4*
Gross alpha	3.5*
K-40	16*
Pu-238	0.0024*
Pu-239	0.011*
Sr-90	0.18*
Tc-99	0.089*
Th-230	0.12*
Th-232	0.38*
U-234	0.21*
U-235	0.0078*
U-238	0.15*

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
<i>Melton Hill Reservoir—Oak Ridge Marina (CRK 80)</i>	
Metals (g/kg)	
Aluminum, total	24
Barium, total	0.090
Beryllium, total	0.0011
Calcium, total	4.5
Chromium, total	0.021
Cobalt, total	0.0073
Copper, total	0.010
Iron, total	22
Lead, total	0.013
Magnesium, total	4.0
Manganese, total	0.85
Mercury, total	0.000051
Nickel, total	0.015
Potassium, total	3.9
Selenium, total	0.0026
Sodium, total	0.095
Uranium, total	0.00041
Vanadium, total	0.028
Zinc, total	0.043
Radionuclides (pCi/g) <sup>c</sup>	
Gross alpha	4.3*
Gross beta	6.2*
K-40	24*
Tc-99	0.12*
Th-230	0.073*
Th-232	0.17*
U-234	0.14*
U-235	0.035*
U-238	0.12*
<i>Melton Hill Reservoir above all DOE inputs (CRK 84)</i>	
Metals (g/kg)	
Aluminum, total	17
Arsenic, total	0.016
Barium, total	0.14
Beryllium, total	0.0012
Calcium, total	2.5
Chromium, total	0.018
Cobalt, total	0.011
Copper, total	0.014
Iron, total	21
Lead, total	0.016
Magnesium, total	2.1
Manganese, total	1.0
Mercury, total	0.000055
Nickel, total	0.019
Potassium, total	1.9
Selenium, total	0.0032

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
Sodium, total	0.039
Uranium, total	0.00054
Vanadium, total	0.025
Zinc, total	0.061
Radionuclides (pCi/g) <sup>c</sup>	
Gross alpha	3.5*
Gross beta	4.9*
K-40	12*
Th-230	0.12*
Th-232	0.21*
U-234	0.30*
U-238	0.13*
<i>East Fork Poplar Creek downstream from floodplain (EFK 5.4)</i>	
Metals (g/kg)	
Aluminum, total	7.8
Barium, total	0.052
Beryllium, total	0.00037
Calcium, total	2.5
Chromium, total	0.014
Cobalt, total	0.0048
Copper, total	0.016
Iron, total	7.6
Lead, total	0.013
Magnesium, total	1.1
Manganese, total	0.35
Mercury, total	0.010
Nickel, total	0.0095
Potassium, total	1.1
Selenium, total	0.0017
Silver, total	0.00068
Sodium, total	0.049
Uranium, total	0.0031
Vanadium, total	0.011
Zinc, total	0.070
PCBs (µg/kg)	
Aroclor-1254	J24
Aroclor-1260	J22
Radionuclides (pCi/g) <sup>c</sup>	
Co-60	0.043*
Cs-137	0.38*
Gross alpha	3.8*
Gross beta	5.4*
K-40	5.7*
Tc-99	0.43*
Th-230	0.49*
Th-232	0.12*
U-234	1.2*
U-235	0.095*
U-238	1.1*

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
<i>East Fork Poplar Creek downstream from the Y-12 Plant (EFK 23.4)</i>	
Metals (g/kg)	
Aluminum, total	5.8
Arsenic, total	0.0078
Barium, total	0.050
Beryllium, total	0.00031
Cadmium, total	0.0015
Calcium, total	6.5
Chromium, total	0.014
Cobalt, total	0.0050
Copper, total	0.040
Iron, total	7.9
Lead, total	0.014
Magnesium, total	1.5
Manganese, total	0.31
Mercury, total	0.061
Nickel, total	0.015
Potassium, total	0.90
Silver, total	0.00056
Sodium, total	0.030
Uranium, total	0.0081
Vanadium, total	0.0088
Zinc, total	0.10
Pesticides (µg/kg)	
Gamma-BHC (Lindane)	10.81
PCBs (µg/kg)	
Aroclor-1260	330
Radionuclides (pCi/g) <sup>c</sup>	
Am-241	0.020*
Cs-137	0.24*
Gross alpha	9.7*
Gross beta	10*
K-40	9.2*
Np-237	0.0043*
Pu-238	0.0073*
Pu-239	0.017*
Tc-99	0.13*
Th-230	2.4*
Th-232	0.21*
U-234	2.7*
U-235	0.11*
U-238	2.4*
<i>Hinds Creek (reference site for East Fork Poplar Creek) (HC)</i>	
Metals (g/kg)	
Aluminum, total	11
Barium, total	0.074
Beryllium, total	0.00053

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
Calcium, total	4.1
Chromium, total	0.013
Cobalt, total	0.0073
Copper, total	0.0080
Iron, total	13
Lead, total	0.011
Magnesium, total	1.7
Manganese, total	0.85
Mercury, total	0.000017
Nickel, total	0.0094
Potassium, total	1.5
Selenium, total	0.0016
Sodium, total	0.030
Uranium, total	0.00030
Vanadium, total	0.017
Zinc, total	0.039
Radionuclides (pCi/g) <sup>c</sup>	
Am-241	0.022*
Cs-137	0.084*
Gross alpha	3.0*
Gross beta	4.6*
K-40	8.9*
Th-230	0.10*
Th-232	0.16*
U-234	0.18*
U-238	0.078*

*Melton Branch upstream from ORNL (MEK 2.1)*

Metals (g/kg)	
Aluminum, total	9.0
Arsenic, total	0.0040
Barium, total	0.079
Beryllium, total	0.00063
Calcium, total	1.8
Chromium, total	0.015
Cobalt, total	0.0080
Copper, total	0.0071
Iron, total	13
Lead, total	0.011
Magnesium, total	1.3
Manganese, total	0.40
Mercury, total	0.000058
Nickel, total	0.013
Potassium, total	1.3
Sodium, total	0.024
Uranium, total	0.011
Vanadium, total	0.016
Zinc, total	0.026



Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
Radionuclides (pCi/g) <sup>c</sup>	
Cm-244	0.0038*
Cs-137	0.15*
Gross alpha	3.0*
K-40	7.0*
Sr-90	0.25*
Th-230	0.038*
Th-232	0.17*
U-234	0.092*
U-235	0.0078*
U-238	0.076*
<i>Mitchell Branch downstream from the K-25 Site (MIK 0.1)</i>	
Metals (g/kg)	
Aluminum, total	8.5
Arsenic, total	0.031
Barium, total	0.061
Beryllium, total	0.00045
Calcium, total	8.6
Chromium, total	0.027
Cobalt, total	0.0057
Copper, total	0.090
Iron, total	14
Lead, total	0.029
Magnesium, total	2.2
Manganese, total	0.65
Mercury, total	0.0015
Nickel, total	0.15
Potassium, total	1.0
Selenium, total	0.0017
Sodium, total	0.046
Uranium, total	0.00053
Vanadium, total	0.014
Zinc, total	0.12
PCBs (µg/kg)	
Aroclor-1254	J180
Aroclor-1260	J250
Radionuclides (pCi/g) <sup>c</sup>	
Am-241	0.026*
Cs-137	0.30*
Gross alpha	43*
Gross beta	150*
K-40	6.2*
Np-237	0.17*
Pu-239	0.20*
Tc-99	54*
Th-230	1.2*
Th-232	1.6*
U-234	24*
U-235	1.1*
U-238	14*

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
<i>Mitchell Branch upstream from the K-25 Site (MIK 1.4)</i>	
Metals (g/kg)	
Aluminum, total	12
Arsenic, total	0.015
Barium, total	0.15
Beryllium, total	0.00074
Calcium, total	1.6
Chromium, total	0.022
Cobalt, total	0.018
Copper, total	0.014
Iron, total	26
Lead, total	0.0091
Magnesium, total	3.3
Manganese, total	2.1
Mercury, total	0.000034
Nickel, total	0.056
Potassium, total	1.7
Selenium, total	0.0033
Sodium, total	0.045
Uranium, total	0.00051
Vanadium, total	0.021
Zinc, total	0.037
Radionuclides (pCi/g) <sup>c</sup>	
Am-241	0.0027*
Cs-137	0.032*
Gross alpha	4.1*
Gross beta	7.3*
K-40	15*
Th-230	0.21*
Th-232	0.049*
U-234	0.21*
U-235	0.0049*
U-238	0.13*
<i>Poplar Creek downstream from the K-25 Site (PCK 2.2)</i>	
Metals (g/kg)	
Aluminum, total	3.1
Arsenic, total	0.0050
Barium, total	0.028
Beryllium, total	0.00025
Calcium, total	1.1
Chromium, total	0.0089
Cobalt, total	0.0044
Copper, total	0.0097
Iron, total	5.1
Lead, total	0.0052
Magnesium, total	0.48
Manganese, total	0.14
Mercury, total	0.0024
Nickel, total	0.010

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
Potassium, total	0.42
Sodium, total	0.012
Uranium, total	0.0014
Vanadium, total	0.0051
Zinc, total	0.029
PCBs ( $\mu\text{g}/\text{kg}$ )	
Aroclor-1260	J16
Radionuclides (pCi/g) <sup>c</sup>	
Am-241	0.0086*
Cm-244	0.013*
Cs-137	0.15*
Gross alpha	1.6*
Gross beta	7.6*
K-40	4.1*
Pu-239	0.023*
Tc-99	1.0*
Th-230	0.46*
Th-232	0.11*
U-234	0.62*
U-235	0.030*
U-238	0.51*
<i>Poplar Creek upstream from the K-25 Site and East Fork (PCK 22)</i>	
Metals (g/kg)	
Aluminum, total	10
Arsenic, total	0.012
Barium, total	0.068
Beryllium, total	0.00076
Calcium, total	0.86
Chromium, total	0.011
Cobalt, total	0.013
Copper, total	0.011
Iron, total	12
Lead, total	0.011
Magnesium, total	1.1
Manganese, total	0.50
Mercury, total	0.000044
Nickel, total	0.020
Potassium, total	0.94
Sodium, total	0.024
Uranium, total	0.00056
Vanadium, total	0.015
Zinc, total	0.054
Radionuclides (pCi/g) <sup>c</sup>	
Gross alpha	5.7*
K-40	6.8*
Sr-90	0.11*
Tc-99	0.10*
Th-230	0.11*

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
Th-232	0.19*
U-234	0.17*
U-235	0.0059*
U-238	0.12*
<i>White Oak Lake at White Oak Dam (WCK 1.0)</i>	
Metals (g/kg)	
Aluminum, total	12
Arsenic, total	0.013
Barium, total	0.045
Beryllium, total	0.00049
Calcium, total	0.91
Chromium, total	0.016
Cobalt, total	0.0087
Copper, total	0.0071
Iron, total	12
Lead, total	0.0085
Magnesium, total	1.2
Manganese, total	0.21
Mercury, total	0.00016
Nickel, total	0.0095
Potassium, total	1.3
Sodium, total	0.038
Uranium, total	0.00033
Vanadium, total	0.016
Zinc, total	0.020
PCBs (µg/kg)	
Aroclor-1254	J14
Radionuclides (pCi/g) <sup>c</sup>	
Am-241	0.026*
Cm-244	0.049*
Co-60	0.81*
Cs-137	35*
Gross alpha	3.0*
Gross beta	20*
K-40	8.6*
Pu-238	0.016*
Pu-239	0.032*
Sr-90	3.5*
Tc-99	0.19*
Th-230	0.14*
Th-232	0.24*
U-234	0.15*
U-235	0.0041*
U-238	0.068*

Table 5.41 (continued)

Parameter	Concentration <sup>b</sup>
<i>White Oak Creek upstream from ORNL (WCK 6.8)</i>	
Metals (g/kg)	
Aluminum, total	3.6
Arsenic, total	0.0036
Barium, total	0.042
Beryllium, total	0.00031
Calcium, total	7.8
Chromium, total	0.0051
Cobalt, total	0.0039
Copper, total	0.0028
Iron, total	3.7
Lead, total	0.0068
Magnesium, total	2.0
Manganese, total	0.12
Mercury, total	0.00012
Nickel, total	0.0043
Potassium, total	0.34
Sodium, total	0.010
Thallium, total	0.0068
Uranium, total	0.00039
Vanadium, total	0.0084
Zinc, total	0.021
Radionuclides (pCi/g) <sup>c</sup>	
Am-241	0.027*
Cs-137	0.12*
Gross alpha	1.7*
Gross beta	2.6*
K-40	3.2*
Th-230	0.10*
Th-232	0.12*
U-234	0.43*
U-235	0.011*
U-238	0.16*

<sup>a</sup>All values were included in the calculations. Only parameters that have detections in one or more samples are listed in the table. The sampling and analysis plan contains a complete list of analyses performed.

<sup>b</sup>Prefix "J" indicates the value was estimated at or below the analytical detection limit by the laboratory.

<sup>c</sup>Individual radionuclide concentrations significantly greater than zero are identified by an \*.

Table 5.42. Concentration of radioactivity in sediment samples taken in the vicinity of the K-25 Site (pCi/g)\*

Parameter	SS1	SS2	SS3	SS4	SS5	SS6	SS7	Max	Min	Median	Average
Alpha	-8.01E-01	-1.64E-02	1.04E+02	-3.59E+00	-3.02E+00	-1.10E+00	-1.90E+00	1.04E+02	-3.59E+00	-1.10E+00	1.34E+01
Beta	4.25E-01	-5.33E-01	2.89E+02	-1.93E+00	-9.43E+00	-1.31E+00	-3.53E+00	2.89E+02	-9.43E+00	-1.31E+00	3.90E+01
<sup>137</sup> Cs	5.53E+00	3.31E+00	-1.61E+00	-7.30E-01	2.18E+00	1.60E+00	5.65E+00	5.65E+00	-1.61E+00	2.18E+00	2.28E+00
<sup>239</sup> Np	-2.11E-01	1.77E-01	1.28E+00	3.62E-01	-1.66E-01	-2.28E-01	4.17E-02	1.28E+00	-2.28E-01	4.17E-02	1.79E-01
<sup>238</sup> Pu	-1.89E-01	-1.66E-01	-4.66E-02	-2.01E-01	-2.06E-01	-2.27E-01	-1.56E-01	-4.66E-02	-2.27E-01	-1.89E-01	-1.70E-01
<sup>239</sup> Pu	-1.86E-01	-5.53E-02	1.40E-01	-1.00E-01	-2.06E-01	-1.70E-01	-5.19E-02	1.40E-01	-2.06E-01	-1.00E-01	-8.99E-02
<sup>234m</sup> Pa	-2.40E+02	1.35E+03	-5.37E+02	2.87E+02	5.20E+02	6.43E+02	7.27E+02	1.35E+03	-5.37E+02	5.20E+02	3.93E+02
<sup>99</sup> Tc	9.27E+00	1.21E+00	2.34E+02	-1.10E+00	5.27E+00	3.21E+00	4.83E+00	2.34E+02	-1.10E+00	4.83E+00	3.67E+01
<sup>234</sup> Th	-5.17E+00	9.92E+00	8.22E+01	6.78E+00	5.03E+00	-2.00E+01	2.23E+01	8.22E+01	-2.00E+01	6.78E+00	1.44E+01
<sup>234</sup> U	-3.14E-01	0.00E+00	6.52E+01	0.00E+00	6.24E-01	2.18E-01	2.33E-01	6.52E+01	-3.14E-01	2.18E-01	9.42E+00
<sup>235</sup> U	3.11E+00	-4.24E+00	-8.27E-01	2.37E+00	-1.41E+00	7.23E-02	3.07E+00	3.11E+00	-4.24E+00	7.23E-02	3.06E-01
<sup>238</sup> U	9.42E-01	3.35E-01	3.96E+01	0.00E+00	0.00E+00	2.18E-01	0.00E+00	3.96E+01	0.00E+00	2.18E-01	5.87E+00
<sup>106</sup> Ru	b	b	2.52E+01	b	b	b	b	2.52E+01	0.00E+00	0.00E+00	3.60E+00

\*1 pCi/g = 3.7E-02 Bq/g.

<sup>b</sup>Not detected.

Table 5.43. 1993 selected results of sediment analysis at the K-25 Site

Parameter	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7
Arclor-1254 <sup>b</sup>	<120	48 <sup>c</sup>	460	<170	<120	<130	<210
Arsenic	25	<4.9	12	13	<5.0	<4.9	13
Cadmium	4.1	2.9	3.6	1.3	2.4	2.6	4.9
Chromium	15	16	20	12	8.3	12	12
Cobalt	14	15	4.3	6.3	9.1	9.1	8.2
Copper	16	9.2	25	5.1	5.7	9.3	26
Lead	84	21	31	23	12	17	40
Magnesium	1900	940	510	450	740	710	310
Mercury	0.13	0.22	0.24	0.044	0.044	0.14	0.058
Molybdenum	4.4	1.1	2.2	1.1	<0.99	<0.98	2.1
Nickel	14	12	41	6	8.7	9.2	12
Phosphorus	180	430	330	120	130	230	430
Uranium	4	3	120	2	3	3	9
Vandium	39	17	33	15	12	15	34

<sup>a</sup>Units are ug/g unless otherwise indicated.

<sup>b</sup>Units are ug/kg.

<sup>c</sup>Estimated value.

Table 5.44. 1993 sampling and analysis plan for EMP fish

**Location and species:**

PCK 2.2	Poplar Creek downstream from the K-25 Site	Sunfish
CRK 16	Clinch River downstream from all DOE inputs	Sunfish, Catfish
CRK 32	Clinch River downstream from ORNL	Sunfish, Catfish
CRK 66	Melton Hill Reservoir above City of Oak Ridge water intake	Sunfish
CRK 80	Melton Hill Reservoir—Oak Ridge Marina	Sunfish
CRK 84	Melton Hill Reservoir above all DOE inputs —Anderson County Filtration Plant	Sunfish

**Sample type:**

Sunfish—Individual and Composite

Catfish—Composite

**Collection frequency:**

Annual

**Analysis frequency:**

Annual

**Parameters:**

<u>Metals</u>	<u>Pesticides</u>	<u>PCBs</u>	<u>Radionuclides</u>
Antimony	4,4'-DDD	Aroclor-1016	Co-60
Arsenic	4,4'-DDE	Aroclor-1221	Cs-137
Beryllium	4,4'-DDT	Aroclor-1232	Total rad Sr
Cadmium	Aldrin	Aroclor-1242	
Chromium	Alpha-BHC	Aroclor-1248	
Copper	Alpha-Chlordane	Aroclor-1254	
Lead	Beta-BHC	Aroclor-1260	
Mercury	Delta-BHC		
Nickel	Dieldrin		
Selenium	Endosulfan I		
Silver	Endosulfan II		
Thallium	Endosulfan sulfate		
Uranium	Endrin		
Zinc	Endrin ketone		
	Gamma-BHC (Lindane)		
	Gamma-Chlordane		
	Heptachlor		
	Heptachlor epoxide		
	Methoxychlor		
	Toxaphene		



Table 5.45. 1993 concentrations in sunfish tissue<sup>a</sup>

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>	
<i>Poplar Creek downstream from the K-25 Site (PCK 2.2)</i>					
Metals (mg/kg wet wt)					
Arsenic, total	2/6	1.3	<0.45	~0.61	0.14
Chromium, total	6/6	0.24	0.18	0.21	0.0087
Copper, total	6/6	0.31	0.17	0.22	0.022
Lead, total	1/6	0.69	<0.45	~0.51	0.037
Mercury, total	6/6	0.33	0.036	0.16	0.046
Selenium, total	2/6	0.83	<0.45	~0.54	0.061
Silver, total	1/6	0.051	<0.045	~0.048	0.00089
Uranium, total	1/6	0.0060	<0.0010	~0.0018	0.00083
Zinc, total	6/6	16	8.3	11	1.1
Pesticides (µg/kg wet wt)					
4,4'-DDE	1/6	U190	J1.9	~82	25
PCBs (µg/kg wet wt)					
Aroclor-1254	1/6	U1,900	J28	~820	250
Radionuclides (pCi/g ash wt) <sup>e</sup>					
Cs-137	3/3	1.4*	1.2*	1.3*	0.055
Total rad Sr	3/3	1.6*	0.46*	0.91	0.34
Radionuclides (pCi/g wet wt) <sup>e</sup>					
Cs-137	3/3	0.016*	0.015*	0.016*	0.00050
Total rad Sr	3/3	0.018*	0.0055*	0.011	0.0039
<i>Clinch River downstream from all DOE inputs (CRK 16)</i>					
Metals (mg/kg wet wt)					
Arsenic, total	1/6	<0.60	<0.45	~0.50	0.023
Chromium, total	6/6	0.25	0.18	0.21	0.011
Copper, total	6/6	0.51	0.12	0.24	0.061
Mercury, total	6/6	0.27	0.11	0.22	0.026
Selenium, total	1/6	<0.60	<0.43	~0.50	0.027
Uranium, total	1/6	0.0010	<0.0010	~0.0010	0
Zinc, total	6/6	11	8.5	9.7	0.42
PCBs (µg/kg wet wt)					
Aroclor-1254	1/6	U670	J38	~480	91
Radionuclides (pCi/g ash wt) <sup>e</sup>					
Cs-137	3/3	1.5*	1.2*	1.4*	0.078
Total rad Sr	3/3	1.0*	0.54*	0.75*	0.13

Table 5.45 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>	
Radionuclides (pCi/g wet wt) <sup>e</sup>					
Cs-137	3/3	0.015*	0.013*	0.015*	0.00091
Total rad Sr	3/3	0.011*	0.0055*	0.0080*	0.0017
<i>Clinch River downstream from ORNL (CRK 32)</i>					
Metals (mg/kg wet wt)					
Chromium, total	6/6	0.27	0.19	0.22	0.011
Copper, total	6/6	0.22	0.18	0.20	0.0062
Mercury, total	6/6	0.17	0.016	0.12	0.028
Selenium, total	1/6	0.69	<0.45	-0.51	0.038
Uranium, total	2/6	0.0010	<0.0010	-0.0010	0
Zinc, total	6/6	16	8.0	13	1.1
Pesticides (µg/kg wet wt)					
4,4'-DDE	2/6	U140	J1.9	-55	21
PCBs (µg/kg wet wt)					
Aroclor-1254	1/6	U1,400	J68	-670	170
Radionuclides (pCi/g ash wt) <sup>e</sup>					
Cs-137	3/3	11*	5.4*	8.9*	1.8
Total rad Sr	3/3	2.7*	1.8*	2.4*	0.27
Radionuclides (pCi/g wet wt) <sup>e</sup>					
Cs-137	3/3	0.13*	0.058*	0.10*	0.023
Total rad Sr	3/3	0.032*	0.021*	0.027*	0.0031
<i>Melton Hill Reservoir above City of Oak Ridge water intake (CRK 66)</i>					
Metals (mg/kg wet wt)					
Chromium, total	6/6	0.24	0.14	0.18	0.014
Copper, total	6/6	0.24	0.12	0.18	0.019
Mercury, total	6/6	0.047	0.022	0.032	0.0038
Selenium, total	6/6	1.2	0.70	0.94	0.075
Uranium, total	1/6	0.0037	<0.0030	-0.0031	0.00012
Zinc, total	6/6	11	8.9	9.9	0.39
Radionuclides (pCi/g ash wt) <sup>e</sup>					
Co-60	1/3	0.24*	0.054	0.12	0.063
Total rad Sr	1/3	0.12*	0.0027	0.067	0.035
Radionuclides (pCi/g wet wt) <sup>e</sup>					
Co-60	1/3	0.0032*	0.00062	0.0015	0.00085
Total rad Sr	1/3	0.0015*	0.000035	0.00079	0.00042

Table 5.45 (continued)

Parameter	N det/ N total	Concentration			Standard error <sup>d</sup>
		Max <sup>b</sup>	Min <sup>b</sup>	Av <sup>c</sup>	
<i>Melton Hill Reservoir - Oak Ridge Marina (CRK 80)</i>					
Metals (mg/kg wet wt)					
Chromium, total	6/6	0.29	0.16	0.19	0.021
Copper, total	5/6	0.22	<0.14	~0.18	0.013
Mercury, total	6/6	0.075	0.015	0.030	0.0092
Selenium, total	5/6	<0.98	0.53	~0.78	0.071
Uranium, total	3/6	0.0050	<0.0030	~0.0037	0.00036
Zinc, total	6/6	13	8.6	11	0.72
Radionuclides (pCi/g ash wt) <sup>e</sup>					
Total rad Sr	1/3	0.16*	0.073	0.12*	0.025
Radionuclides (pCi/g wet wt) <sup>e</sup>					
Total rad Sr	1/3	0.0018*	0.00081	0.0014*	0.00029
<i>Melton Hill Reservoir above all DOE inputs - Anderson County Filtration Plant (CRK 84)</i>					
Metals (mg/kg wet wt)					
Chromium, total	6/6	0.18	0.17	0.18	0.0022
Copper, total	6/6	0.24	0.14	0.17	0.015
Mercury, total	6/6	0.083	0.010	0.033	0.012
Selenium, total	6/6	1.0	0.68	0.79	0.049
Silver, total	3/6	<0.21	0.063	~0.15	0.029
Uranium, total	3/6	0.014	<0.0030	~0.0054	0.0018
Zinc, total	6/6	17	10	13	0.95
Radionuclides (pCi/g ash wt) <sup>e</sup>					
Cs-137	1/3	0.35*	0.027	0.14	0.11
Total rad Sr	1/3	0.16*	-0.038	0.050	0.057
Radionuclides (pCi/g wet wt) <sup>e</sup>					
Cs-137	1/3	0.0039*	0.00029	0.0015	0.0012
Total rad Sr	1/3	0.0019*	-0.00041	0.00061	0.00067

<sup>a</sup>All values were included in the calculations. Only parameters that have detections in one or more samples are listed in the table. The sampling and analysis plan contains a complete list of analyses performed.

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

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

<sup>d</sup>Standard error of the mean.

<sup>e</sup>Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

Table 5.46. 1993 concentrations in catfish tissue<sup>a</sup>

Parameter	Concentration <sup>b</sup>
<i>Clinch River downstream from all DOE inputs (CRK 16)</i>	
Metals (mg/kg wet wt)	
Arsenic, total	1.1
Mercury, total	0.51
Thallium, total	0.0060
Uranium, total	0.0016
Pesticides (µg/kg wet wt)	
4,4'-DDE	J34
Alpha-Chlordane	J7.6
PCBs (µg/kg wet wt)	
Aroclor-1254	650
Aroclor-1260	780
Radionuclides (pCi/g ash wt) <sup>c</sup>	
Cs-137	3.0*
Radionuclides (pCi/g wet wt) <sup>c</sup>	
Cs-137	0.034*
<i>Clinch River downstream from ORNL (CRK 32)</i>	
Metals (mg/kg wet wt)	
Mercury, total	0.16
Nickel, total	0.14
Zinc, total	3.6
Pesticides (µg/kg wet wt)	
4,4'-DDD	J14
4,4'-DDE	80
Alpha-Chlordane	J87
PCBs (µg/kg wet wt)	
Aroclor-1254	770
Aroclor-1260	810
Radionuclides (pCi/g ash wt) <sup>c</sup>	
Cs-137	4.9*
Total rad Sr	0.81*
Radionuclides (pCi/g wet wt) <sup>c</sup>	
Cs-137	0.048*
Total rad Sr	0.0080*

<sup>a</sup>Only parameters that have detections in one or more samples are listed in the table. The sampling and analysis plan contains a complete list of analyses performed.

<sup>b</sup>Prefix "J" indicates the value was estimated at or below the analytical detection limit by the laboratory.

<sup>c</sup>Individual radionuclide concentrations significantly greater than zero are identified by an \*.

Table 6.1. Release point parameters and receptor locations used in the dose calculations

Source name	Type	Release height (m)	Inner diameter (m)	Gas exit velocity (m/s)	Gas exit temperature (°C)	Distance (m) and direction to maximally exposed individual	
						Plant	ORR
<i>Y-12 Plant</i>							
All	Point	20	0	0	Ambient	1080 NNE	1080 NNE
<i>ORNL</i>							
2026	Point	22.9	1.07	10.1	Ambient	5450 E	9300 NE
3020	Point	61.0	1.52	5.5	Ambient	5450 E	9300 NE
3039	Point	76.2	2.44	2.0	Ambient	5450 E	9300 NE
7025	Point	4.0	0.31	13.6	Ambient	3500 E	7550 NNE
7512	Point	30.5	0.91	8.4	Ambient	4540 ENE	9640 NNE
7911	Point	76.2	1.52	2.4	Ambient	4540 ENE	9640 NNE
7830	Point	4.6	0.22	8.0	Ambient	5810 ENE	10990 NNE
7877	Point	13.9	0.51	8.6	Ambient	5810 ENE	10990 NNE
2000	Point	15.2	0.66	8.9	Ambient	5450 E	9300 NE
3018	Point	61.0	4.11	0.2	Ambient	5450 E	9300 NE
3074	Point	4.0	0.26	10.2	Ambient	5450 E	9300 NE
3544	Point	9.5	0.27	18.0	Ambient	5450 E	9300 NE
2523	Point	7.0	0.3	7.8	57.2	5450 E	9300 NE
<i>K-25 Site</i>							
K-1435	Point	30.5	1.37	5.6	79.1	5180 SWS	13000 ENE
K-1015	Point	3.7	0	0	Ambient	4340 WSW	14000 ENE
K-31/K-33	Point	25.9	0	0	Ambient		

**Table 6.2. Calculated radiation doses to maximally exposed off-site individuals from airborne releases during 1993**

Plant	Total effective dose equivalents [mrem (mSv)]	
	Plant max	ORR max
ORNL	0.1 (1E-3) <sup>a</sup>	3E-2 (3E-4)
K-25 Site	0.1 (1E-3) <sup>b</sup>	4E-2 (4E-4)
Y-12 Plant	1.3 (1.3E-2) <sup>c</sup>	1.3 (1.3E-2)
Entire ORR	NA <sup>d</sup>	1.4 (1.4E-2)

<sup>a</sup>The maximally exposed individual is located 5450 m (3.4 miles) E of the 3039 stack and 4540 m (2.8 miles) ENE of the 7911 stack.

<sup>b</sup>The maximally exposed individual is located 5180 m (3.2 miles) WSW of the K-1435 stack.

<sup>c</sup>The maximally exposed individual is located 1080 m (0.7 miles) NNE of the Y-12 Plant release point.

<sup>d</sup>The maximally exposed individual for the entire ORR is the Y-12 Plant maximally exposed individual.

**Table 6.3. Calculated collective EDEs from airborne releases during 1993**

Plant	Effective dose equivalents	
	Person-rem <sup>a</sup>	Person-Sv
ORNL	6	6E-2
K-25 Site	8	8E-2
Y-12 Plant	12	1.2E-1
ORR	26	2.6E-1

<sup>a</sup>The collective effective dose equivalents to the 879,546 persons residing within 80 km (50 miles) of the ORR.

**Table 6.4. Potential maximum individual EDEs (mrem)<sup>a</sup>  
from use of off-site waters**

Location	Eating fish	Swimming	Boating	Using shoreline	Total
CRK 84: Clinch River above all DOE input	0.03	6E-9	3E-9	2E-4	0.03
CRK 80: Clinch River at Oak Ridge Marina	0.02	6E-4	9E-5	0.2	0.2
CRK 66: Clinch River above Oak Ridge city water intake	0.02	2E-4	6E-5	0.1	0.1
CRK 58: Clinch River at Knox County water intake	<i>b</i>	3E-4	2E-4	0.2	0.2
CRK 32: Clinch River below ORNL	0.2	8E-5	2E-7	2E-3	0.2
CRK 23: Clinch River at K-25 Site water intake	<i>b</i>	9E-5	4E-5	0.2	0.2
CRK 16: Clinch River below all DOE inputs	0.04	2E-5	7E-6	5E-2	0.1
TRK 915: Tennessee River at Kingston Water Plant intake	<i>b</i>	5E-5	8E-6	6E-2	0.06
PCK 22: Poplar Creek above union with East Fork Poplar Creek	<i>b</i>	2E-4	7E-5	0.1	0.1
PCK 2.2: Poplar Creek below the K-25 Site	0.06	3E-5	7E-8	1E-3	0.06

<sup>a</sup>To convert mrem to mSv, divide the given values by 100.

<sup>b</sup>Not sampled.

**Table 6.5. Average EDEs from ingesting vegetables grown at ORR ambient air monitoring stations**

Vegetable	EDE [mrem (mSv)]	
	All reported radionuclides	Excluding <sup>40</sup> K
Tomatoes	1E-2 (1E-4)	1E-2 (1E-4) <sup>a</sup>
Turnip greens	2 (2E-2)	0.7 (7E-3)
Turnips	4 (4E-2)	0.8 (8E-3)
Total	6 (6E-2)	2 (2E-2)

<sup>a</sup>No <sup>40</sup>K concentrations were reported in tomatoes.

**Table 6.6. 1993 total dose rate for aquatic organisms (rad/day),<sup>a,b</sup> ORNL**

Measurement location	Fish average	Fish maximum	Crustacea average	Crustacea maximum	Muskrat average	Muskrat maximum
Melton Branch (X-13)	3.1E-3	5.1E-3	2.7E-2	4.4E-2	7.4E-3	1.2E-2
White Oak Creek (X14)	2.1E-3	4.9E-3	5.6E-3	1.2E-2	1.9E-3	4.3E-3
White Oak Dam (X15)	1.5E-3	3.5E-3	9.3E-3	1.5E-2	2.6E-3	4.5E-3
7500 Road Bridge	1.9E-3	5.0E-3	4.6E-3	9.3E-3	1.6E-3	3.6E-3
First Creek	1.2E-3	3.5E-3	1.1E-2	2.5E-2	2.9E-3	6.8E-3
Fifth Creek	3.1E-4	7.3E-4	1.5E-3	2.4E-3	4.3E-4	7.7E-4
Melton Branch 2	1.7E-5	6.3E-4	1.2E-4	1.4E-3	3.8E-5	3.3E-4
Northwest Tributary	3.6E-4	1.8E-3	1.8E-3	4.9E-3	5.3E-4	1.4E-3
Raccoon Creek	1.6E-4	1.4E-3	1.6E-3	5.4E-3	4.1E-4	1.4E-3

<sup>a</sup>Total dose rate includes the contribution of internally deposited radionuclides, sediment exposure (derived from water concentrations), and water immersion.

<sup>b</sup>To convert from rad/day to gray/day divide by 100.



Table 6.7. 1993 total dose rate for aquatic organisms (rad/day),<sup>a,b</sup>  
Y-12 Plant and K-25 Site

Measurement location	Fish average	Fish maximum	Crustacea average	Crustacea maximum	Muskrat average	Muskrat maximum
<i>Y-12 Plant</i>						
East Fork Poplar Creek (Station 17)	6.9E-5	4.3E-4	3.3E-4	2.3E-3	4.7E-3	6.1E-2
Bear Creek (Outfall 304)	6.8E-5	3.5E-4	3.3E-4	1.9E-3	1.1E-3	4.7E-2
Rogers Quarry Outfall 302	3.0E-5	1.1E-4	2.7E-4	1.0E-3	1.5E-5	1.2E-4
<i>K-25 Site</i>						
Mitchell Branch (K-1700)	3.8E-3	4.3E-2	3.7E-2	4.3E-1	6.8E-4	6.5E-3
Poplar Creek (Outfall 005)	8.7E-3	7.5E-2	8.4E-2	7.3E-1	1.4E-3	1.0E-2
Clinch River (Holding Pond, K-901-A)	2.7E-3	3.2E-2	2.9E-2	3.3E-1	2.3E-3	2.5E-2

<sup>a</sup>Total dose rate includes the contribution of internally deposited radionuclides, sediment exposure (derived from water concentrations), and water immersion.

<sup>b</sup>To convert from rad/day to Gy/day divide by 100.

**Table 6.8. Summary of estimated radiation dose equivalents to an adult during 1993 at locations of maximum exposure**

Pathway	Location	Effective dose equivalent	
		mrem	mSv
Gaseous effluents	Maximally exposed resident to		
Inhalation plus direct radiation from air, ground, and food chains	Y-12 Plant	1.3	0.013
	ORNL	0.1	0.001
	K-25 Site	0.1	0.001
	ORR	1.4	0.014
Liquid effluents			
Drinking water	Gallaher Water Plant	0.2	0.002
Eating fish	Clinch River, CRK 32	0.2	0.016
Other activities	Clinch River	0.2	0.002
Direct radiation	Clinch River shoreline	1 <sup>a</sup>	0.01
	Poplar Creek (K-25 Site)	1	0.11

<sup>a</sup>This is an overestimate of the potential dose because the source of direct radiation was remediated during 1993.

**Table 6.9. Trends in committed effective dose equivalent for selected pathways**

Pathway	Effective dose equivalent (mrem) <sup>a</sup>				
	1989	1990	1991	1992	1993
All air	1	2	2	1.3	1.4
Fish consumption	0.2	0.3	0.3	0.4	0.2
Drinking water (Kingston)	<0.3	0.04	0.1	0.05	0.07
Direct radiation (Clinch River)	1 <sup>b</sup>	1 <sup>b</sup>	1 <sup>b</sup>	1 <sup>b</sup>	1 <sup>c</sup>
Direct radiation (Poplar Creek)			11 <sup>b</sup>	11 <sup>b</sup>	1

<sup>a</sup>To convert mrem to mSv, divide by 100.

<sup>b</sup>These values have been corrected by removing the contribution of natural background radiation and by using International Commission on Radiological Protection recommendations for converting external exposure to effective dose equivalent.

<sup>c</sup>This is an overestimate of the potential dose because the source of the direct radiation was remediated during 1993.

Table 6.10. Chemical reference doses and slope factors used in drinking water and fish intake analysis

Chemical	Reference dose or slope factor	Reference <sup>a</sup>
4,4'-DDD	2.4E-1	SF
4,4'-DDE	3.4E-1	SF
Alpha chlordane	1.3	SF
Aluminum	6E-3	SMCL
Arsenic	3E-4	RfD
Barium	7E-4	RfD
Beryllium	5E-3	RfD
Boron	9E-2	RfD
Cadmium	5E-4	RfD
Chloride	7.14	SMCL
Chromium (VI)	5E-3	RfD
Copper	0.04	SMCL
Cyanide	2E-2	RfD
Fluoride	6E-2	RfD
Iron	9E-3	SMCL
Lead	4E-4	MCL
Manganese	5E-3	RfD
Mercury	5.7E-5	MCL
Methylene chloride	7.5E-3	SF
Molybdenum	5E-3	RfD
Nickel	2E-2	RfD
Nitrate	1.6	RfD
PCBs	7.7	SF
Phenols	6E-1	RfD
Selenium	5E-3	RfD
Silver	5E-3	RfD
Strontium	6E-1	RfD
Sulfate	7.14	SMCL
Thallium	8E-3	RfD
Trichloroethane	6E-3	MCL
Uranium	3E-3	RfD
Vanadium	9E-3	RfD
Zinc	3E-1	RfD
Methyl isobutyl ketone	8E-2	RfD

<sup>a</sup>SMCL: secondary maximum contaminant level; RfD: reference dose; MCL: maximum contaminant level; SF: slope factor.

**Table 6.11. Chemical hazard quotients  
for drinking water**

Chemical	Hazard quotient
<i>Melton Hill Reservoir above all DOE inputs (CRK 84)</i>	
<b>Metals</b>	
Aluminium	1E+0
Arsenic	-5E+0
Barium	3E-2
Chromium	-4E-2
Iron	1E+0
Manganese	5E-1
Uranium	-2E-3
Vanadium	-7E-3
Zinc	-1E-3
<b>Anions</b>	
Chloride	1E-2
Nitrate	4E-2
Sulfate	9E-2
<i>Water supply intake for Knox County (CRK 58)</i>	
<b>Metals</b>	
Aluminium	9E-1
Barium	1E-2
Iron	-5E-1
Manganese	2E-1
Uranium	-4E-3
Zinc	-9E-4
<b>Anions</b>	
Chloride	2E-2
Nitrate	4E-2
Sulfate	1E-1
<i>Water supply intake for the K-25 Site (CRK 23)</i>	
<b>Metals</b>	
Aluminium	1E+0
Barium	-1E-2
Iron	-9E-1
Manganese	3E-1
Uranium	-1E-3
Vanadium	-7E-3
Zinc	-5E-4
<b>Anions</b>	
Chloride	-2E-2
Nitrate	5E-2
Sulfate	9E-2
<i>Clinch River downstream of all DOE inputs (CRK 16)</i>	
<b>Metals</b>	
Aluminum	1E+0
Barium	-1E-2
Iron	-8E-1
Manganese	2E-1
Uranium	-4E-3
Vanadium	-6E-3
<b>Anions</b>	
Chloride	2E-2
Fluoride	-5E-2
Nitrate	6E-2
Sulfate	8E-2

**Table 6.12. Chemical hazard quotient and I/CDI for fish intake**

Chemical	Hazard quotient	I/CDI
<i>Melton Hill Reservoir—above all DOE inputs, Anderson County Filtration Plant (CRK 84)</i>		
<i>Sunfish</i>		
<b>Metals</b>		
Chromium	3E-2	
Copper	4E-3	
Mercury	5E-1	
Selenium	1E-1	
Silver	-3E-2	
Uranium	-2E-3	
Zinc	-4E-2	
<i>Melton Hill Reservoir—Oak Ridge Marina (above ORNL) (CRK 80)</i>		
<i>Sunfish</i>		
<b>Metals</b>		
Chromium	3E-2	
Copper	-4E-3	
Mercury	4E-1	
Selenium	-1E-1	
Uranium	-1E-3	
Zinc	3E-2	
<i>Melton Hill Reservoir above city of Oak Ridge water intake (CRK 66)</i>		
<i>Sunfish</i>		
<b>Metals</b>		
Chromium	3E-2	
Copper	4E-3	
Mercury	5E-1	
Selenium	2E-1	
Uranium	-9E-4	
Zinc	3E-2	
<i>Clinch River downstream from ORNL (CRK 32)</i>		
<i>Sunfish</i>		
<b>Metals</b>		
Chromium	4E-2	
Copper	4E-3	
Mercury	2E+0	
Selenium	9E-2	
Uranium	3E-4	
Zinc	4E-2	
<b>Pesticides</b>		
4,4'-DDE		-2E+0
<b>PCB</b>		
Aroclor-1254		4E+2
<i>Catfish</i>		
<b>Metals</b>		
Mercury	2E+0	
Nickel	6E-3	
Zinc	1E-2	

Table 6.12 (continued)

Chemical	Hazard quotient	1/CDI
<b>Pesticides</b>		
4,4'-DDD		-3E-1
4,4'-DDE		-2E+0
Alpha-chlordane		9E+0
<b>PCB</b>		
Aroclor-1254		5E+2
Aroclor-1260		5E+2
<i>Clinch River downstream from all DOE inputs (CRK 16)</i>		
<i>Sunfish</i>		
<b>Metals</b>		
Arsenic	-1E+0	
Chromium	4E-2	
Copper	5E-3	
Mercury	3E+0	
Selenium	-8E-2	
Uranium	-3E-4	
Zinc	3E-2	
<b>PCB</b>		
Aroclor-1254		-3E+2
<i>Catfish</i>		
<b>Metals</b>		
Arsenic	3E+0	
Mercury	7E+0	
Thallium	6E-2	
Uranium	4E-4	
<b>Pesticide</b>		
4,4'-DDE		1E+0
Alpha-chlordane		8E-1
<b>PCBs</b>		
Aroclor-1254		4E+2
Aroclor-1260		5E+2
<i>Poplar Creek downstream from the K-25 Site (PCK 2.2)</i>		
<i>Sunfish</i>		
<b>Metals</b>		
Arsenic	-2E+0	
Chromium	4E-2	
Copper	5E-3	
Lead	-1E+0	
Mercury	2E+0	
Selenium	-9E-2	
Silver	-8E-3	
Uranium	5E-4	
Zinc	3E-2	
<b>Pesticide</b>		
4,4'-DDE		-2E+0
<b>PCB</b>		
Aroclor-1254		-5E+2

Table 7.1. Y-12 Plant monitoring wells installed in 1993

Monitoring objective <sup>a</sup>	Bear Creek regime	East Fork regime	Chestnut Ridge regime
Category I	0	0	0
Category II	0	0	0
Category III <sup>b</sup>	1	9	5
Category IV <sup>c</sup>	5	0	0

<sup>a</sup>Category I—Wells added to define extent of groundwater contamination. Category II—Wells to monitor potential exit pathways. Category III—New or replacement wells for compliance monitoring. Category IV—Wells installed by Environmental Restoration Program.

<sup>b</sup>Includes one replacement well at the Oil Landfarm, nine wells to monitor corrective actions at underground storage tanks, and five wells at Industrial Landfill V and Construction/Demolition Landfill VII.

<sup>c</sup>Includes five wells installed as part of the Bear Creek OU 2 RI.

**Table 7.2. Summary of the comprehensive groundwater monitoring program at the Y-12 Plant, 1993**

Hydrogeologic regime/waste disposal site	Requirements <sup>a</sup>	Number of wells	Analytical parameters <sup>b</sup>
<i>Bear Creek Hydrogeologic Regime</i>			
Background <sup>c</sup>	BMP	16	Standard + CMP
Bear Creek Springs	EXP	5	Standard + (beta for SS-1)
Bear Creek surface water	EXP	5	Standard + (beta for NT-1)
Exit pathway—Traverse A	EXP	3	Standard
Exit pathway—Traverse B	EXP	5	Standard + (beta for GW-694 and GW-706)
Exit pathway—Traverse C	EXP	8	Standard
Exit pathway—Traverse W	EXP	6	Standard
Oil Landfarm	RCRA-AM/SMP	18	Standard + (beta at GW-537 and CMP at GW-40, GW-43, and GW-44 only)
Rust Spoil Area	RCRA-AM	2	Standard
S-3 Site	RCRA-AM/RCRA-CM/SMP	9	Standard + (CMP for GW-115, GW-324, GW-325, GW-613, and GW-614)
Spoil Area I	RCRA-AM/SMP	4	Standard
Y-12 Burial Grounds	RCRA-AM/SMP	31	Standard + (CMP for GW-40, GW-42, GW-79, GW-80, GW-162, GW-342, GW-372, GW-373, and GW-642)
Above Grade Low-Level Storage Facility	BMP	3	Standard + ( <sup>234</sup> U, <sup>235</sup> U, <sup>238</sup> U for GW-794 and GW-795)
<i>East Fork Poplar Creek Hydrogeologic Regime</i>			
Background	BMP	7	Standard
Beta-4 Security Pit	GRID	4	Standard
Exit pathway—Traverse J	EXP	2	Standard
Grid C-1	GRID	2	Standard
Grid E-1	GRID	2	Standard
Grid G-1	GRID	2	Standard
Grid G-2	GRID	2	Standard
Grid G-3	GRID	2	Standard
Grid H-2	GRID	2	Standard
Grid H-3	GRID	2	Standard
Grid I-1	GRID	2	Standard
Grid I-2	GRID	2	Standard + TPH
Grid J-1	GRID	2	Standard
Grid J-2	GRID	2	Standard
Grid J-3	GRID	2	Standard
Grid K-1	GRID	3	Standard
Grid K-2	GRID	3	Standard
Grid K-3	GRID	1	Standard
J-Primary	GRID	2	Standard
New Hope Pond	RCRA-AM	11	Standard



Table 7.2 (continued)

Hydrogeologic regime/waste disposal site	Requirements <sup>a</sup>	Number of wells	Analytical parameters <sup>b</sup>
U.S. Geological Survey Sites/exit pathway	EXP	12	Standard
UST Program	UST	13	Standard + (TPH for GW-656, GW-657, GW-658, GW-659, GW-707, and GW-708)
Waste Coolant Facilities/Salvage Yard/Fire Training Facility	GRID	8	Standard
<i>Chestnut Ridge Hydrogeologic Regime</i>			
Ash Disposal Basin	BMP	4	Standard + TOX + TOC
Chestnut Ridge Security Pits	RCRA-AM	11	Standard
East Chestnut Ridge Waste Pile	BMP	4	Standard
Kerr Hollow Quarry	RCRA-DM	7	Standard + REP + PHEN
Landfill II	SWDF	3	Standard + AOC + ORP
Landfill III (Chestnut Ridge Borrow Area Waste Pile)	SWDF	7	Standard + AOC + ORP + (U + beta for GW-295 only)
Landfill IV	SWDF	5	Standard + AOC + ORP
Landfill V	SWDF	5	Standard + AOC + ORP + U + OMP + (TPH for GW-799 only)
Landfill VI	SWDF	7	Standard + AOC + ORP
Landfill VII	SWDF	4	Standard + AOC + ORP + OMP + (U + TPH for GW-560, GW-562, and GW-564)
Rogers Quarry	SWDF	4	Standard + BNA
Sediment Disposal Basin	RCRA-DM	8	Standard + REP + BNA
United Nuclear Site	ROD	6	Standard + U + Ra

<sup>a</sup>BMP = best management practices monitoring; EXP = exit-pathway monitoring under DOE Order 5400.1; RCRA-AM = RCRA Assessment Monitoring at interim status units; RCRA-DM = RCRA Detection Monitoring at interim status units; RCRA-CM = RCRA post-closure compliance monitoring; SMP = Y-12 Plant Environmental Restoration Program's Surveillance and Maintenance Program; GRID = grid well monitoring locations under DOE Order 5400.1; UST = petroleum underground storage tank locations; SWDF = monitoring for solid waste disposal facilities under TDEC Rule 1200-1-7-.04; ROD = CERCLA record of decision post-closure monitoring.

<sup>b</sup>Standard = ICP metals scan; Cd, Cr, Pb by AAS; Hg; U (total); VOCs; major anions; gross alpha; gross beta; pH; conductance; TSS; TDS; turbidity; standard field parameters, including dissolved oxygen, water level, pH, temperature, conductance, and redox potential. CMP = RCRA compliance monitoring parameters, including <sup>241</sup>Am, <sup>129</sup>I, <sup>237</sup>Np, <sup>238</sup>Pu, total radium, total strontium, <sup>99</sup>Tc, <sup>3</sup>H, <sup>234</sup>U, <sup>235</sup>U, and <sup>238</sup>U. Beta = beta-emitting isotopes, including total strontium, <sup>99</sup>Tc, and <sup>3</sup>H. TPH = total petroleum hydrocarbons. REP = four replicate analyses for pH, conductance, TOC, and TOX. PHEN = phenols. TOX = total organic halides. TOC = total organic carbon. ORP = other parameters required by TDEC Rule 1200-1-7-.04, including chemical oxygen demand, cyanide, TOC, and TOX. U = isotopic uranium analysis, including <sup>234</sup>U, <sup>235</sup>U, and <sup>238</sup>U. OMP = other miscellaneous permit-required parameters including ammonia (as N), gamma activity, and trans-1,2-dichloroethene. Ra = total radium. BNA = base/neutral/acid extractable organic compounds (semivolatile organics). AOC = additional VOC list required by TDEC Rule 1200-1-7-.04.

<sup>c</sup>Background monitoring wells are illustrated separately only for comparative purposes. Background wells are associated with individual sites.

**Table 7.3. Description of surface-water and spring monitoring stations included in the Exit-Pathway Monitoring Program**

Locations	Description
NT-13 (background)	Tributary that enters Bear Creek at BCK 6.76 and represents drainage from a relatively undisturbed catchment that has not been impacted by waste-disposal activities in Bear Creek Valley.
BCK 0.63	Upstream of the confluence with East Fork Poplar Creek. Represents essentially all surface-water discharge from the Bear Creek watershed.
BCK 4.55	Location of NPDES monitoring site 304. Site represents surface-water discharge from at least one area of the Bear Creek floodplain known to be contaminated with uranium and PCBs. Formal perimeter monitoring location for the ORR.
BCK 9.40	Represents surface-water discharge from area of Bear Creek watershed impacted by waste-disposal activities.
NT-1	North Tributary (NT)-1 to Bear Creek, which probably receives groundwater inputs from S-3 Site contamination.
SS-1	Located on south side of Bear Creek at the confluence with NT-1, near headwaters of Bear Creek
SS-4	Discharges on southside of Bear Creek Road at contact between the Knox Group and the Maynardville Limestone. Location is about 500 ft west of exit-pathway Picket B.
SS-5	Large spring located on south side of Bear Creek Road near contact between the Knox Group and the Maynardville Limestone. Location is coincident with exit-pathway Picket A.
SS-6	Discharges on north side of Bear Creek Road; location is within the Maynardville Limestone about 500 ft west of exit-pathway Picket W.
SS-8	Large spring located at junction of Bear Creek Road and TN 95 near Station BCK 4.55, within the Maynardville Limestone. Westernmost spring monitored under the exit-pathway program.

**Table 7.4. Waste management sites, CERCLA operable units, and underground storage tanks included in the 1993 Groundwater Protection Program; East Fork Hydrogeologic Regime**

Site name	Regulatory classification	
	Historical <sup>a</sup>	Current <sup>b</sup>
New Hope Pond	TSD Unit	TSD Unit
Mercury Process Spill Areas	SWMU	UEFPC OU 01
Abandoned Nitric Acid Pipeline	SWMU	UEFPC OU 02
Salvage Yard Scrap Metal Storage Area	SWMU	UEFPC OU 03
Salvage Yard Oil/Solvent Drum Storage Area	SWMU	UEFPC OU 03
Salvage Yard Oil Storage	SWMU	UEFPC OU 03
Salvage Yard Drum Deheader	SWMU	UEFPC OU 03
Tank 2063-U	SWMU	UEFPC OU 03
S-2 Site	SWMU	UEFPC OU 03
Waste Coolant Processing Area	SWMU	UEFPC OU 03
Tank 2328-U	SWMU	Y-12 SA
Tank 2329-U	SWMU	Y-12 SA
Interim Drum Yard	SWMU	Y-12 SA
Beta-4 Security Pits	SWMU	Y-12 SA
Tank 2331-U	UST	UST
Tank 0134-U	UST	UST
Building 9754-2 Fuel Facility	UST	UST
Garage Underground Tanks	SMU/UST	Y-12 SA/UST
Rust Garage Area	SWMU/UST	Y-12 SA/UST

<sup>a</sup>Regulatory status before 1992 Federal Facility Agreement: TSD unit—RCRA-regulated land-based treatment, storage, or disposal unit; SWMU—RCRA-regulated solid waste management unit; and UST—Non-RCRA UST.

<sup>b</sup>Modified from *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program*. (U.S. Department of Energy 1992). UEFPC OU 01 = East Fork Poplar Creek Operable Unit 01 (integrator); UEFPC OU 02 = East Fork Poplar Creek Operable Unit 02 (source control); UEFPC OU 03 = East Fork Poplar Creek Operable Unit 03 (source control); and Y-12 SA = Y-12 Plant Study Area.

**Table 7.5. Waste management sites and CERCLA operable units included in the 1993 Groundwater Protection Program; Bear Creek Hydrogeologic Regime**

Site name	Regulatory classification	
	Historical <sup>a</sup>	Current <sup>b</sup>
S-3 Site	TSD Unit	BC OU 01
Oil Landfarm Waste Management Area		
Oil Landfarm	TSD Unit	BC OU 01
Burnyard, Boneyard, and Hazardous Chemical Storage Area	SWMU	BC OU 01
Sanitary Landfill I	SWMU	BC OU 01
Bear Creek Burial Grounds Waste Management Area		
Burial Ground A (North and South)	TSD Unit	BC OU 01
Burial Ground C	TSD Unit	BC OU 01
Burial Grounds B, D, E, and J	SWMUs	BC OU 01
Oil Retention Pond No. 1	SWMU	BC OU 01
Oil Retention Pond No. 2	SWMU	BC OU 01
Spoil Area I	SWMU	BC OU 02
SY-200 Yard	SWMU	BC OU 02
Rust Spoil Area	SWMU	BC OU 02
Bear Creek floodplain soils	N/A <sup>c</sup>	BC OU 03
Bear Creek groundwater, surface water, and creek sediments	N/A	BC OU 04
Above Grade Low Level Storage Facility	N/A	N/A

<sup>a</sup>Regulatory status before 1992 federal facility agreement: TSD Unit—RCRA-regulated land-based treatment, storage, or disposal unit and SWMU—RCRA-regulated solid waste management unit.

<sup>b</sup>Modified from *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program* (U.S. Department of Energy 1992): BC OU 01 = Bear Creek Operable Unit 01 (source control OU); BC OU 02 = Bear Creek Operable Unit 02 (source control OU); BC OU 03 = Bear Creek Operable Unit 03 (Source Control OU); and BC OU 04 = Bear Creek Operable Unit 04 (integrator OU).

<sup>c</sup>N/A = Not applicable (not previously regulated as a separate unit or not currently regulated).

Table 7.6. Waste management sites and CERCLA operable units included in the 1993 Groundwater Protection Program; Chestnut Ridge Hydrogeologic Regime

Site	Regulatory classification	
	Historical <sup>a</sup>	Current <sup>b</sup>
Chestnut Ridge Sediment Disposal Basin	TSD unit	TSD unit
East Chestnut Ridge Waste Pile	TSD unit	TSD unit
Kerr Hollow Quarry	TSD unit	TSD unit
Chestnut Ridge Security Pits	TSD unit	CR OU 01
Ash Disposal Basin	SWMU	CR OU 02
United Nuclear Corporation Site	SWMU	CR OU 03
Rogers Quarry	SWMU	CR OU 04
Industrial Landfill II	SWDF	SWDF
Industrial Landfill III	SWDF	SWDF
Industrial Landfill IV	SWDF	SWDF
Industrial Landfill V	N/A <sup>c</sup>	SWDF
Construction Debris Landfill VI	N/A	SWDF
Construction Debris Landfill VII	N/A	SWDF

<sup>a</sup>Regulatory classification before the 1992 Federal Facility Agreement: TSD Unit—RCRA-regulated land-based treatment, storage, or disposal facility; SWDF—solid waste disposal facility (nonhazardous waste); and SWMU—RCRA regulated solid waste management unit.

<sup>b</sup>Modified from *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program* (U.S. Department of Energy 1992): CR OU 01—Chestnut Ridge Operable Unit 01 (source control and groundwater OU); CR OU 02—Chestnut Ridge Operable Unit 02 (source control and Groundwater OU); CR OU 03—Chestnut Ridge Operable Unit 03 (source control and groundwater OU); and CR OU 04—Chestnut Ridge Operable Unit 04 (source control and groundwater OU).

<sup>c</sup>N/A—Not applicable (new facility).

**Table 7.7. Annual average summed VOC concentrations in groundwater at the Chestnut Ridge Security Pits, 1989-93**

Well No.	Summed average VOCs (µg/L)					Percentage decrease
	1989	1990	1991	1992	1993	
GW-173	17	13.5	11.8	11.7	NS <sup>a</sup>	31
GW-174	47.8	48.5	43.7	34	NS	29
GW-175	31.8	38.5	31	29.5	17	47
GW-176	285.3	233.5	170.5	139.7	NS	51
GW-177	66.7	18.8	26.3	25.5	33.7	49
GW-178	43.4	40	34	29	NS	32
GW-179	838	455	328.3	262.3	NS	69
GW-180	145.8	99.5	74.2	52.3	NS	64
GW-322	696	730.3	633	538.3	NS	23
GW-607	NS	16.9	ND <sup>b</sup>	ND	ND	100
GW-608	NS	14.8	15.5	4.5	5.8	61
GW-609	NS	78	67.5	35.5	30.9	55
GW-610	NS	1	0.5	ND	ND	100
GW-611	NS	16	9	13.5	15	6
GW-612	NS	505.8	451.3	358.3	NS	29

<sup>a</sup>NS = not sampled.

<sup>b</sup>ND = not detected.

Table 7.8. Summary of ORNL waste area groupings

WAG	Description	Number of sites <sup>a</sup>
1	Main plant area	117
2	White Oak Creek/White Oak Lake	2
3	SWSA 3	3
4	SWSA 4	3
5	SWSA 5	28
6	SWSA 6	3
7	Low-level waste pits and trenches area	19
8	Melton Valley area	35
9	Homogeneous reactor experiment area	13
10	Hydrofracture injection wells and grout sheets	4 <sup>b</sup>
11	White Wing scrapyard	1
12	Closed contractors' landfill	1
13	Environmental research areas	2
14	Tower Shielding Facility	2
15	ORNL facilities at Y-12 Plant	14
16	Health Physics Research Reactor area	5
17	ORNL services area	8
18	Consolidated fuel reprocessing area	10
19	Hazardous waste treatment and storage facility	8
20	Oak Ridge Landfarm	<u>1</u>
	Total	279
<i>Additional sites outside of WAGs</i>		
<sup>c</sup>	Surplus contaminated facilities	29

<sup>a</sup>Source: July 18, 1991, letter from Lanny Bates, Director of Environmental Restoration, to Robert Sleeman, DOE-ORO.

<sup>b</sup>Principal sites are located underground, beneath WAG 5.

<sup>c</sup>Not applicable.

**Table 7.9. Summary of the groundwater surveillance program at ORNL, 1993**

WAG	Regulatory status	Upgradient/ downgradient wells		Parameters monitored <sup>a</sup>	Frequency and last date sampled
<i>Bethel Valley Operable Unit</i>					
1	DOE Orders 5400.1 and 5400.5	3	24	Standard	Rotation June 1993
3	DOE Orders 5400.1 and 5400.5	3	12	Standard	Rotation November 1993
17	DOE Orders 5400.1 and 5400.5	4	4	Standard	Rotation July 1993
<i>Melton Valley Operable Unit</i>					
2	DOE Orders 5400.1 and 5400.5	12	8	Standard	Rotation February 1993
4	DOE Orders 5400.1 and 5400.5	4	11	Standard	Rotation January 1994 <sup>b</sup>
5	DOE Orders 5400.1 and 5400.5	2	20	Standard	Rotation April 1993
6	RCRA <sup>c</sup> assessment monitoring and DOE Orders 5400.1 and 5400.5	7	17	Volatile organics, gross alpha, gross beta, <sup>3</sup> H, <sup>137</sup> Cs, <sup>60</sup> Co, total rad Sr + standard field measurements	8 wells quarterly; 16 wells semiannually
7	DOE Orders 5400.1 and 5400.5	2	14	Standard	Rotation August 1993
8 and 9	DOE Orders 5400.1 and 5400.5	2	9	Standard	Rotation October 1993
<i>White Wing Scrapyard</i>					
11	DOE Orders 5400.1 and 5400.5	6	5	Standard	Rotation January 1993

<sup>a</sup>Standard: volatile and semivolatile organics, total organic carbon, total organic halides, metals, anions, total phenolics, total suspended solids, alkalinity, gross alpha and beta, <sup>3</sup>H, <sup>137</sup>Cs, <sup>60</sup>Co, and total radioactive strontium. Standard field measurements: pH, conductivity, turbidity, oxidation/reduction potential, temperature, and dissolved oxygen.

<sup>b</sup>Initiated in December 1993 and completed in January 1994. Results will be reported in the 1994 report.

<sup>c</sup>The appropriate regulatory authority at SWSA 6 in WAG 6 is RCRA. The regulatory authority is expected to change to CERCLA, with RCRA as an applicable and appropriate requirement.

**Table 7.10. Summary of the plant perimeter surveillance program at ORNL, 1993<sup>a</sup>**

Exit pathway	WAG	Number of wells	Surface water locations
White Oak Creek/Melton Valley	6 & 2 <sup>b</sup>	10	White Oak Creek at White Oak Dam
West Bethel Valley	3	3	Raccoon Creek
East Bethel Valley	17	4	Bearden Creek
White Wing Scrapyard	11	3	Bear Creek

<sup>a</sup>All locations are monitored for volatile organics, tritium, total radioactive strontium, gross alpha and beta, <sup>60</sup>Co, and <sup>137</sup>Cs.

<sup>b</sup>Four wells are part of the ORNL WAG 6 perimeter network, and four wells are part of the ORNL WAG 2 perimeter network. Two other wells were not sampled in 1993, pending a decision regarding installing dedicated pumps in them.



## Key to Y-12 Plant Groundwater Tables

### GENERAL FOOTNOTES:

- \* Duplicate analysis outside control limits.
- \*\* Indicates those standards that were not effective until January 17, 1994. All other values are currently applicable MCLs.

### VOA FOOTNOTES:

- B Analyte found in blank as well as sample.
- D Compounds identified in an analysis at a secondary dilution factor.
- E Concentrations exceed calibrated range of the CG/MS instrument.
- J Indicates an estimated value.

### RAD FOOTNOTES:

- D Spike control limits do not apply; sample activity exceeds the activity of the spike.
- E Result of analysis is less than the MDA; confidence level is less than 95%.
- F Result is less than background.
- G Gamma photopeak near MDA<, resulting in a poor curve fit.
- I Insufficient amount of sample to meet customer's MDA requirements.
- J Chemical tracer recovery is outside of control limits.
- S Spike recovery not within limits.

### ABBREVIATIONS:

- NR no reference
- NA not applicable
- HGR hydrogeologic regime
- EF East Fork Poplar Creek
- CR Chestnut Ridge
- BC Bear Creek

Table 7.11. Reference standards for Y-12 groundwater and surface water

Parameter	Groundwater reference standards					Surface water reference stds. (to supplement NPDES for creeks/streams)			
	TDEC stds. for hazardous waste TSD facilities 1200-1-11-.06	TDEC stds. for landfills rule 1200-1-7 Appendix I	National primary drinking water (MCL)	National secondary drinking water (MCL)	Tennessee primary drinking water (MCL)	Tennessee secondary drinking water (MCL)	4% of DOE DCG	DOE Order 5400.5 DCG	Tennessee water quality recreation
Chloride									
Fluoride	1.4-2.4	4	4	250	4	250			
Nitrate as nitrogen	10	10	10	2	10	2			
Nitrite as nitrogen			1		1				
Nitrate and nitrite				250	10	250			
Sulfate									
<i>Anions (mg/L)</i>									
Aluminum				0.05-0.2		0.2			4.31
Antimony		0.006*	0.006*		0.006				
Arsenic, total	0.05	0.05	0.05		0.05			0.36	
Arsenic (III)									
Barium	1	2*	2		2				
Beryllium		0.004	0.004*		0.004				0.0013
Cadmium	0.01	0.005	0.005		0.005			0.004	
Cadmium, dissolved									
Chromium, total	0.05		0.1		0.1				670
Chromium (III)									
Chromium (VI)		0.1	1.3 (1)	1	1.3 (1)	1		0.016	
Copper									
Copper, dissolved									
Iron									
Lead	0.05	0.05	0.015 (1)	0.3	0.015 (1)	0.3		0.018	
Lead, dissolved									
Manganese									
Manganese				0.05	0.002	0.05		0.082	
Mercury	0.002	0.002	0.002		0.002			0.0024	0.00015
Nickel		0.1	0.1		0.1			1.4	4.6
Selenium	0.01	0.05	0.05		0.5			0.02	
Silver	0.05	0.01		0.1		0.1		0.004	
Silver, dissolved									
Thallium		0.002*	0.002*		0.002				
Uranium		0.020 (2)	0.020 (2)	5		5			0.117
Zinc									
Zinc, dissolved									

Table 7.11 (continued)

Parameter	Groundwater reference standards				Surface water reference stds. (to supplement NPDES for creeks/streams)				
	TDEC stds. for hazardous waste, TSD facilities 1200-1-11-06	TDEC stds. for landfills rule 1200-1-7 Appendix I	National primary drinking water (MCL)	National secondary drinking water (MCL)	Tennessee primary drinking water (MCL)	Tennessee secondary drinking water (MCL)	DOE Order 5400.5 DCG	Tenn. water quality fish & aquatic life criterion max. conc. (CMC)	Tennessee water quality recreation
pH						6.5-8.5		30.5	6.0-9.0
Water temperature (°C)									
<i>Field measurements</i>									
Asbestos, fibers/L			7,000,000		7,000,000				
Coliform bacteria	1/100 mL		1/100 mL		1/100 mL				
Color (color units)			0.2*	15	0.2	15			0.022
Cyanide, mg/L				500		500			
Dissolved solids, mg/L									
Turbidity, NTU		1.0 (3)	1		1				
Petroleum hydrocarbons, mg/L									
<i>Others</i>									
Gross alpha activity	15		15		15				
Gross beta activity	50 (4)		50 (4)		50 (4)				
Am-241								1	30
Co-60								200	5,000
Cs-137								120	3,000
H-3		20,000			20,000			80,000	2,000,000
Np-237								1	30
Pu-238								2	40
Pu-239/240								1	30
Ra-226	5		5		5			4	100
Ra-228	5		5		5			4	100
Tc-99								4,000	100,000
Th-228								16	400
Th-230								12	300
Th-232								2	50
Th-234								400	10,000
Thorium, total								2	500
Total rad Sr (Sr-90)		8			8			40	1,000
U-234								20	500
U-235								24	600
U-236								20	500
U-238								24	600
Uranium, total			13 (2)					24	600

Table 7.11 (continued)

Parameter	Groundwater reference standards				Surface water reference stds. (to supplement NPDES for creeks/streams)					
	TDEC stds. for hazardous waste TSD facilities 1200-1-11-06	TDEC stds. for landfills rule 1200-1-7 Appendix I	National primary drinking water (MCL)	National secondary drinking water (MCL)	Tennessee primary drinking water (MCL)	Tennessee secondary drinking water (MCL)	4% of DOE DCG	DOE Order 5400.5 DCG	Tenn. water quality fish & aquatic life criterion max. conc. (CMC)	Tennessee water quality recreation
<i>Volatile organics (ug/L)</i>										
Acrolein									780	
Acrylonitrile									6.7	
Benzene		5	5		5				710	
Bromodichloromethane (THM)			100		100					4,700
Bromoform (THM)			100		100					44
Carbon tetrachloride		5	5		5					
Chlorobenzene		100	100		100					4,700
Chloroform (THM)			100		100					4,700
Dibromochloromethane (THM)			100		100					32
1,1-Dichloroethene		7	7		7					990
1,2-Dichloroethane		5	5		5					
cis-1,2-Dichloroethene		70	70		70					
trans-1,2-Dichloroethene		100	100		100					
1,2-Dichloropropane		5	5		5					
cis-1,3-Dichloropropene										
trans-1,3-Dichloropropene										
Ethylbenzene		700	700		700					1,700
Methylene chloride		5*	5*		5					1,700
Styrene		100	100		100					29,000
1,1,2,2-Tetrachloroethane										16,000
Tetrachloroethene		5	5		5					110
Total trihalomethanes (THM)		100	100		100					88
Toluene		1,000	1,000		1,000					100
1,1,1-Trichloroethane		200	200		200					30,000
1,1,2-Trichloroethane		5*	5*		5					170,000
Trichloroethylene		5	5		5					420
Vinyl chloride		2	2		2					807
Xylene		10,000	10,000		10,000					5,250
<i>Base/neutral/acid extractable organics (ug/L)</i>										
Acenaphthylene										0.3
Anthracene										0.03
Benzo(a)anthracene										0.3
Benzo(a)pyrene										0.3
3,4-Benzofluoranthene										0.3
Benzo(k)fluoranthene										0.3
Di-n-butyl phthalate										0.3
bis-(2-chloroethyl)ether										12,000
										14

Table 7.11 (continued)

Parameter	Groundwater reference standards				Surface water reference stds. (to supplement NPDES for creeks/streams)					
	TDEC stds. for hazardous waste TSD facilities 1200-1-11-.06	TDEC stds. for landfills rule 1200-1-7 Appendix I	National primary drinking water (MCL)	National secondary drinking water (MCL)	Tennessee primary drinking water (MCL)	Tennessee secondary drinking water (MCL)	4% of DOE DCG	DOE Order 5400.5 DCG	Tenn. water quality fish & aquatic life criterion max. conc. (CMC)	Tennessee water quality recreation
1,2-Dichlorobenzene		600	600	600	600				17,000	
1,3-Dichlorobenzene									2,600	
1,4-Dichlorobenzene		75	75	75	75				2,600	
bis-(2-Ethylhexyl)adipate		40*	40*							59
bis-(2-Ethylhexyl)phthalate		6*	6*	6*	6					120,000
Diethyl phthalate										2,900,000
Dimethyl phthalate										1,400
2,4-Dinitrophenol										42
2,4-Dinitrotoluene										54
Fluoranthene										0.03
Fluorene										0.007
Hexachlorobenzene		1*	1*	1*	1					500
Hexachlorobutadiene										
Hexachlorocyclopentadiene		50*	50*							89
Hexachloroethane										765
2-Methyl-4,6-dinitrophenol										1,900
Nitrobenzene										0.03
Phenathrene										
Pentachlorophenol		1	1	1	1				20	
Pyrene										0.03
1,2,4-Trichlorobenzene		70*	70*	70*	70					
2,4,6-Trichlorophenol										6.5
<i>Pesticides/herbicides/PCBs (µg/L)</i>										
Alachlor		2	2	2	2					
Aldicarb		3								
Aldicarb sulfoxide		4	4	4						
Aldicarb sulfone		2	2	2						
Aldrin										3
Atrazine		3	3	3	3					0.0014
Carbofuran		40	40	40	40					
Chlorodane		2	2	2	2				2.4	0.006
2,4-D	100	70	70	70	70					
4,4'-DDT										
4,4'-DDE										
4,4'-DDD										
Dalapon		200	200	200	200					
1,2-Dibromo-3-chloropropane										
Dieldren										
Dinoseb		7*	7*	7*	7				1.1	0.006
Diquat		20*	20*	20*	20				2.5	0.0014

Table 7.11 (continued)

Parameter	Groundwater reference standards				Surface water reference stds. (to supplement NPDES for creeks/streams)					
	TDEC stds. for hazardous waste TSD facilities 1200-1-11-.06	TDEC stds. for landfills rule 1200-1-7 Appendix I	National primary drinking water (MCL)	National secondary drinking water (MCL)	Tennessee primary drinking water (MCL)	Tennessee secondary drinking water (MCL)	4% of DOE DCG	DOE Order 5400.5 DCG	Tenn. water quality fish & aquatic life criterion max. conc. (CMC)	Tennessee water quality recreation
Endothall		100*	100*		100					
a-Endosulfan								0.22	2	
b-Endosulfan								0.22	2	
Endrin	0.2	2*	2*		2			0.18		
Ethylene dibromide		0.05	0.05		0.05					
Glyphosate		700*	700*		700					
Heptachlor		0.4	0.4		0.4			0.52	0.002	
Heptachlor epoxide		0.2	0.2		0.2			2	0.001	
g-BHC (Lindane)	4	0.2	0.2		0.2			2	0.63	
Methoxychlor	100	40	40		40					
Oxamyl (Vydate)		200*	200*		200					
Picloram		500*	500*		500					
PCB-1242									0.0005	
PCB-1254									0.0005	
PCB-1221									0.0005	
PCB-1232									0.0005	
PCB-1248									0.0005	
PCB-1260									0.0005	
PCB-1016									0.0005	
PCB total									0.0005	
Simazine		0.5	0.5		0.5					
2,3,7,8-TCDD (Dioxin)		4*	4*		3					
2,4,5-TP (Silvex)	10	50	50		0.00003					0.000001
Toxaphene	5	3	3		3			0.73	0.008	

## Notes:

TDEC standards for hazardous waste facilities—TDEC rule 1200-1-11-.05, Appendix B.

National Primary Drinking Water MCLs—enforceable health-based maximum containment levels for water supply systems.

National Secondary Drinking Water MCLs—nonenforceable taste, odor, or appearance guidelines.

4% of DCG—represents DOE criteria of 4 mrem effective dose equivalent.

Fish and aquatic life criteria maximum concentration—TDEC general water quality criteria and use classification of streams; TDEC rule 1200-4-3 and 1200-4-4.

The items marked with \* indicate those standards that are not effective until January 17, 1994. All other values are currently applicable MCLs.

(1) Treatment-based standard.

(2) Proposed by EPA.

(3) TDEC UST regulation for groundwater.

(4) Regulatory standard is 4 mrem/year effective dose equivalent. 50 pCi/L is recommended level for screening of beta activity.

Table 7.12. Constituents in groundwater at the Y-12 Plant site

HGR=BC area=Background

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.		
CHLORIDE	43	38	4.1	1.0	1.8	250.000	0			0
FLUORIDE	43	28	1.7	0.10	0.35	2.000	0			0
SULFATE	43	43	33	3.0	15	250.000	0			0
ALUMINUM	43	35	44	0.027	3.7	0.200	23			23
ALUMINUM	43	11	0.27	0.022	0.057	0.200	1			1
ARSENIC	43	2	0.062	0.057	0.060	0.050	2			2
BARIUM	43	43	0.35	0.015	0.15	1.000	0			0
BARIUM	43	43	0.24	0.013	0.12	1.000	0			0
BERYLLIUM	43	7	0.0018	0.0003	0.0008	0.004**	0			0
BERYLLIUM	43	1	0.0007	0.0007	0.0007	0.004**	0			0
BORON	43	42	0.18	0.0041	0.032	NR	NA			NA
BORON	43	43	0.17	0.0048	0.031	NR	NA			NA
CADMIUM	43	4	0.066	0.0020	0.027	0.005	3			3
CADMIUM	43	6	0.062	0.0038	0.019	0.005	3			3
CADMIUM	43	5	0.077	0.0021	0.019	0.005	3			3
CALCIUM	43	43	74	1.3	31	NR	NA			NA
CALCIUM	43	43	72	1.1	30	NR	NA			NA
CHROMIUM	43	8	0.22	0.011	0.066	0.050	3			3
CHROMIUM	43	8	0.098	0.010	0.044	0.050	3			3
COBALT	43	7	0.021	0.0052	0.012	NR	NA			NA
COBALT	43	2	0.0065	0.0062	0.0064	NR	NA			NA
COPPER	43	24	0.10	0.0042	0.018	1.000	0			0
COPPER	43	10	0.037	0.0040	0.012	1.000	0			0
IRON	43	43	46	0.0050	4.3	0.300	28			28
IRON	43	31	1.2	0.0069	0.16	0.300	5			5
LEAD	43	9	0.042	0.0047	0.022	0.050	0			0
MAGNESIUM	43	43	12	0.14	5.6	NR	NA			NA
MAGNESIUM	43	43	12	0.11	5.0	NR	NA			NA
MANGANESE	43	43	1.4	0.0034	0.19	0.050	18			18

Table 7.12 (continued)

VARIABLE	# SAMPLES	MAXIMUM		MINIMUM		AVERAGE	# MMTS. > REFERENCE VALUE
		# DETECTED	MMT.	# DETECTED	MMT.		
MANGANESE	43	40	1.3	0.0014	0.16	0.050	13
MERCURY	43	2	0.0003	0.0002	0.0002	0.002	0
MERCURY	43	2	0.0003	0.0002	0.0002	0.002	0
NICKEL	43	8	0.061	0.012	0.040	0.100**	0
NICKEL	43	9	0.023	0.010	0.018	0.100**	0
POTASSIUM	43	39	8.6	0.60	2.0	NR	NA
POTASSIUM	43	37	3.1	0.60	1.4	NR	NA
SILVER	43	1	0.0074	0.0074	0.0074	0.100	0
SODIUM	43	43	110	1.4	16	NR	NA
SODIUM	43	43	110	1.4	16	NR	NA
STRONTIUM	43	43	0.66	0.010	0.11	NR	NA
STRONTIUM	43	43	0.63	0.0094	0.11	NR	NA
URANIUM	43	5	0.0020	0.0010	0.0012	13.000	0
URANIUM FILT.	43	7	0.0010	0.0010	0.0010	13.000	0
VANADIUM	43	8	0.058	0.0056	0.022	NR	NA
ZINC	43	41	1.6	0.0024	0.063	5.000	0
ZINC	43	38	0.17	0.0023	0.023	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	43	NA	480	35	250	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	43	NA	12	0.30	3.9	NR	NA
PH, FIELD MMT. (PH UNITS)	43	NA	9.2	5.2	7.2	6.5/8.5	14
REDOX, FIELD MMT. (MV)	43	NA	260	-230	110	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	43	NA	19	12	15	NR	0
ALKALINITY-CO3 (MG/L)	43	3	26	24	25	NR	NA
ALKALINITY-HCO3 (MG/L)	43	43	240	8.0	120	NR	NA
CONDUCTIVITY (UMHOS/CM)	43	43	490	36	260	NR	NA
DISSOLVED SOLIDS (MG/L)	43	43	360	50	200	500.000	0
PH (PH UNITS)	43	NA	9.1	5.7	7.5	6.5/8.5	11
TOTAL SUSPENDED SOLIDS (MG/L)	43	32	730	1.0	63	NR	NA
TURBIDITY (NTU)	43	43	1000	0.70	65	1.000	39



Table 7.12 (continued)

VARIABLE	SAMPLES	#	# DETECTED	MAXIMUM		MINIMUM	AVERAGE		REFERENCE VALUE	# MMTS. > REFERENCE
				DETECTED	MMT.		DETECTED	MMTS.		
234-URANIUM	(PCI/L)	16	16	9.1	J	-7.2	2.9	20.000	0	
235-URANIUM	(PCI/L)	16	16	200		-43	29	24.000	4	
237-NEPTUNIUM	(PCI/L)	16	16	18	F	-12	-0.21	1.000	2	
238-URANIUM	(PCI/L)	16	16	22		-0.19	4.9	24.000	0	
241-AMERICIUM	(PCI/L)	16	16	10	J	-5.2	0.61	1.000	4	
99-TECHNETIUM	(PCI/L)	16	16	110		11	54	4000.00	0	
CESIUM-137	(PCI/L)	6	6	29	F	-7.5	9.5	120	NA	
GROSS ALPHA	(PCI/L)	43	43	11	S	-2.5	0.82	15.000	0	
GROSS BETA	(PCI/L)	43	43	23		-14	-0.54	50.000	0	
PLUTONIUM-238	(PCI/L)	16	16	14		-28	-0.56	2.000	2	
PLUTONIUM-239	(PCI/L)	16	16	15	E	-7.4	1.1	1.000	2	
PROTACTINIUM-234	(PCI/L)	5	5	2400	E	-780	1200	2800	NA	
RADIUM	(PCI/L)	16	16	0.24		0.0000	0.055	4.000	0	
RUTHENIUM-106	(PCI/L)	2	2	360	I	0.38	180	240	NA	
STRONTIUM	(PCI/L)	16	16	61		0.075	38	8.000	14	
THORIUM-228	(PCI/L)	2	2	1400	E	7.4	700	16	NA	
TRITIUM	(PCI/L)	15	15	700		-190	180	20000.0	0	
2-BUTANONE	(UG/L)	43	9	12	B	7.0	8.9	NR	NA	
4-METHYL-2-PENTANONE	(UG/L)	43	7	3.0	BJ	1.0	1.6	NR	NA	
ACETONE	(UG/L)	43	10	3.0	BJ	1.0	2.1	NR	NA	
CHLOROBENZENE	(UG/L)	43	1	0.60	J	0.60	0.60	100.000	0	
METHYLENE CHLORIDE	(UG/L)	43	20	3.0	BJ	0.70	1.8	NR	NA	

Table 7.13. Constituents in groundwater at the Y-12 Plant site  
HGR=BC area=Above Ground Low-Level Storage Facility

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	12	9	12	1.0	7.3	250.000	0	0	
FLUORIDE	12	6	0.20	0.10	0.13	2.000	0	0	
NITRATE NITROGEN	12	3	5.2	0.30	2.0	10.000	0	0	
SULFATE	12	12	39	3.9	17	250.000	0	0	
ALUMINUM	12	10	9.6	0.024	1.1	0.200	5	5	
ALUMINUM	12	3	0.036	0.022	0.027	0.200	0	0	
BARIUM	12	12	0.19	0.052	0.11	1.000	0	0	
BARIUM	12	12	0.15	0.051	0.097	1.000	0	0	
BORON	12	12	0.13	0.010	0.037	NR	NR	NA	
BORON	12	11	0.047	0.0069	0.029	NR	NR	NA	
CALCIUM	12	12	190	49	84	NR	NR	NA	
CALCIUM	12	12	97	48	74	NR	NR	NA	
CHROMIUM	12	1	0.032	0.032	0.032	0.050	0	0	
COBALT	12	2	0.0067	0.0054	0.0061	NR	NR	NA	
COPPER	12	5	0.012	0.0041	0.0080	1.000	0	0	
COPPER	12	3	0.0059	0.0046	0.0052	1.000	0	0	
IRON	12	12	17	0.012	1.6	0.300	5	5	
IRON	12	4	0.046	0.0093	0.022	0.300	0	0	
LEAD	12	3	0.013	0.0040	0.0071	0.050	0	0	
MAGNESIUM	12	12	19	3.3	6.2	NR	NR	NA	
MAGNESIUM	12	12	12	3.2	5.4	NR	NR	NA	
MANGANESE	12	12	0.58	0.013	0.11	0.050	6	6	
MANGANESE	12	12	0.13	0.0037	0.050	0.050	4	4	
NICKEL	12	1	0.012	0.012	0.012	0.100**	0	0	
POTASSIUM	12	11	11	0.69	2.3	NR	NR	NA	
POTASSIUM	12	11	3.0	0.64	1.4	NR	NR	NA	
SODIUM	12	12	3.8	0.23	2.7	NR	NR	NA	
SODIUM	12	12	3.7	1.9	2.9	NR	NR	NA	
STRONTIUM	12	12	0.35	0.088	0.15	NR	NR	NA	

Table 7.13 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
STRONTIUM	12	12	0.16		0.085		0.13		NR	NA
URANIUM	12	10	0.0030		0.0010		0.0013	13.000	13.000	0
URANIUM FILT.	12	8	0.0030		0.0010		0.0013	13.000	13.000	0
ZINC	12	12	0.069		0.0068		0.017	5.000	5.000	0
ZINC	12	12	0.022		0.0060		0.011	5.000	5.000	0
CONDUCTIVITY, FIELD MMT	12	NA	440		240		360		NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	12	NA	9.0		0.40		3.2		NR	NA
PH, FIELD MMT.	12	NA	7.7		6.7		7.1	6.5/8.5	6.5/8.5	0
REDOX, FIELD MMT. (MV)	12	NA	260		89		160		NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	12	NA	18		12		15		NR	0
ALKALINITY-HCO3 (MG/L)	12	12	230		150		190		NR	NA
CONDUCTIVITY (UMHOS/CM)	12	12	520		290		410		NR	NA
DISSOLVED SOLIDS (MG/L)	12	12	370		190		260	500.000	500.000	0
PH	12	NA	7.8		7.3		7.5	6.5/8.5	6.5/8.5	0
TOTAL SUSPENDED SOLIDS (MG/L)	12	8	220		1.0		36		NR	NA
TURBIDITY (NTU)	12	12	110		1.0		14	1.000	1.000	11
234-URANIUM (PCI/L)	12	12	280		-11		34	20.000	20.000	3
235-URANIUM (PCI/L)	12	12	68		-24		28	24.000	24.000	6
238-URANIUM (PCI/L)	12	12	74		-18		15	24.000	24.000	4
CESIUM-137 (PCI/L)	1	1	33		33	E	33	120.000	120.000	0
GROSS ALPHA (PCI/L)	12	12	3.2		-6.2		-1.5	15.000	15.000	0
GROSS BETA (PCI/L)	12	12	10		-8.5		1.9	50.000	50.000	0
POTASSIUM-40 (PCI/L)	1	1	560		560	I	560		NR	NA
PROTACTINIUM-234 (PCI/L)	1	1	9600		9600		9600	2800	2800	1
2-BUTANONE (UG/L)	12	5	10	B	3.0	BJ	7.0		NR	NA
4-METHYL-2-PENTANONE (UG/L)	12	3	2.0	BJ	1.0	BJ	1.7		NR	NA
ACETONE (UG/L)	12	4	2.0	BJ	1.0	J	1.5		NR	NA
METHYLENE CHLORIDE (UG/L)	12	4	3.0	BJ	1.0	BJ	2.0		NR	NA

Table 7.14. Constituents in groundwater at the Y-12 Plant site  
HGR=BC area=Bear Creek Burial Grounds

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE (MG/L)	95	84	3900	1.0	170	250.000	4		
FLUORIDE (MG/L)	95	66	6.0	0.10	0.84	2.000	8		
NITRATE NITROGEN (MG/L)	95	6	12	0.20	3.3	10.000	1		
SULFATE (MG/L)	95	88	40	1.8	14	250.000	0		
ALUMINUM ICAP (MG/L)	95	71	23	0.020	2.2	0.200	48		
ALUMINUM FILTERED ICAP (MG/L)	95	23	0.27	0.022	0.053	0.200	1		
ARSENIC ICAP (MG/L)	95	3	0.062	0.053	0.057	0.050	3		
ARSENIC FILTERED ICAP (MG/L)	95	1	0.060	0.060	0.060	0.050	1		
BARIUM ICAP (MG/L)	95	94	0.96	0.0058	0.15	1.000	0		
BARIUM FILTERED ICAP (MG/L)	95	94	0.41	0.017	0.12	1.000	0		
BERYLLIUM ICAP (MG/L)	95	17	0.0038	0.0003	0.0011	0.004**	0		
BERYLLIUM FILTERED ICAP (MG/L)	95	5	0.0008	0.0004	0.0005	0.004**	0		
BORON ICAP (MG/L)	95	92	0.65	0.0056	0.085	NR	NA		
BORON FILTERED ICAP (MG/L)	95	93	0.59	0.0043	0.080	NR	NA		
CADMIUM AAS (MG/L)	95	6	0.066	0.0045	0.024	0.005	3		
CADMIUM ICAP (MG/L)	95	10	0.062	0.0036	0.016	0.005	6		
CADMIUM FILTERED AAS (MG/L)	95	6	0.077	0.0021	0.016	0.005	2		
CALCIUM ICAP (MG/L)	95	95	82	0.85	26	NR	NA		
CALCIUM FILTERED ICAP (MG/L)	95	95	81	0.75	26	NR	NA		
CHROMIUM AAS (MG/L)	95	13	0.29	0.011	0.067	0.050	3		
CHROMIUM ICAP (MG/L)	95	13	0.18	0.010	0.043	0.050	3		
COBALT ICAP (MG/L)	95	10	0.023	0.0051	0.011	NR	NA		
COBALT FILTERED ICAP (MG/L)	95	2	0.0065	0.0062	0.0064	NR	NA		
COPPER ICAP (MG/L)	95	39	0.054	0.0040	0.011	1.000	0		
COPPER FILTERED ICAP (MG/L)	95	19	0.078	0.0043	0.012	1.000	0		
IRON ICAP (MG/L)	95	94	93	0.0094	4.2	0.300	62		
IRON FILTERED ICAP (MG/L)	95	64	2.8	0.0050	0.25	0.300	12		
LEAD AAS (MG/L)	95	21	0.040	0.0040	0.015	0.050	0		
LEAD ICAP (MG/L)	49	1	0.062	0.062	0.062	0.050	1		

Table 7.14 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE VALUE		# MMTS. > REFERENCE
						VALUE	REFERENCE	
MAGNESIUM	95	95	21	0.041	5.3	NR	NR	NA
MAGNESIUM	95	95	24	0.035	5.1	NR	NR	NA
MANGANESE	95	91	2.4	0.0012	0.21	0.050	0.050	36
MANGANESE	95	83	1.3	0.0010	0.15	0.050	0.050	21
MERCURY	95	3	0.0003	0.0002	0.0002	0.002	0.002	0
MERCURY	95	7	0.0003	0.0002	0.0002	0.002	0.002	0
MOLYBDENUM	95	1	0.054	0.054	0.054	NR	NR	NA
NICKEL	95	19	0.12	0.012	0.032	0.100**	0.100**	1
NICKEL	95	14	0.043	0.010	0.020	0.100**	0.100**	0
POTASSIUM	95	90	31	0.62	3.3	NR	NR	NA
POTASSIUM	95	86	34	0.62	3.0	NR	NR	NA
SILVER	95	2	0.023	0.017	0.020	0.100	0.100	0
SILVER	95	3	0.0083	0.0065	0.0075	0.100	0.100	0
SODIUM	95	95	2100	0.92	120	NR	NR	NA
SODIUM	95	95	2000	0.87	110	NR	NR	NA
STRONTIUM	95	95	1.6	0.014	0.22	NR	NR	NA
STRONTIUM	95	95	1.7	0.0095	0.22	NR	NR	NA
URANIUM	95	22	0.064	0.0010	0.0065	13.000	13.000	0
URANIUM FILT.	95	21	0.046	0.0010	0.0054	13.000	13.000	0
VANADIUM	95	12	0.058	0.0056	0.020	NR	NR	NA
ZINC	95	92	1.6	0.0024	0.038	5.000	5.000	0
ZINC	95	87	0.12	0.0025	0.015	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	95	NA	9260	28	660	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	95	NA	12	0.40	4.4	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	95	NA	11	4.7	7.3	6.5/8.5	6.5/8.5	48
REDOX, FIELD MMT. (MV)	95	NA	310	-160	120	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	95	NA	20	4.5	15	NR	NR	0
ALKALINITY-CO3 (MG/L)	95	18	190	6.0	74	NR	NR	NA
ALKALINITY-HCO3 (MG/L)	95	95	540	12	140	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	95	95	9400	32	700	NR	NR	NA

Table 7.14 (continued)

VARIABLE	#	SAMPLES	#	MAXIMUM		#	MINIMUM		AVERAGE	#	REFERENCE	#
				DETECTED	MMT.		DETECTED	MMT.				
DISSOLVED SOLIDS	95	95	95	5100	36	95	440	500.000	12			
PH		(MG/L)										
	95	(PH UNITS)	NA	10	5.7	NA	7.6	6.5/8.5	33			
TOTAL SUSPENDED SOLIDS	95	(MG/L)	75	730	1.0	75	66	NR	NA			
TURBIDITY	95	(NTU)	95	1000	0.30	95	34	1.000	82			
234-URANIUM	9	(PCI/L)	9	8.3	0.0000	9	2.4	20.000	0			
235-URANIUM	9	(PCI/L)	9	200	-43	9	23	24.000	1			
237-NEPTUNIUM	9	(PCI/L)	9	1.1	-12	9	-1.7	1.000	1			
238-URANIUM	9	(PCI/L)	9	17	-0.19	9	3.5	24.000	0			
241-AMERICIUM	9	(PCI/L)	9	3.9	-5.2	9	-1.4	1.000	1			
99-TECHNETIUM	9	(PCI/L)	9	110	11	9	51	4000.00	0			
CESIUM-137	3	(PCI/L)	3	29	0.075	3	11	120.00	0			
GROSS ALPHA	95	(PCI/L)	95	33	-52	95	0.84	15.000	2			
GROSS BETA	95	(PCI/L)	95	44	-21	95	1.6	50.000	0			
PLUTONIUM-238	9	(PCI/L)	9	6.9	-1.5	9	0.55	2.000	1			
PLUTONIUM-239	9	(PCI/L)	9	0.74	-7.4	9	-0.58	1.000	0			
PROFRACTINIUM-234	2	(PCI/L)	2	2400	-780	2	790	2800	0			
RADIUM	9	(PCI/L)	9	0.24	0.023	9	0.083	4.000	0			
RUTHENIUM-106	2	(PCI/L)	2	360	0.38	2	180	240	1			
STRONTIUM	9	(PCI/L)	9	61	5.5	9	37	8.000	8			
THORIUM-228	2	(PCI/L)	2	1400	7.4	2	700	16.00	1			
TRITIUM	9	(PCI/L)	9	700	-27	9	290	20000.0	0			
1,1,1-TRICHLOROETHANE	95	(UG/L)	4	17	4.0	4	8.3	200.000	0			
1,1-DICHLOROETHANE	95	(UG/L)	8	51	3.0	8	16	NR	NA			
1,1-DICHLOROETHENE	95	(UG/L)	5	28	1.0	5	11	7.000	3			
1,2-DICHLOROETHANE	95	(UG/L)	2	4.0	3.0	2	3.5	5.000	0			
1,2-DICHLOROETHENE	95	(UG/L)	11	1200	3.0	11	210	70.000	4			
2-BUTANONE	95	(UG/L)	17	23	3.0	17	9.4	NR	NA			
4-METHYL-2-PENTANONE	95	(UG/L)	8	3.0	1.0	8	1.8	NR	NA			
ACETONE	95	(UG/L)	18	7.0	1.0	18	3.3	NR	NA			

Table 7.14 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM	AVERAGE		# MMTS. > REFERENCE	# MMTS. REFERENCE
			DETECTED	MMT.		DETECTED	MMTS.		
BENZENE (UG/L)	95	2	2.0	J	1.0	J	1.5	5.000	0
CHLOROFORM (UG/L)	95	1	0.60	J	0.60	J	0.60	100.000	0
METHYLENE CHLORIDE (UG/L)	95	35	7.0	BJ	0.70	J	2.0	NR	NA
TETRACHLOROETHENE (UG/L)	95	12	140	J	0.70	J	36	5.000	8
TOLUENE (UG/L)	95	2	2.0	J	2.0	J	2.0	1000.00	0
TRICHLOROETHENE (UG/L)	95	10	110	J	3.0	J	26	5.000	8
VINYL CHLORIDE (UG/L)	95	7	72	J	0.80	J	22	2.000	5
XYLENES (UG/L)	95	1	2.0	J	2.0	J	2.0	10000.0	0

Table 7.15. Constituents in groundwater at the Y-12 Plant site

HGR=BC area=exit Pathway

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	145	143	2200	1.0	97	250.000	10			
FLUORIDE	145	110	1.8	0.10	0.39	2.000	0			
NITRATE NITROGEN	145	115	290	0.20	24	10.000	58			
SULFATE	145	143	2100	2.3	140	250.000	11			
ALUMINUM	145	107	5.8	0.021	0.30	0.200	24			
ALUMINUM	144	66	0.91	0.020	0.068	0.200	4			
ANTIMONY	145	1	0.057	0.057	0.057	0.006**	0			
ARSENIC	145	2	0.086	0.051	0.069	0.050	2			
ARSENIC	144	1	0.062	0.062	0.062	0.050	1			
BARIUM	145	143	0.71	0.0069	0.11	1.000	0			
BARIUM	144	140	0.70	0.0074	0.10	1.000	0			
BERYLLIUM	145	14	0.0072	0.0003	0.0013	0.004**	2			
BERYLLIUM	144	11	0.0007	0.0003	0.0005	0.004**	0			
BORON	145	144	1.3	0.0088	0.11	NR	NA			
BORON	144	143	1.3	0.0047	0.11	NR	NA			
CADMIUM	145	5	0.024	0.0074	0.018	0.005	5			
CADMIUM	145	19	0.020	0.0033	0.0083	0.005	11			
CADMIUM	144	4	0.022	0.013	0.018	0.005	4			
CALCIUM	145	144	630	5.5	110	NR	NA			
CALCIUM	144	143	640	6.4	110	NR	NA			
CHROMIUM	145	17	0.23	0.010	0.066	0.050	7			
CHROMIUM	145	13	0.17	0.011	0.058	0.050	6			
CHROMIUM	144	2	0.036	0.019	0.028	0.050	0			
COBALT	145	7	0.012	0.0054	0.0078	NR	NA			
COBALT	144	4	0.020	0.0068	0.011	NR	NA			
COPPER	145	21	0.042	0.0042	0.0091	1.000	0			
COPPER	144	8	0.044	0.0044	0.011	1.000	0			
IRON	145	141	42	0.0064	2.3	0.300	76			
IRON	144	100	11	0.0052	1.0	0.300	32			



Table 7.15 (continued)

VARIABLE	# SAMPLES DETECTED	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE VALUE	# MMTS. >
						REFERENCE VALUE	REFERENCE
LEAD	145	5	0.0073	0.0046	0.0063	0.050	0
LEAD	144	1	0.018	0.018	0.018	0.050	0
MAGNESIUM	145	144	250	1.3	33	NR	NA
MAGNESIUM	144	143	260	1.4	33	NR	NA
MANGANESE	145	142	4.0	0.0015	0.24	0.050	72
MANGANESE	144	133	3.7	0.0010	0.22	0.050	56
MERCURY	145	2	0.0002	0.0002	0.0002	0.002	0
MERCURY	144	2	0.0002	0.0002	0.0002	0.002	0
MOLYBDENUM	144	1	0.011	0.011	0.011	NR	NA
NICKEL	145	37	0.22	0.010	0.040	0.100**	3
NICKEL	144	32	0.24	0.011	0.044	0.100**	3
POTASSIUM	145	140	26	0.67	3.8	NR	NA
POTASSIUM	144	142	31	0.60	3.7	NR	NA
SELENIUM	144	2	0.060	0.057	0.059	0.050	2
SILVER	145	2	0.015	0.0061	0.011	0.100	0
SILVER	144	1	0.046	0.046	0.046	0.100	0
SODIUM	145	144	1300	0.45	56	NR	NA
SODIUM	144	143	1200	0.48	56	NR	NA
STRONTIUM	145	144	15	0.016	0.99	NR	NA
STRONTIUM	144	143	15	0.016	0.99	NR	NA
URANIUM	145	113	0.30	0.0010	0.033	13.000	0
URANIUM FILT.	144	122	0.31	0.0010	0.028	13.000	0
VANADIUM	145	4	0.010	0.0056	0.0072	NR	NA
ZINC	144	122	0.084	0.0032	0.013	5.000	0
ZINC	145	116	0.12	0.0020	0.012	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	144	NA	7600	30	870	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	145	NA	12	0.30	5.2	NR	NA
PH, FIELD MMT. (PH UNITS)	144	NA	8.4	5.2	7.4	6.5/8.5	3
REDOX, FIELD MMT. (MV)	104	NA	280	-140	82	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	144	NA	26	5.7	14	NR	0

Table 7.15 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE VALUE
			DETECTED	MMT.		DETECTED	MMT.	DETECTED	MMTS.		
ALKALINITY-CO3	145	2	8.0	2.0		5.0		NR	NR	NA	NA
ALKALINITY-HCO3	145	144	360	16		200		NR	NR	NA	NA
CONDUCTIVITY	145	144	8700	5.8		980		NR	NR	NA	NA
DISSOLVED SOLIDS	145	144	6500	40		690		500.000	500.000	52	52
PH	145	NA	8.6	6.5		7.7		6.5/8.5	6.5/8.5	1	1
TOTAL SUSPENDED SOLIDS	145	114	330	1.0		13		NR	NR	NA	NA
TURBIDITY	145	144	200	0.60		12		1.000	1.000	134	134
234-URANIUM	6	6	1.8	-0.32		0.63		20.000	20.000	0	0
235-URANIUM	6	6	18	E -27		5.8	F	24.000	24.000	0	0
237-NEPTUNIUM	6	6	1.7	-0.27		0.20		1.000	1.000	1	1
238-URANIUM	6	6	0.74	-0.23		0.19		24.000	24.000	0	0
241-AMERICIUM	6	6	23	0.0000		4.7		1.000	1.000	4	4
99-TECHNETIUM	22	22	4300	-2400		330		4000.00	4000.00	1	1
CESIUM-137	1	1	35	I 35		35	I	NR	NR	NA	NA
GROSS ALPHA	145	145	110	-34		9.2		15.000	15.000	26	26
GROSS BETA	145	145	380	D -23		30.5		50.000	50.000	26	26
PLUTONIUM-238	6	6	0.67	-13		-1.9		2.000	2.000	0	0
PLUTONIUM-239	6	6	0.99	-4.3		-0.66		1.000	1.000	0	0
POTASSIUM-40	3	3	470	I 330		380	I	NR	NR	NA	NA
RADIUM	6	6	0.20	0.032		0.10		4.000	4.000	0	0
RUTHENIUM-106	3	3	210	I 110		170	I	NR	NR	NA	NA
STRONTIUM	22	22	50	-19		11		8.000	8.000	11	11
TRITIUM	22	22	30000	-350		2000		20000.0	20000.0	1	1
1,1,1-TRICHLOROETHANE	145	8	2.0	J 0.50		1.2	J	200.000	200.000	0	0
1,1,2-TRICHLOROETHANE	145	1	1.0	J 1.0		1.0	J	0.005	0.005	1	1
1,1,1-DICHLOROETHANE	145	2	1.0	J 0.50		0.75	J	NR	NR	NA	NA
1,1-DICHLOROETHENE	145	9	6.0	J 0.50		3.3	J	7.000	7.000	0	0
1,2-DICHLOROETHENE	145	56	13	1.0		4.3		70.000	70.000	0	0
2-BUTANONE	145	15	11	B 2.0		6.5	BJ	NR	NR	NA	NA
2-HEXANONE	145	1	2.0	BJ 2.0		2.0	BJ	NR	NR	NA	NA

Table 7.15 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
4-METHYL-2-PENTANONE	145	29	6.0	BJ	1.0	BJ	1.8	NR	NR	NA
ACETONE	145	17	7.0	BJ	1.0	J	2.7	NR	NR	NA
BENZENE	145	2	1.0	J	0.30	J	0.65	5.000	5.000	0
CARBON DISULFIDE	145	1	2.0	J	2.0	J	2.0	NR	NR	NA
CARBON TETRACHLORIDE	145	12	2.0	J	0.40	J	1.3	5.000	5.000	0
CHLOROBENZENE	145	1	1.0	J	1.0	J	1.0	100.000	100.000	0
CHLOROFORM	145	18	7.0	J	0.40	J	1.7	100.000	100.000	0
ETHYLBENZENE	145	1	2.0	J	2.0	J	2.0	700.000	700.000	0
METHYLENE CHLORIDE	145	69	3.0	BJ	0.60	JB	1.6	NR	NR	NA
STYRENE	145	1	1.0	J	1.0	J	1.0	100.000	100.000	0
TETRACHLOROETHENE	145	24	7.0	J	0.50	J	2.2	5.000	5.000	1
TOLUENE	145	1	2.0	J	2.0	J	2.0	1000.00	1000.00	0
TRICHLOROETHENE	145	59	140	J	0.70	J	28	5.000	5.000	42
VINYL ACETATE	145	1	1.0	J	1.0	J	1.0	NR	NR	NA
XYLENES	145	1	5.0	J	5.0	J	5.0	10000.0	10000.0	0

Table 7.16. Constituents in groundwater at the Y-12 Plant site

HGR=BC area=Oil Landfarm

VARIABLE	# SAMPLES DETECTED		MAXIMUM DETECTED MMT.		MINIMUM DETECTED MMT.		AVERAGE DETECTED MMTS.		REFERENCE VALUE	# MMTS. > REFERENCE
	#	#	DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	VALUE	REFERENCE
CHLORIDE	65	61	130		1.0		20	250,000	0	0
FLUORIDE	65	24	0.40		0.10		0.18	2,000	0	0
NITRATE NITROGEN	65	33	2100		0.23		210	10,000	14	14
SULFATE	65	60	180		2.1		20	250,000	0	0
ALUMINUM	65	51	28		0.024		3.1	0.200	30	30
ALUMINUM	64	21	0.16		0.021		0.051	0.200	0	0
ARSENIC	65	1	0.058		0.058		0.058	0.050	1	1
ARSENIC	64	1	0.072		0.072		0.072	0.050	1	1
BARIUM	65	65	2.5		0.015		0.43	1,000	8	8
BARIUM	64	64	2.5		0.013		0.36	1,000	7	7
BERYLLIUM	65	10	0.0019		0.0003		0.0010	0.004**	0	0
BERYLLIUM	64	1	0.0007		0.0007		0.0007	0.004**	0	0
BORON	65	61	0.42		0.0046		0.069	NR	NR	NA
BORON	64	60	0.40		0.0060		0.065	NR	NR	NA
CADMIUM	65	2	0.0078		0.0020		0.0049	0.005	1	1
CADMIUM	65	7	0.0094		0.0030		0.0068	0.005	6	6
CADMIUM	64	3	0.0069		0.0021		0.0051	0.005	2	2
CALCIUM	65	65	1200		7.7		170	NR	NR	NA
CALCIUM	64	64	1100		7.4		150	NR	NR	NA
CHROMIUM	65	8	0.067		0.012		0.039	0.050	2	2
CHROMIUM	65	10	0.15		0.010		0.064	0.050	4	4
COBALT	65	7	0.026		0.0072		0.014	NR	NR	NA
COPPER	65	25	0.10		0.0040		0.021	1,000	0	0
COPPER	64	12	0.046		0.0040		0.010	1,000	0	0
IRON	65	63	49		0.0050		3.5	0.300	41	41
IRON	64	33	1.4		0.0057		0.28	0.300	8	8
LEAD	65	12	0.031		0.0050		0.013	0.050	0	0
MAGNESIUM	65	65	77		1.5		18	NR	NR	NA
MAGNESIUM	64	64	74		1.5		16	NR	NR	NA

Table 7.16 (continued)

VARIABLE	# SAMPLES DETECTED	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE VALUE		# MMTS. > REFERENCE
						VALUE	MMTS.	
MANGANESE	65	61	1.3	0.0019	0.17	0.050	0.050	18
MANGANESE	64	53	1.3	0.0012	0.095	0.050	0.050	5
MERCURY	65	1	0.0003	0.0003	0.0003	0.002	0.002	0
NICKEL	65	13	0.15	0.011	0.042	0.100**	0.100**	1
NICKEL	64	11	0.037	0.011	0.022	0.100**	0.100**	0
POTASSIUM	65	60	9.5	0.60	2.8	NR	NR	NA
POTASSIUM	64	57	5.3	0.60	2.2	NR	NR	NA
SELENIUM	65	3	0.074	0.058	0.066	0.050	0.050	3
SELENIUM	64	3	0.26	0.089	0.15	0.050	0.050	3
SILVER	65	1	0.0074	0.0074	0.0074	0.100	0.100	0
SODIUM	65	65	78	0.81	14	NR	NR	NA
SODIUM	64	64	75	0.84	14	NR	NR	NA
STRONTIUM	65	65	3.0	0.025	0.56	NR	NR	NA
STRONTIUM	64	64	3.0	0.026	0.51	NR	NR	NA
URANIUM	65	31	0.018	0.0010	0.0031	13.000	13.000	0
URANIUM FILT.	61	31	0.018	0.0010	0.0029	13.000	13.000	0
VANADIUM	65	11	0.071	0.0051	0.021	NR	NR	NA
ZINC	65	58	0.19	0.0023	0.032	5.000	5.000	0
ZINC	64	59	0.11	0.0027	0.020	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	65	NA	5400	120	930	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	65	NA	10	0.30	3.9	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	65	NA	8.4	6.0	7.1	6.5/8.5	6.5/8.5	8
REDOX, FIELD MMT. (MV)	65	NA	310	-80	170	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	65	NA	20	9.8	15	NR	NR	0
ALKALINITY-CO3 (MG/L)	65	5	6.0	1.0	2.8	NR	NR	NA
ALKALINITY-HCO3 (MG/L)	65	65	350	52	190	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	65	65	6100	120	990	NR	NR	NA
DISSOLVED SOLIDS (MG/L)	65	65	4700	110	730	500.000	500.000	19
PH (PH UNITS)	65	NA	8.5	6.3	7.4	6.5/8.5	6.5/8.5	3
TOTAL SUSPENDED SOLIDS (MG/L)	65	57	5400	1.0	180	NR	NR	NA

Table 7.16 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.		DETECTED	MMT.	DETECTED	MMTS.		
TURBIDITY	65	65	3100	0.50		98	1.000	59			
234-URANIUM (NTU)	3	3	9.1	J		2.0	20.000	0			
235-URANIUM (PCI/L)	3	3	43	E	F	19	24.000	1			
237-NEPTUNIUM (PCI/L)	3	3	18			4.1	1.000	1			
238-URANIUM (PCI/L)	3	3	22			12	24.000	0			
99-TECHNETIUM (PCI/L)	8	8	1300			740	4000.00	0			
CESIUM-137 (PCI/L)	2	2	19	E	E	16	NR	NA			
GROSS ALPHA (PCI/L)	65	65	40			2.7	15.000	5			
PLUTONIUM-238 (PCI/L)	3	3	14			4.5	2.000	1			
PLUTONIUM-239 (PCI/L)	3	3	15			2.7	1.000	1			
PROTACTINIUM-234 (PCI/L)	2	2	2100	E	E	2000	NR	NA			
RADIUM (PCI/L)	3	3	0.025			0.013	4.000	0			
STRONTIUM (PCI/L)	8	8	58			30	8.000	6			
TRITIUM (PCI/L)	8	8	3200			560	20000.0	0			
1,1,1-TRICHLOROETHANE (UG/L)	64	11	11		J	2.4	200.000	0			
1,1-DICHLOROETHANE (UG/L)	64	6	5.0		J	3.3	NR	NA			
1,1-DICHLOROETHENE (UG/L)	64	8	21		J	9.6	7.000	4			
1,2-DICHLOROETHENE (UG/L)	64	14	23		J	8.4	70.000	0			
2-BUTANONE (UG/L)	64	11	12	B	BJ	8.8	NR	NA			
4-METHYL-2-PENTANONE (UG/L)	64	10	3.0	BJ	BJ	1.6	NR	NA			
ACETONE (UG/L)	64	7	5.0	J	BJ	3.3	NR	NA			
CARBON TETRACHLORIDE (UG/L)	64	7	4.0	J	J	2.7	5.000	0			
CHLOROFORM (UG/L)	64	11	3.0	J	J	1.3	100.000	0			
METHYLENE CHLORIDE (UG/L)	64	25	3.0	BJ	JB	1.4	NR	NA			
TETRACHLOROETHENE (UG/L)	64	10	2.0	J	J	1.0	5.000	0			
TRICHLOROETHENE (UG/L)	64	17	140			70	5.000	17			
VINYL ACETATE (UG/L)	64	1	3.0	J	J	3.0	NR	NA			

Table 7.17. Constituents in groundwater at the Y-12 Plant site

HGR=BC area=Rust Spoil Area

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. >
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
									REFERENCE VALUE
CHLORIDE	8	8	3.0		1.0		2.0	250.000	0
FLUORIDE	8	4	0.20		0.20		0.20	2.000	0
NITRATE NITROGEN	8	7	0.54		0.20		0.38	10.000	0
SULFATE	8	8	9.9		3.0		5.8	250.000	0
ALUMINUM	8	8	6.2		0.050		2.5	0.200	6
ALUMINUM	8	7	3.9		0.021		2.0	0.200	5
ARSENIC	8	1	0.070		0.070		0.070	0.050	1
BARIUM	8	8	0.034		0.017		0.025	1.000	0
BARIUM	8	8	0.041		0.016		0.027	1.000	0
BERYLLIUM	8	1	0.0003		0.0003		0.0003	0.004**	0
BERYLLIUM	8	1	0.0027		0.0027		0.0027	0.004**	0
BORON	8	8	0.022		0.0047		0.014	NR	NA
BORON	8	8	0.026		0.0060		0.015	NR	NA
CADMIUM	8	1	0.0022		0.0022		0.0022	0.005	0
CADMIUM	8	1	0.0031		0.0031		0.0031	0.005	0
CALCIUM	8	8	170		79		120	NR	NA
CALCIUM	8	8	200		76		120	NR	NA
CHROMIUM	8	5	0.015		0.010		0.012	0.050	0
CHROMIUM	8	5	0.029		0.011		0.020	0.050	0
CHROMIUM	8	3	0.012		0.010		0.011	0.050	0
COPPER	8	5	0.016		0.0046		0.0094	1.000	0
COPPER	8	3	0.0094		0.0042		0.0059	1.000	0
IRON	8	8	2.9		0.025		0.80	0.300	4
IRON	8	2	0.035		0.030		0.033	0.300	0
LEAD	8	2	0.024		0.014		0.019	0.050	0
MAGNESIUM	8	8	5.8		0.019		2.8	NR	NA
MAGNESIUM	8	7	5.3		0.023		2.9	NR	NA
MANGANESE	8	8	0.089		0.0010		0.020	0.050	1
MANGANESE	8	7	0.0058		0.0019		0.0035	0.050	0

Table 7.17 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.		
MOLYBDENUM	8	1	0.011	0.011	0.011	0.011	0.011	NR	NR	NA
NICKEL	8	3	0.031	0.031	0.011	0.019	0.019	0.100**	0.100**	0
NICKEL	8	1	0.014	0.014	0.014	0.014	0.014	0.100**	0.100**	0
POTASSIUM	8	8	11	11	1.2	5.8	5.8	NR	NR	NA
POTASSIUM	8	8	10	10	0.77	5.3	5.3	NR	NR	NA
SELENIUM	8	1	0.056	0.056	0.056	0.056	0.056	0.050	0.050	1
SODIUM	8	8	16	16	1.6	6.9	6.9	NR	NR	NA
SODIUM	8	8	16	16	1.5	6.9	6.9	NR	NR	NA
STRONTIUM	8	8	0.46	0.46	0.065	0.25	0.25	NR	NR	NA
STRONTIUM	8	8	0.51	0.51	0.064	0.26	0.26	NR	NR	NA
URANIUM	8	5	0.0010	0.0010	0.0010	0.0010	0.0010	13.000	13.000	0
URANIUM FILT.	8	4	0.0010	0.0010	0.0010	0.0010	0.0010	13.000	13.000	0
VANADIUM	8	4	0.013	0.013	0.0054	0.0076	0.0076	NR	NR	NA
VANADIUM	8	2	0.0082	0.0082	0.0078	0.0080	0.0080	NR	NR	NA
ZINC	8	8	0.086	0.086	0.025	0.041	0.041	5.000	5.000	0
ZINC	8	8	0.072	0.072	0.0041	0.033	0.033	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	2600	2600	360	1200	1200	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	7.0	7.0	1.4	4.7	4.7	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	8	NA	12	12	7.5	9.8	9.8	6.5/8.5	6.5/8.5	4
REDOX, FIELD MMT. (MV)	8	NA	270	270	-78	81	81	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	19	19	14	16	16	NR	NR	0
ALKALINITY-CO3 (MG/L)	8	4	52	52	48	50	50	NR	NR	NA
ALKALINITY-HCO3 (MG/L)	8	4	230	230	210	210	210	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	8	8	2400	2400	400	1100	1100	NR	NR	NA
DISSOLVED SOLIDS (MG/L)	8	8	680	680	240	390	390	500.000	500.000	2
PH (PH UNITS)	8	NA	12	12	7.4	9.8	9.8	6.5/8.5	6.5/8.5	4
TOTAL SUSPENDED SOLIDS (MG/L)	8	7	81	81	4.0	30	30	NR	NR	NA
TURBIDITY (NTU)	8	8	68	68	1.2	19	19	1.000	1.000	8
GROSS ALPHA (PCI/L)	8	8	1.0	1.0	-2.8	-0.69	-0.69	15.000	15.000	0
GROSS BETA (PCI/L)	8	8	10	10	-7.5	1.4	1.4	50.000	50.000	0



Table 7.17 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
2-BUTANONE	8	1	10	B	10	B	10	NR	NR	NA
4-METHYL-2-PENTANONE	8	1	1.0	BJ	1.0	BJ	1.0	NR	NR	NA
ACETONE	8	1	3.0	BJ	3.0	BJ	3.0	NR	NR	NA
CARBON TETRACHLORIDE	8	4	3.0	J	0.90	J	1.7	5.000	5.000	0
CHLOROFORM	8	5	1.0	J	0.80	J	0.96	100.000	100.000	0
METHYLENE CHLORIDE	8	2	3.0	BJ	1.0	JB	2.0	NR	NR	NA
TRICHLOROETHENE	8	8	83		10		34	5.000	5.000	8

Table 7.18. Constituents in groundwater at the Y-12 Plant site

HGR=BC area=S3 Ponds

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			(MG/L)	DETECTED MMT.	DETECTED MMT.	DETECTED MMT.	DETECTED MMTS.	REFERENCE VALUE		
CHLORIDE	30	25	21	1.0	6.0	250.000	0	0		
FLUORIDE	30	8	0.30	0.10	0.13	2.000	0	0		
NITRATE NITROGEN	30	12	1200	3.4	330	10.000	7	7		
SULFATE	30	29	18	1.1	8.2	250.000	0	0		
ALUMINUM	30	20	44	0.023	2.7	0.200	8	8		
ALUMINUM	30	4	0.042	0.025	0.030	0.200	0	0		
BARIUM	30	30	13	0.0092	1.7	1.000	4	4		
BARIUM	30	30	13	0.0082	1.6	1.000	4	4		
BERYLLIUM	30	3	0.0014	0.0004	0.0008	0.004**	0	0		
BORON	30	27	0.21	0.0041	0.041	NR	NA	NA		
BORON	30	26	0.22	0.0048	0.043	NR	NA	NA		
CADMIUM	30	2	0.0048	0.0041	0.0045	0.005	0	0		
CALCIUM	30	30	130	2.3	51	NR	NA	NA		
CALCIUM	30	30	130	2.4	52	NR	NA	NA		
CHROMIUM	30	3	0.077	0.011	0.035	0.050	1	1		
CHROMIUM	30	3	0.098	0.011	0.041	0.050	1	1		
CHROMIUM	30	1	0.012	0.012	0.012	0.050	0	0		
COBALT	30	1	0.021	0.021	0.021	NR	NA	NA		
COPPER	30	10	0.098	0.0043	0.024	1.000	0	0		
COPPER	30	5	0.030	0.0084	0.016	1.000	0	0		
IRON	30	30	46	0.011	2.9	0.300	14	14		
IRON	30	16	0.44	0.0067	0.13	0.300	2	2		
LEAD	30	3	0.042	0.0070	0.019	0.050	0	0		
MAGNESIUM	30	30	53	1.4	13	NR	NA	NA		
MAGNESIUM	30	30	52	1.1	12	NR	NA	NA		
MANGANESE	30	27	0.35	0.0015	0.077	0.050	10	10		
MANGANESE	30	26	0.30	0.0012	0.061	0.050	7	7		
NICKEL	30	5	0.061	0.012	0.025	0.100**	0	0		
NICKEL	30	5	0.020	0.015	0.017	0.100**	0	0		

Table 7.18 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE VALUE	# MMTS. >
						REFERENCE VALUE	REFERENCE
POTASSIUM ICAP (MG/L)	30	28	22	0.70	4.3	NR	NA
POTASSIUM FILTERED ICAP (MG/L)	30	27	23	0.69	4.5	NR	NA
SODIUM ICAP (MG/L)	30	30	1600	0.65	200	NR	NA
SODIUM FILTERED ICAP (MG/L)	30	30	1600	0.63	200	NR	NA
STRONTIUM ICAP (MG/L)	30	30	16	0.010	2.0	NR	NA
STRONTIUM FILTERED ICAP (MG/L)	30	30	15	0.0094	1.9	NR	NA
URANIUM FLUORIMETRIC (MG/L)	30	9	0.0020	0.0010	0.0012	13.000	0
URANIUM FILT. FLUORIMETRIC (MG/L)	30	9	0.0040	0.0010	0.0014	13.000	0
VANADIUM ICAP (MG/L)	30	2	0.058	0.0065	0.032	NR	NA
ZINC ICAP (MG/L)	30	28	0.097	0.0025	0.027	5.000	0
ZINC FILTERED ICAP (MG/L)	30	24	3.2	0.0022	0.17	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	30	NA	7500	35	1100	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	30	NA	8.6	0.30	3.3	NR	NA
PH, FIELD MMT. (PH UNITS)	30	NA	8.4	4.6	6.9	6.5/8.5	8
REDOX, FIELD MMT. (MV)	30	NA	250	-230	110	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	30	NA	20	12	15	NR	0
ALKALINITY-CO3 (MG/L)	30	1	2.0	2.0	2.0	NR	NA
ALKALINITY-HCO3 (MG/L)	30	30	250	8.0	110	NR	NA
CONDUCTIVITY (UMHOS/CM)	30	30	7600	36	1200	NR	NA
DISSOLVED SOLIDS (MG/L)	30	30	6300	50	1000	500.000	5
PH (PH UNITS)	30	NA	8.2	5.6	7.3	6.5/8.5	8
TOTAL SUSPENDED SOLIDS (MG/L)	30	20	190	1.0	22	NR	NA
TURBIDITY (NTU)	30	30	800	0.70	37	1.000	24
234-URANIUM (PCI/L)	5	5	7.3	0.0000	J	20.000	0
235-URANIUM (PCI/L)	5	5	120	-14	F	24.000	2
238-URANIUM (PCI/L)	5	5	7.6	0.0000	J	24.000	0
241-AMERICIUM (PCI/L)	5	5	10	0.0000	J	1.000	3
99-TECHNETIUM (PCI/L)	5	5	100	37	72	4000.00	0
GROSS ALPHA (PCI/L)	30	30	120	-14	4.3	15.000	1
GROSS BETA (PCI/L)	30	30	290	-22	18	50.000	1

Table 7.18 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
PLUTONIUM-239	5	5	14		0.0000		3.0	1.000	1	1
PROTACTINIUM-234	1	1	580	E	580	E	580	NR	NR	NA
RADIUM	5	5	0.055		0.0000		0.030	4.000	4.000	0
STRONTIUM	5	5	61		0.075		27	8.000	8.000	3
TRITIUM	4	4	300		-190		14	20000.0	20000.0	0
2-BUTANONE	30	7	9.0	BJ	6.0	BJ	7.6	NR	NR	NA
4-METHYL-2-PENTANONE	30	6	2.0	BJ	1.0	BJ	1.8	NR	NR	NA
ACETONE	30	7	4.0	J	1.0	BJ	2.1	NR	NR	NA
CHLOROBENZENE	30	1	0.60	J	0.60	J	0.60	100.000	100.000	0
CHLOROFORM	30	2	2.0	J	2.0	J	2.0	100.000	100.000	0
METHYLENE CHLORIDE	30	13	5.0	J	1.0	J	2.4	NR	NR	NA

Table 7.19. Constituents in groundwater at the Y-12 Plant site

HGR=BC area=Spill Area I

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.		
CHLORIDE	16	12	13		1.0		4.3	250.000	0	0
FLUORIDE	16	3	0.10		0.10		0.10	2.000	0	0
NITRATE NITROGEN	16	10	20		0.20		5.3	10.000	2	2
SULFATE	16	16	38		1.9		9.3	250.000	0	0
ALUMINUM	16	8	0.22		0.022		0.061	0.200	1	1
ALUMINUM	16	1	0.043		0.043		0.043	0.200	0	0
BARIUM	16	16	0.39		0.012		0.11	1.000	0	0
BARIUM	16	16	0.39		0.012		0.11	1.000	0	0
BERYLLIUM	16	1	0.0004		0.0004		0.0004	0.004**	0	0
BORON	16	15	0.049		0.0046		0.016	NR	NR	NA
BORON	16	14	0.027		0.0057		0.013	NR	NR	NA
CALCIUM	16	16	100		42		57	NR	NR	NA
CALCIUM	16	16	100		41		56	NR	NR	NA
CHROMIUM	16	1	0.014		0.014		0.014	0.050	0	0
COPPER	16	4	0.0071		0.0042		0.0053	1.000	0	0
COPPER	16	2	0.0091		0.0047		0.0069	1.000	0	0
IRON	16	12	0.87		0.0053		0.13	0.300	1	1
IRON	16	1	0.012		0.012		0.012	0.300	0	0
MAGNESIUM	16	16	27		8.1		20	NR	NR	NA
MAGNESIUM	16	16	27		7.9		20	NR	NR	NA
MANGANESE	16	12	0.010		0.0010		0.0028	0.050	0	0
MANGANESE	16	10	0.0043		0.0010		0.0017	0.050	0	0
NICKEL	16	1	0.030		0.030		0.030	0.100**	0	0
NICKEL	16	3	0.013		0.012		0.013	0.100**	0	0
POTASSIUM	16	16	3.6		0.87		1.9	NR	NR	NA
POTASSIUM	16	16	3.6		0.87		1.9	NR	NR	NA
SELENIUM	16	1	0.063		0.063		0.063	0.050	1	1
SELENIUM	16	1	0.055		0.055		0.055	0.050	1	1
SILVER	16	1	0.0065		0.0065		0.0065	0.100	0	0

Table 7.19 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
							VALUE	REFERENCE	
SODIUM	16	16	7.1	0.90	3.4	NR	NR	NR	NA
SODIUM	16	16	6.9	1.0	3.4	NR	NR	NR	NA
STRONTIUM	16	16	0.17	0.018	0.058	NR	NR	NR	NA
STRONTIUM	16	16	0.17	0.018	0.059	NR	NR	NR	NA
URANIUM	16	9	0.0060	0.0010	0.0017	13.000	13.000	0	0
URANIUM FILT.	16	8	0.0010	0.0010	0.0010	13.000	13.000	0	0
ZINC	16	16	0.049	0.0034	0.015	5.000	5.000	0	0
ZINC	16	16	0.054	0.0047	0.016	5.000	5.000	0	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	16	NA	580	320	400	NR	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	16	NA	8.9	2.5	7.1	NR	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	16	NA	8.1	6.5	7.5	6.5/8.5	6.5/8.5	0	0
REDOX, FIELD MMT. (MV)	16	NA	230	14	180	NR	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	16	NA	19	12	15	NR	NR	NR	0
ALKALINITY=HCO3 (MG/L)	16	16	230	180	210	NR	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	16	16	630	360	440	NR	NR	NR	NA
DISSOLVED SOLIDS (MG/L)	16	16	410	180	250	500.000	500.000	0	0
PH (PH UNITS)	16	NA	8.0	7.1	7.8	6.5/8.5	6.5/8.5	0	0
TOTAL SUSPENDED SOLIDS (MG/L)	16	3	4.0	1.0	2.7	NR	NR	NR	NA
TURBIDITY (NTU)	16	16	8.0	0.40	1.8	1.000	1.000	7	7
GROSS ALPHA (PCI/L)	16	16	5.4	-2.5	1.1	15.000	15.000	0	0
GROSS BETA (PCI/L)	16	16	54	-1.4	9.0	50.000	50.000	1	1
1,2-DICHLOROETHENE (UG/L)	16	4	7.0	2.0	4.8	70.000	70.000	0	0
2-BUTANONE (UG/L)	16	6	8.0	3.0	5.7	NR	NR	NR	NA
4-METHYL-2-PENTANONE (UG/L)	16	4	2.0	2.0	2.0	NR	NR	NR	NA
ACETONE (UG/L)	16	5	3.0	1.0	2.2	NR	NR	NR	NA
BROMODICHLOROMETHANE (UG/L)	16	4	2.0	1.0	1.8	100.000	100.000	0	0
CHLOROFORM (UG/L)	16	4	9.0	6.0	7.5	100.000	100.000	0	0
METHYLENE CHLORIDE (UG/L)	16	4	2.0	1.0	1.5	NR	NR	NR	NA
TETRACHLOROETHENE (UG/L)	16	4	10	5.0	7.5	5.000	5.000	3	3
TRICHLOROETHENE (UG/L)	16	4	5.0	2.0	3.8	5.000	5.000	0	0

Table 7.20. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Background

VARIABLE	#	SAMPLES	#	#	MAXIMUM		MINIMUM		AVERAGE		REFERENCE		#	MMTS. >
					DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	VALUE	REFERENCE		
CHLORIDE		(MG/L)	24	22	59	1.0	16	250.000	0					
FLUORIDE		(MG/L)	24	20	0.30	0.10	0.16	2.000	0					
NITRATE NITROGEN		(MG/L)	24	4	0.60	0.27	0.45	10.000	0					
SULFATE		(MG/L)	24	24	140	2.0	35	250.000	0					
ALUMINUM		ICAP (MG/L)	24	24	42	0.038	3.1	0.200	17					
ALUMINUM		FILTERED ICAP (MG/L)	24	14	0.16	0.021	0.046	0.200	0					
BARIIUM		ICAP (MG/L)	24	24	1.1	0.024	0.22	1.000	1					
BARIIUM		FILTERED ICAP (MG/L)	24	24	0.32	0.026	0.16	1.000	0					
BERYLLIUM		ICAP (MG/L)	24	3	0.0021	0.0004	0.0010	0.004**	0					
BORON		ICAP (MG/L)	24	24	0.18	0.010	0.039	NR	NA					
BORON		FILTERED ICAP (MG/L)	24	24	0.075	0.010	0.030	NR	NA					
CADMIUM		AAS (MG/L)	24	3	0.0067	0.0030	0.0045	0.005	1					
CADMIUM		ICAP (MG/L)	24	3	0.0062	0.0035	0.0049	0.005	1					
CADMIUM		FILTERED AAS (MG/L)	24	3	0.0066	0.0025	0.0040	0.005	1					
CALCIUM		ICAP (MG/L)	24	24	220	46	90	NR	NA					
CALCIUM		FILTERED ICAP (MG/L)	24	24	150	46	84	NR	NA					
CHROMIUM		AAS (MG/L)	24	6	5.8	0.016	1.0	0.050	4					
CHROMIUM		ICAP (MG/L)	24	5	5.0	0.036	1.1	0.050	4					
CHROMIUM		FILTERED AAS (MG/L)	24	1	0.026	0.026	0.026	0.050	0					
COBALT		ICAP (MG/L)	24	5	0.048	0.0054	0.020	NR	NA					
COBALT		FILTERED ICAP (MG/L)	24	2	0.0091	0.0066	0.0079	NR	NA					
COPPER		ICAP (MG/L)	24	12	0.20	0.0041	0.025	1.000	0					
COPPER		FILTERED ICAP (MG/L)	24	2	0.034	0.0046	0.019	1.000	0					
IRON		ICAP (MG/L)	24	24	56	0.011	5.8	0.300	19					
IRON		FILTERED ICAP (MG/L)	24	17	4.6	0.0083	0.84	0.300	5					
LEAD		AAS (MG/L)	24	3	0.11	0.0066	0.048	0.050	1					
MAGNESIUM		ICAP (MG/L)	24	24	42	5.9	17	NR	NA					
MAGNESIUM		FILTERED ICAP (MG/L)	24	24	41	5.9	16	NR	NA					
MANGANESE		ICAP (MG/L)	24	24	2.1	0.011	0.46	0.050	13					

Table 7.20 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
MANGANESE	24	24	2.2	0.0027	0.38	0.050	9		
MOLYBDENUM	24	1	0.051	0.051	0.051	NR	NA		
NICKEL	24	7	2.1	0.011	0.45	0.100**	4		
NICKEL	24	7	0.96	0.012	0.25	0.100**	4		
POTASSIUM	24	24	13	1.2	2.7	NR	NA		
POTASSIUM	24	24	3.8	0.91	2.1	NR	NA		
SODIUM	24	24	29	6.8	15	NR	NA		
SODIUM	24	24	30	6.8	15	NR	NA		
STRONTIUM	24	24	0.96	0.087	0.25	NR	NA		
STRONTIUM	24	24	0.53	0.087	0.23	NR	NA		
URANIUM	24	9	0.0020	0.0010	0.0011	13.000	0		
URANIUM FILT.	24	9	0.0010	0.0010	0.0010	13.000	0		
VANADIUM	24	4	0.060	0.0057	0.027	NR	NA		
ZINC	24	24	0.20	0.0042	0.030	5.000	0		
ZINC	24	22	0.063	0.0024	0.017	5.000	0		
CONDUCTIVITY, FIELD MMT	24	NA	1000	300	550	NR	NA		
DISSOLVED OXYGEN, FIELD MMT.	24	NA	8.4	1.2	5.6	NR	NA		
PH, FIELD MMT.	24	NA	8.1	6.4	7.2	6.5/8.5	2		
REDOX, FIELD MMT.	24	NA	220	-160	91	NR	NA		
WATER TEMP, FIELD MMT (DEG. CENT.)	24	NA	29	12	18	NR	0		
ALKALINITY-HCO3	24	24	450	150	250	NR	NA		
CONDUCTIVITY	24	24	1100	360	570	NR	NA		
CONDUCTIVITY, REP. 2	1	1	460	460	460	NR	NA		
DISSOLVED SOLIDS	24	24	740	220	370	500.000	4		
PH	24	NA	8.3	6.7	7.6	6.5/8.5	0		
PH, REP. 2	1	NA	7.9	7.9	7.9	6.5/8.5	0		
TOTAL SUSPENDED SOLIDS	24	23	2200	1.0	130	NR	NA		
TURBIDITY	24	24	1700	1.0	130	1.000	23		
GROSS ALPHA	24	24	28	-4.3	1.3	15.000	1		



Table 7.20 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.			
GROSS BETA	24	24	81	-8.5		6.9	50.000	1			
1,1-DICHLOROETHANE	(PCI/L)	24	2	1.0	J	1.0	NR	NR	NR	NA	
1,2-DICHLOROETHENE	(UG/L)	24	4	19		16	70.000	0	70.000	0	
2-BUTANONE	(UG/L)	24	2	9.0	JB	8.5	NR	NR	NR	NA	
4-METHYL-2-PENTANONE	(UG/L)	24	5	2.0	BJ	1.6	NR	NR	NR	NA	
ACETONE	(UG/L)	24	3	32	JB	13	NR	NR	NR	NA	
METHYLENE CHLORIDE	(UG/L)	24	8	2.0	JB	1.4	NR	NR	NR	NA	
TETRACHLOROETHENE	(UG/L)	24	3	1.0	J	1.0	5.000	0	5.000	0	
TRICHLOROETHENE	(UG/L)	24	3	3.0	J	3.0	5.000	0	5.000	0	

Table 7.21. Constituents in groundwater at the Y-12 Plant site  
HGR=EF area=Beta-4 Security Pit

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE DETECTED MMTS.	REFERENCE VALUE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.		VALUE	REFERENCE	
CHLORIDE	16	16	15	2.2	250.000	5.9	250.000	0	0	
FLUORIDE	16	6	0.20	0.10	2.000	0.15	2.000	0	0	
NITRATE NITROGEN	16	1	0.30	0.30	10.000	0.30	10.000	0	0	
SULFATE	16	16	20	2.0	250.000	11	250.000	0	0	
ALUMINUM	16	16	42	0.077	0.200	6.9	0.200	14	14	
ALUMINUM	16	8	0.097	0.022	0.200	0.042	0.200	0	0	
BARIUM	16	16	1.1	0.16	1.000	0.36	1.000	1	1	
BARIUM	16	16	0.32	0.15	1.000	0.23	1.000	0	0	
BERYLLIUM	16	5	0.0021	0.0004	0.004**	0.0009	0.004**	0	0	
BORON	16	16	0.097	0.0092	NR	0.039	NR	NR	NA	
BORON	16	16	0.084	0.0099	NR	0.031	NR	NR	NA	
CADMIUM	16	3	0.0056	0.0042	0.005	0.0049	0.005	1	1	
CALCIUM	16	16	220	64	NR	92	NR	NR	NA	
CALCIUM	16	16	110	62	NR	82	NR	NR	NA	
CHROMIUM	16	6	0.094	0.016	0.050	0.039	0.050	1	1	
CHROMIUM	16	5	0.079	0.015	0.050	0.034	0.050	1	1	
COBALT	16	7	0.030	0.0068	NR	0.015	NR	NR	NA	
COBALT	16	2	0.0066	0.0053	NR	0.0060	NR	NR	NA	
COPPER	16	11	0.050	0.0041	1.000	0.020	1.000	0	0	
COPPER	16	1	0.012	0.012	1.000	0.012	1.000	0	0	
IRON	16	16	56	0.80	0.300	11	0.300	16	16	
IRON	16	15	4.6	0.0064	0.300	0.87	0.300	4	4	
LEAD	16	6	0.026	0.0041	0.050	0.011	0.050	0	0	
MAGNESIUM	16	16	33	6.2	NR	11	NR	NR	NA	
MAGNESIUM	16	16	13	5.7	NR	8.6	NR	NR	NA	
MANGANESE	16	16	2.1	0.042	0.050	1.2	0.050	15	15	
MANGANESE	16	16	2.2	0.016	0.050	0.56	0.050	8	8	
NICKEL	16	7	0.078	0.010	0.100**	0.027	0.100**	0	0	
NICKEL	16	2	0.017	0.014	0.100**	0.016	0.100**	0	0	
POTASSIUM	16	16	13	0.74	NR	3.3	NR	NR	NA	

Table 7.21 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE VALUE	# MMTS. > REFERENCE
POTASSIUM	16	15	3.2	0.75	1.4	NR	NA
SODIUM	16	16	15	4.7	8.1	NR	NA
SODIUM	16	16	14	5.0	7.8	NR	NA
STRONTIUM	16	16	0.96	0.13	0.27	NR	NA
STRONTIUM	16	16	0.53	0.13	0.24	NR	NA
URANIUM	16	5	0.090	0.0010	0.020	13.000	0
URANIUM FILT.	16	8	0.090	0.0010	0.014	13.000	0
URANIUM	16	7	0.060	0.0064	0.020	NR	NA
ZINC	16	16	0.20	0.011	0.044	5.000	0
ZINC	16	16	0.046	0.0056	0.019	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	16	NA	720	340	470	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	16	NA	8.4	1.5	5.1	NR	NA
PH, FIELD MMT. (PH UNITS)	16	NA	7.6	6.3	6.9	6.5/8.5	3
REDOX, FIELD MMT. (MV)	16	NA	220	-36	120	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	16	NA	23	12	18	NR	0
ALKALINITY-HCO3 (MG/L)	16	16	350	180	250	NR	NA
CONDUCTIVITY (UMHOS/CM)	16	16	660	370	490	NR	NA
DISSOLVED SOLIDS (MG/L)	16	16	430	250	330	500.000	0
PH (PH UNITS)	16	NA	8.0	6.7	7.3	6.5/8.5	0
TOTAL SUSPENDED SOLIDS (MG/L)	16	16	2200	6.0	290	NR	NA
TURBIDITY (NTU)	16	16	1700	5.8	250	1.000	16
GROSS ALPHA (PCI/L)	16	16	28	-1.7	5.2	15.000	2
GROSS BETA (PCI/L)	16	16	81	-9.0	13	50.000	1
1,1-DICHLOROETHANE (UG/L)	16	2	1.0	1.0	1.0	NR	NA
1,2-DICHLOROETHANE (UG/L)	16	4	19	9.0	16	70.000	0
2-BUTANONE (UG/L)	16	4	9.0	6.0	7.8	NR	NA
4-METHYL-2-PENTANONE (UG/L)	16	4	2.0	1.0	1.3	NR	NA
ACETONE (UG/L)	16	4	4.0	2.0	3.0	NR	NA
METHYLENE CHLORIDE (UG/L)	16	4	2.0	2.0	2.0	NR	NA
TETRACHLOROETHENE (UG/L)	16	3	1.0	1.0	1.0	5.000	0
TRICHLOROETHENE (UG/L)	16	3	3.0	3.0	3.0	5.000	0

Table 7.22. Constituents in groundwater at the Y-12 Plant site  
HGR=EF area=exit Pathway

VARIABLE	#	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
				DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	64	64	64	280	1.0	29	250.000	3		
FLUORIDE	64	43	3.6	0.10	0.63	2.000	6			
NITRATE NITROGEN	64	35	2.4	0.20	0.82	10.000	0			
SULFATE	64	64	110	4.5	27	250.000	0			
ALUMINUM	64	45	75	0.020	7.2	0.200	20			
ALUMINUM	64	17	2.3	0.023	0.28	0.200	4			
ANTIMONY	64	1	0.097	0.097	0.097	0.006**	0			
ARSENIC	64	1	0.063	0.063	0.063	0.050	1			
ARSENIC	64	2	0.071	0.050	0.061	0.050	1			
BARIUM	64	64	0.88	0.012	0.12	1.000	0			
BARIUM	64	64	0.60	0.010	0.091	1.000	0			
BERYLLIUM	64	9	0.0092	0.0006	0.0039	0.004**	3			
BERYLLIUM	64	1	0.0011	0.0011	0.0011	0.004**	0			
BORON	64	63	1.6	0.0064	0.25	NR	NA			
BORON	64	63	1.6	0.0049	0.25	NR	NA			
CADMIUM	64	7	0.030	0.0021	0.014	0.005	5			
CADMIUM	64	11	0.027	0.0034	0.015	0.005	9			
CADMIUM	64	4	0.022	0.0040	0.0089	0.005	2			
CALCIUM	64	64	150	1.2	62	NR	NA			
CALCIUM	64	64	120	1.1	59	NR	NA			
CHROMIUM	64	12	0.20	0.010	0.071	0.050	8			
CHROMIUM	64	11	0.12	0.010	0.059	0.050	6			
COBALT	64	13	0.089	0.0054	0.033	NR	NA			
COBALT	64	6	0.025	0.0051	0.010	NR	NA			
COPPER	64	27	0.11	0.0040	0.023	1.000	0			
COPPER	64	9	0.017	0.0040	0.0084	1.000	0			
IRON	64	64	130	0.017	10	0.300	41			
IRON	64	44	47	0.0071	1.9	0.300	13			

Table 7.22 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
LEAD	64	11	0.18	0.0045	0.081	0.050	6			
LEAD	32	4	0.16	0.0000	0.090	0.050	3			
LEAD	64	1	0.064	0.064	0.064	0.050	1			
MAGNESIUM	64	64	79	0.43	19	NR	NA			
MAGNESIUM	64	64	53	0.46	17	NR	NA			
MANGANESE	64	61	7.8	0.0010	0.83	0.050	29			
MANGANESE	64	56	5.7	0.0012	0.49	0.050	22			
MERCURY	64	1	0.0003	0.0003	0.0003	0.002	0			
NICKEL	64	16	0.37	0.012	0.097	0.100**	6			
NICKEL	64	12	0.30	0.010	0.075	0.100**	3			
POTASSIUM	64	63	19	1.0	4.1	NR	NA			
POTASSIUM	64	63	7.5	0.92	3.0	NR	NA			
SELENIUM	64	3	0.056	0.053	0.054	0.050	3			
SELENIUM	64	1	0.061	0.061	0.061	0.050	1			
SILVER	64	1	0.012	0.012	0.012	0.100	0			
SODIUM	64	64	430	1.3	46	NR	NA			
SODIUM	65	64	430	1.2	46	NR	NA			
STRONTIUM	65	64	1.5	0.036	0.31	NR	NA			
STRONTIUM	65	64	1.5	0.033	0.31	NR	NA			
URANIUM	65	20	0.19	0.0010	0.028	13.000	0			
URANIUM FILT.	65	17	0.19	0.0010	0.038	13.000	0			
VANADIUM	65	10	0.13	0.0061	0.062	NR	NA			
VANADIUM	65	1	0.021	0.021	0.021	NR	NA			
ZINC	65	60	2.0	0.0037	0.16	5.000	0			
ZINC	65	61	1.8	0.0027	0.10	5.000	0			
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	65	NA	1800	150	570	NR	NA			
DISSOLVED OXYGEN, FIELD MMT. (PPM)	65	NA	9.3	0.20	2.8	NR	NA			
PH, FIELD MMT. (PH UNITS)	65	NA	9.0	4.8	7.3	6.5/8.5	13			
REDOX, FIELD MMT. (MV)	65	NA	240	-320	73	NR	NA			

Table 7.22 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
WATER TEMP, FIELD MMT (DEG. CENT.)	65	NA	22		12		15		NR	0
ALKALINITY-CO3 (MG/L)	65	6	82		40		57		NR	NA
ALKALINITY-HCO3 (MG/L)	65	64	510		34		250		NR	NA
CONDUCTIVITY (UMHOS/CM)	65	64	1900		170		610		NR	NA
DISSOLVED SOLIDS (MG/L)	65	64	1100		110		380		500.000	8
PH (PH UNITS)	65	NA	9.3		5.7		7.6		6.5/8.5	12
TOTAL SUSPENDED SOLIDS (MG/L)	65	45	2800		1.0		250		NR	NA
TURBIDITY (NTU)	65	64	2300		0.70		120		1.000	59
GROSS ALPHA (PCI/L)	65	65	83		-11		7.9		15.000	9
GROSS BETA (PCI/L)	65	65	200		-4.0		14.3		50.000	5
1,1-DICHLOROETHANE (UG/L)	65	3	3.0	J	3.0	J	3.0		NR	NA
1,1-DICHLOROETHENE (UG/L)	65	3	2.0	J	1.0	J	1.3		7.000	0
1,2-DICHLOROETHENE (UG/L)	65	14	41	J	1.0	J	22.7		70.000	0
2-BUTANONE (UG/L)	65	4	8.0	BJ	3.0	BJ	6.3		NR	NA
4-METHYL-2-PENTANONE (UG/L)	65	13	11	BJ	1.0	BJ	2.2		NR	NA
ACETONE (UG/L)	65	8	29	J	1.0	BJ	6.3		NR	NA
CARBON TETRACHLORIDE (UG/L)	65	15	1100	E	1.0	J	260		5.000	14
CHLOROFORM (UG/L)	65	19	310		1.0	J	73		100.000	4
METHYLENE CHLORIDE (UG/L)	65	21	17	BJ	0.80	J	3.2		NR	NA
TETRACHLOROETHENE (UG/L)	65	26	43		1.0	J	10.8		5.000	16
TRICHLOROETHENE (UG/L)	65	22	41		0.90	J	9.1		5.000	9
VINYL ACETATE (UG/L)	65	1	10	J	10	J	10		NR	NA
VINYL CHLORIDE (UG/L)	65	1	2.0	J	2.0	J	2.0		2.000	0

Table 7.23. Constituents in groundwater at the Y-12 Plant site  
HGR=EF area=Fite Training Facility

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. >
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
								VALUE	REFERENCE
CHLORIDE	8	8	3.2	1.7	2.6	250.000	0		
FLUORIDE	8	4	0.20	0.10	0.15	2.000	0		
NITRATE NITROGEN	8	8	2.3	0.49	1.3	10.000	0		
SULFATE	8	8	9.1	2.8	5.1	250.000	0		
ALUMINUM	8	8	3.7	0.14	1.2	0.200	5		
ALUMINUM	8	8	3.3	0.032	1.1	0.200	6		
ARSENIC	8	1	0.057	0.057	0.057	0.050	1		
BARIUM	8	8	0.061	0.0069	0.024	1.000	0		
BARIUM	8	8	0.055	0.0067	0.021	1.000	0		
BORON	8	8	0.084	0.019	0.042	NR	NA		
BORON	8	8	0.080	0.019	0.042	NR	NA		
CALCIUM	8	8	200	44	74	NR	NA		
CALCIUM	8	8	180	36	69	NR	NA		
CHROMIUM	8	1	0.013	0.013	0.013	0.050	0		
CHROMIUM	8	1	0.011	0.011	0.011	0.050	0		
CHROMIUM	8	1	0.011	0.011	0.011	0.050	0		
COPPER	8	4	0.0067	0.0044	0.0057	1.000	0		
COPPER	8	1	0.0046	0.0046	0.0046	1.000	0		
IRON	8	7	0.11	0.013	0.042	0.300	0		
IRON	8	2	0.012	0.0051	0.0086	0.300	0		
MAGNESIUM	8	8	9.0	0.68	3.7	NR	NA		
MAGNESIUM	8	8	8.5	0.030	2.5	NR	NA		
MANGANESE	8	4	0.0052	0.0014	0.0030	0.050	0		
MANGANESE	8	2	0.0033	0.0014	0.0024	0.050	0		
NICKEL	8	1	0.010	0.010	0.010	0.100**	0		
POTASSIUM	8	8	32	4.4	17	NR	NA		
POTASSIUM	8	8	32	4.9	19	NR	NA		
SODIUM	8	8	6.0	2.5	3.6	NR	NA		
SODIUM	8	8	5.9	2.5	3.9	NR	NA		

Table 7.23 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.	
STRONTIUM	8	8	0.60	0.13	0.23	NR	NR	NA	NA
STRONTIUM	8	8	0.57	0.11	0.25	NR	NR	NA	NA
URANIUM	8	4	0.0010	0.0010	0.0010	13.000	13.000	0	0
URANIUM FILT.	8	3	0.0010	0.0010	0.0010	13.000	13.000	0	0
VANADIUM	8	3	0.0063	0.0051	0.0056	NR	NR	NA	NA
VANADIUM	8	1	0.0052	0.0052	0.0052	NR	NR	NA	NA
ZINC	8	6	0.022	0.0022	0.010	5.000	5.000	0	0
ZINC	8	6	0.0078	0.0025	0.0052	5.000	5.000	0	0
CONDUCTIVITY, FIELD MMT	8	NA	2100	240	590	NR	NR	NA	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	6.3	1.9	4.0	NR	NR	NA	NA
PH, FIELD MMT. (PH UNITS)	8	NA	12	9.1	10	6.5/8.5	6.5/8.5	8	8
REDOX, FIELD MMT. (MV)	8	NA	84	-37	23	NR	NR	NA	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	20	11	16	NR	NR	0	0
ALKALINITY-CO3 (MG/L)	8	7	240	8.0	49	NR	NR	NA	NA
ALKALINITY-HCO3 (MG/L)	8	4	140	37	74	NR	NR	NA	NA
CONDUCTIVITY (UMHOS/CM)	8	8	2200	120	490	NR	NR	NA	NA
DISSOLVED SOLIDS (MG/L)	8	8	560	72	190	500.000	500.000	1	1
PH	8	NA	12	8.2	9.9	6.5/8.5	6.5/8.5	7	7
TOTAL SUSPENDED SOLIDS (MG/L)	8	7	78	30	53	NR	NR	NA	NA
TURBIDITY (NTU)	8	8	36	2.9	19	1.000	1.000	8	8
GROSS ALPHA (PCI/L)	8	8	3.1	-0.67	0.81	15.000	15.000	0	0
GROSS BETA (PCI/L)	8	8	20	7.3	13	50.000	50.000	0	0
1,2-DICHLOROETHENE (UG/L)	8	8	620	61	320	70.000	70.000	7	7
2-BUTANONE (UG/L)	8	1	41	41	41	B	NR	NR	NA
4-METHYL-2-PENTANONE (UG/L)	8	1	4.0	4.0	4.0	JB	NR	NR	NA
ACETONE (UG/L)	8	2	60	20	40	JB	NR	NR	NA
METHYLENE CHLORIDE (UG/L)	8	2	9.0	8.0	8.5	JB	NR	NR	NA
TETRACHLOROETHENE (UG/L)	8	8	780	95	360	5.000	5.000	8	8
TRICHLOROETHENE (UG/L)	8	8	230	35	120	5.000	5.000	8	8



Table 7.24. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid C1

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	8	8	56	9.0	24	250.000	0	0	
FLUORIDE	8	7	0.10	0.10	0.10	2.000	0	0	
SULFATE	8	8	16	2.0	9.1	250.000	0	0	
ALUMINUM	8	6	0.58	0.024	0.16	0.200	1	1	
ALUMINUM	8	4	0.048	0.023	0.036	0.200	0	0	
BARIUM	8	8	0.17	0.084	0.12	1.000	0	0	
BARIUM	8	8	0.16	0.083	0.12	1.000	0	0	
BERYLLIUM	8	4	0.0079	0.0005	0.0052	0.004**	3	3	
BERYLLIUM	8	1	0.0051	0.0051	0.0051	0.004**	1	1	
BORON	8	7	0.076	0.017	0.042	NR	NR	NA	
BORON	8	7	0.11	0.0095	0.045	NR	NR	NA	
CADMIUM	8	2	0.010	0.0046	0.0073	0.005	1	1	
CALCIUM	8	8	77	11	42	NR	NR	NA	
CALCIUM	8	8	77	11	42	NR	NR	NA	
CHROMIUM	8	2	0.038	0.011	0.025	0.050	0	0	
COBALT	8	4	0.069	0.056	0.059	NR	NR	NA	
COBALT	8	5	0.063	0.0054	0.047	NR	NR	NA	
COPPER	8	1	0.012	0.012	0.012	1.000	0	0	
COPPER	8	1	0.013	0.013	0.013	1.000	0	0	
IRON	8	8	37	0.15	18	0.300	6	6	
IRON	8	8	37	0.019	17	0.300	4	4	
LEAD	8	1	0.015	0.015	0.015	0.050	0	0	
LEAD	8	1	0.0042	0.0042	0.0042	0.050	0	0	
MAGNESIUM	8	8	7.5	5.0	6.2	NR	NR	NA	
MAGNESIUM	8	8	7.5	5.0	6.3	NR	NR	NA	
MANGANESE	8	8	13	0.20	6.4	0.050	8	8	
MANGANESE	8	8	13	0.21	6.4	0.050	8	8	
NICKEL	8	2	0.013	0.011	0.012	0.100**	0	0	

Table 7.24 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM	AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.		DETECTED	MMTS.		
POTASSIUM	8	7	1.6	0.68	1.1	NR	NA	NA	
POTASSIUM	8	7	1.5	1.1	1.3	NR	NA	NA	
SILVER	8	2	0.0091	0.0082	0.0087	0.100	0	0	
SILVER	8	1	0.0096	0.0096	0.0096	0.100	0	0	
SODIUM	8	8	22	5.0	13	NR	NA	NA	
SODIUM	8	8	22	5.1	13	NR	NA	NA	
STRONTIUM	8	8	0.16	0.035	0.097	NR	NA	NA	
STRONTIUM	8	8	0.16	0.035	0.097	NR	NA	NA	
URANIUM	8	2	0.0010	0.0010	0.0010	13.000	0	0	
VANADIUM	8	2	0.0065	0.0062	0.0064	NR	NA	NA	
ZINC	8	8	0.050	0.0041	0.022	5.000	0	0	
ZINC	8	8	0.055	0.0055	0.023	5.000	0	0	
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	390	300	350	NR	NA	NA	
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	6.7	1.1	4.2	NR	NA	NA	
PH, FIELD MMT. (PH UNITS)	8	NA	7.6	5.6	6.7	6.5/8.5	4	4	
REDOX, FIELD MMT. (MV)	8	NA	220	-26	62	NR	NA	NA	
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	20	16	18	NR	0	0	
ALKALINITY-HCO3 (MG/L)	8	8	200	110	160	NR	NA	NA	
CONDUCTIVITY (UMHOS/CM)	8	8	420	320	380	NR	NA	NA	
DISSOLVED SOLIDS (MG/L)	8	8	310	190	240	500.000	0	0	
PH (PH UNITS)	8	NA	8.0	6.2	7.0	6.5/8.5	4	4	
TOTAL SUSPENDED SOLIDS (MG/L)	8	7	31	1.0	9.0	NR	NA	NA	
TURBIDITY (NTU)	8	8	20	1.9	8.0	1.000	8	8	
GROSS ALPHA (PCI/L)	8	8	1.6	-0.86	-0.046	15.000	0	0	
GROSS BETA (PCI/L)	8	8	3.9	-9.3	-2.8	50.000	0	0	
ACETONE (UG/L)	8	1	10	10	10	NR	NA	NA	
BENZENE (UG/L)	8	1	1.0	1.0	1.0	5.000	0	0	
CARBON DISULFIDE (UG/L)	8	1	2.0	2.0	2.0	NR	NA	NA	
METHYLENE CHLORIDE (UG/L)	8	2	1.0	1.0	1.0	NR	NA	NA	
TOLUENE (UG/L)	8	1	1.0	1.0	1.0	1000.00	0	0	
TRICHLOROETHENE (UG/L)	8	1	4.0	4.0	4.0	5.000	0	0	

Table 7.25. Constituents in groundwater at the Y-12 Plant site  
HGR=EF area=Grid E1

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		REFERENCE VALUE	# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE (MG/L)	8	8	9.1	2.8	5.6	250.000	0	0		
FLUORIDE (MG/L)	8	8	0.10	0.10	0.10	2.000	0	0		
SULFATE (MG/L)	8	8	13	9.7	11	250.000	0	0		
ALUMINUM ICAP (MG/L)	8	8	21	0.022	5.8	0.200	5	5		
ALUMINUM FILTERED ICAP (MG/L)	8	6	0.19	0.022	0.073	0.200	0	0		
BARIUM ICAP (MG/L)	8	8	0.40	0.18	0.30	1.000	0	0		
BARIUM FILTERED ICAP (MG/L)	8	8	0.31	0.056	0.21	1.000	0	0		
BERYLLIUM ICAP (MG/L)	8	3	0.0008	0.0003	0.0006	0.004**	0	0		
BORON ICAP (MG/L)	8	8	0.087	0.020	0.056	NR	NA	NA		
BORON FILTERED ICAP (MG/L)	8	8	0.079	0.012	0.049	NR	NA	NA		
CADMIUM ICAP (MG/L)	8	1	0.0050	0.0050	0.0050	0.005	0	0		
CALCIUM ICAP (MG/L)	8	8	100	43	75	NR	NA	NA		
CALCIUM FILTERED ICAP (MG/L)	8	8	100	45	67	NR	NA	NA		
CHROMIUM AAS (MG/L)	8	3	0.068	0.022	0.038	0.050	1	1		
CHROMIUM ICAP (MG/L)	8	4	0.047	0.013	0.025	0.050	0	0		
COBALT ICAP (MG/L)	8	2	0.012	0.011	0.012	NR	NA	NA		
COPPER ICAP (MG/L)	8	2	0.015	0.0044	0.0097	1.000	0	0		
COPPER FILTERED ICAP (MG/L)	8	1	0.013	0.013	0.013	1.000	0	0		
IRON ICAP (MG/L)	8	8	27	0.11	8.5	0.300	6	6		
IRON FILTERED ICAP (MG/L)	8	7	0.22	0.012	0.13	0.300	0	0		
LEAD AAS (MG/L)	8	3	0.020	0.0041	0.011	0.050	0	0		
MAGNESIUM ICAP (MG/L)	8	8	12	5.4	8.7	NR	NA	NA		
MAGNESIUM FILTERED ICAP (MG/L)	8	8	10	3.5	7.0	NR	NA	NA		
MANGANESE ICAP (MG/L)	8	8	0.82	0.069	0.32	0.050	8	8		
MANGANESE FILTERED ICAP (MG/L)	8	8	0.37	0.027	0.14	0.050	7	7		
NICKEL ICAP (MG/L)	8	2	0.031	0.020	0.026	0.100**	0	0		
POTASSIUM ICAP (MG/L)	8	8	6.4	1.7	3.1	NR	NA	NA		
POTASSIUM FILTERED ICAP (MG/L)	8	6	2.2	1.1	1.9	NR	NA	NA		
SELENIUM ICAP (MG/L)	8	1	0.061	0.061	0.061	0.050	1	1		

Table 7.25 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.			
SODIUM	8	8	28	8.3	18	NR	NR	NA		NA	
SODIUM	8	8	27	5.1	17	NR	NR	NA		NA	
STRONTIUM	8	8	0.52	0.13	0.30	NR	NR	NA		NA	
STRONTIUM	8	8	0.46	0.069	0.28	NR	NR	NA		NA	
URANIUM	8	1	0.0010	0.0010	0.0010	13.000	13.000	0		0	
URANIUM FILT.	8	2	0.0010	0.0010	0.0010	13.000	13.000	0		0	
VANADIUM	8	3	0.027	0.0082	0.019	NR	NR	NA		NA	
ZINC	8	8	0.058	0.0077	0.026	5.000	5.000	0		0	
ZINC	8	6	0.018	0.0050	0.010	5.000	5.000	0		0	
CONDUCTIVITY, FIELD MMT	8	NA	520	300	410	NR	NR	NA		NA	
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	9.0	1.9	5.6	NR	NR	NA		NA	
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	7.9	6.5	7.3	6.5/8.5	6.5/8.5	0		0	
PH, FIELD MMT. (PH UNITS)	8	NA	340	22	160	NR	NR	NA		NA	
REDOX, FIELD MMT. (MV)	8	NA	19	13	17	NR	NR	0		0	
WATER TEMP, FIELD MMT (DEG. CENT.)	8	8	290	180	230	NR	NR	NA		NA	
ALKALINITY-HCO3 (MG/L)	8	8	580	330	460	NR	NR	NA		NA	
CONDUCTIVITY (UMHOS/CM)	8	8	430	240	310	500.000	500.000	0		0	
DISSOLVED SOLIDS (MG/L)	8	8	8.0	7.3	7.6	6.5/8.5	6.5/8.5	0		0	
PH (PH UNITS)	8	8	350	2.0	120	NR	NR	NA		NA	
TOTAL SUSPENDED SOLIDS (MG/L)	8	8	620	1.1	180	1.000	1.000	8		8	
TURBIDITY (NTU)	8	8	18	-0.89	3.2	15.000	15.000	1		1	
GROSS ALPHA (PCI/L)	8	8	8.7	-5.5	0.93	50.000	50.000	0		0	
GROSS BETA (PCI/L)	8	1	4.0	4.0	4.0	NR	NR	NA		NA	
CARBON DISULFIDE (UG/L)	8	1	1.0	1.0	1.0	NR	NR	NA		NA	
METHYLENE CHLORIDE (UG/L)	8	1	1.0	1.0	1.0	NR	NR	NA		NA	

Table 7.26. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid G1

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE	#	REFERENCE
						VALUE	MMTS.	REFERENCE
CHLORIDE (MG/L)	8	8	67	14	24	250.000	0	0
FLUORIDE (MG/L)	8	7	0.20	0.10	0.11	2.000	0	0
SULFATE (MG/L)	8	8	21	16	19	250.000	0	0
ALUMINUM ICAP (MG/L)	8	7	12	0.023	2.1	0.200	3	3
ALUMINUM FILTERED ICAP (MG/L)	8	3	0.050	0.030	0.037	0.200	0	0
ARSENIC ICAP (MG/L)	8	1	0.080	0.080	0.080	0.050	1	1
BARIUM ICAP (MG/L)	8	8	0.29	0.10	0.14	1.000	0	0
BARIUM FILTERED ICAP (MG/L)	8	8	0.18	0.072	0.12	1.000	0	0
BERYLLIUM ICAP (MG/L)	8	2	0.0007	0.0006	0.0007	0.004**	0	0
BORON ICAP (MG/L)	8	8	0.085	0.020	0.042	NR	NA	NA
BORON FILTERED ICAP (MG/L)	8	8	0.071	0.032	0.045	NR	NA	NA
CADMIUM ICAP (MG/L)	8	1	0.0046	0.0046	0.0046	0.005	0	0
CALCIUM ICAP (MG/L)	8	8	96	63	74	NR	NA	NA
CALCIUM FILTERED ICAP (MG/L)	8	8	75	32	65	NR	NA	NA
CHROMIUM AAS (MG/L)	8	1	0.036	0.036	0.036	0.050	0	0
CHROMIUM ICAP (MG/L)	8	2	0.052	0.010	0.031	0.050	1	1
COBALT ICAP (MG/L)	8	1	0.012	0.012	0.012	NR	NA	NA
COPPER ICAP (MG/L)	8	1	0.038	0.038	0.038	1.000	0	0
IRON ICAP (MG/L)	8	8	24	0.020	3.6	0.300	5	5
IRON FILTERED ICAP (MG/L)	8	7	0.34	0.055	0.17	0.300	1	1
LEAD AAS (MG/L)	8	1	0.014	0.014	0.014	0.050	0	0
MAGNESIUM ICAP (MG/L)	8	8	16	8.0	10	NR	NA	NA
MAGNESIUM FILTERED ICAP (MG/L)	8	8	10	2.9	8.3	NR	NA	NA
MANGANESE ICAP (MG/L)	8	8	1.1	0.18	0.33	0.050	8	8
MANGANESE FILTERED ICAP (MG/L)	8	8	0.35	0.0029	0.20	0.050	7	7
NICKEL ICAP (MG/L)	8	2	0.061	0.024	0.043	0.100**	0	0
NICKEL FILTERED ICAP (MG/L)	8	4	0.013	0.011	0.012	0.100**	0	0
POTASSIUM ICAP (MG/L)	8	8	4.7	1.0	2.3	NR	NA	NA
POTASSIUM FILTERED ICAP (MG/L)	8	7	2.7	1.4	2.2	NR	NA	NA

Table 7.26 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM	AVERAGE		# MMTS. > REFERENCE	# MMTS. REFERENCE
			DETECTED	MMT.		DETECTED	MMTS.		
SODIUM	8	8	15		8.5	12		NR	NA
SODIUM	8	8	15		6.5	12		NR	NA
STRONTIUM	8	8	0.49		0.14	0.29		NR	NA
STRONTIUM	8	8	0.51		0.052	0.31		NR	NA
URANIUM	8	1	0.0010		0.0010	0.0010	13.000	13.000	0
URANIUM FILT.	8	1	0.0010		0.0010	0.0010	13.000	13.000	0
VANADIUM	8	1	0.032		0.032	0.032		NR	NA
ZINC	8	8	0.058		0.0022	0.015	5.000	5.000	0
ZINC	8	6	0.022		0.0033	0.0078	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	460		370	410		NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	8.1		0.50	4.6		NR	NA
PH, FIELD MMT. (PH UNITS)	8	NA	7.6		6.9	7.4	6.5/8.5	6.5/8.5	0
REDOX, FIELD MMT. (MV)	8	NA	290		-24	110		NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	20		9.5	16		NR	0
ALKALINITY-HCO3 (MG/L)	8	8	200		190	190		NR	NA
CONDUCTIVITY (UMHOS/CM)	8	8	480		440	460		NR	NA
DISSOLVED SOLIDS (MG/L)	8	8	300		270	280	500.000	500.000	0
PH (PH UNITS)	8	NA	7.8		7.5	7.7	6.5/8.5	6.5/8.5	0
TOTAL SUSPENDED SOLIDS (MG/L)	8	8	590		1.0	86		NR	NA
TURBIDITY (NTU)	8	8	80		1.7	20	1.000	1.000	8
GROSS ALPHA (PCI/L)	8	8	8.5		-1.8	0.94	15.000	15.000	0
GROSS BETA (PCI/L)	8	8	15		-8.1	0.44	50.000	50.000	0
ACETONE (UG/L)	8	1	15		15	15		NR	NA
METHYLENE CHLORIDE (UG/L)	8	1	1.0	J	1.0	1.0		NR	NA

Table 7.27. Constituents in groundwater at the Y-12 Plant site  
HGR=EF area=Grid G2

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	8	8	21	7.0	13	250.000	0	0	0	0
FLUORIDE	8	3	0.10	0.10	0.10	2.000	0	0	0	0
NITRATE NITROGEN	8	3	0.26	0.20	0.24	10.000	0	0	0	0
SULFATE	8	8	21	11	16	250.000	0	0	0	0
ALUMINUM	8	5	3.6	0.023	1.3	0.200	4	4	0	0
ALUMINUM	8	3	0.046	0.026	0.036	0.200	0	0	0	0
BARIUM	8	8	0.48	0.076	0.27	1.000	0	0	0	0
BARIUM	8	8	0.48	0.065	0.27	1.000	0	0	0	0
BERYLLIUM	8	2	0.0060	0.0003	0.0032	0.004**	1	1	0	0
BERYLLIUM	8	1	0.0007	0.0007	0.0007	0.004**	0	0	0	0
BORON	8	8	0.074	0.019	0.045	NR	NA	NA	NA	NA
BORON	8	8	0.068	0.012	0.042	NR	NA	NA	NA	NA
CADMIUM	8	2	0.0059	0.0041	0.0050	0.005	1	1	0	0
CALCIUM	8	8	80	29	53	NR	NA	NA	NA	NA
CALCIUM	8	8	79	28	57	NR	NA	NA	NA	NA
CHROMIUM	8	3	0.063	0.012	0.029	0.050	1	1	0	0
CHROMIUM	8	2	0.065	0.014	0.040	0.050	1	1	0	0
COBALT	8	1	0.015	0.015	0.015	NR	NA	NA	NA	NA
COPPER	8	1	0.0095	0.0095	0.0095	1.000	0	0	0	0
IRON	8	8	5.2	0.12	1.2	0.300	4	4	0	0
IRON	8	8	0.28	0.0078	0.10	0.300	0	0	0	0
MAGNESIUM	8	8	11	2.9	6.7	NR	NA	NA	NA	NA
MAGNESIUM	8	8	11	2.5	7.3	NR	NA	NA	NA	NA
MANGANESE	8	8	0.38	0.015	0.083	0.050	4	4	0	0
MANGANESE	8	8	0.21	0.0039	0.038	0.050	1	1	0	0
NICKEL	8	5	0.049	0.011	0.020	0.100**	0	0	0	0
NICKEL	8	2	0.031	0.012	0.022	0.100**	0	0	0	0
POTASSIUM	8	8	3.3	0.72	2.0	NR	NA	NA	NA	NA
POTASSIUM	8	6	3.1	0.78	2.5	NR	NA	NA	NA	NA

Table 7.27 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	# DETECTED	MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.			DETECTED	MMT.	DETECTED	MMTS.	
SILVER	8	1	0.0082	0.0082	1	0.0082	0.0082	0.0082	0.100	0	0
SODIUM	8	8	6.9	5.9	8	6.3	6.3	6.3	NR	NR	NA
SODIUM	8	8	15	5.7	8	7.4	7.4	7.4	NR	NR	NA
STRONTIUM	8	8	0.44	0.045	8	0.24	0.24	0.24	NR	NR	NA
STRONTIUM	8	8	0.46	0.043	8	0.29	0.29	0.29	NR	NR	NA
URANIUM	8	1	0.0010	0.0010	1	0.0010	0.0010	0.0010	13.000	13.000	0
VANADIUM	8	1	0.014	0.014	1	0.014	0.014	0.014	NR	NR	NA
ZINC	8	7	0.036	0.0051	7	0.018	0.018	0.018	5.000	5.000	0
ZINC	8	8	0.026	0.0035	8	0.011	0.011	0.011	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	470	170	NA	300	300	300	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	7.5	0.50	NA	3.9	3.9	3.9	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	8	NA	7.5	6.6	NA	7.0	7.0	7.0	6.5/8.5	6.5/8.5	0
REDOX, FIELD MMT. (MV)	8	NA	430	36	NA	180	180	180	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	21	12	NA	17	17	17	NR	NR	0
ALKALINITY-HCO3 (MG/L)	8	8	210	72	8	140	140	140	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	8	8	480	200	8	340	340	340	NR	NR	NA
DISSOLVED SOLIDS (MG/L)	8	8	300	120	8	210	210	210	500.000	500.000	0
PH (PH UNITS)	8	NA	7.9	7.1	NA	7.5	7.5	7.5	6.5/8.5	6.5/8.5	0
TOTAL SUSPENDED SOLIDS (MG/L)	8	5	41	1.0	5	17	17	17	NR	NR	NA
TURBIDITY (NTU)	8	8	520	0.90	8	71	71	71	1.000	1.000	6
GROSS ALPHA (PCI/L)	8	8	3.3	-0.96	8	0.49	0.49	0.49	15.000	15.000	0
GROSS BETA (PCI/L)	8	8	5.3	-2.8	8	1.4	1.4	1.4	50.000	50.000	0
1,1,1-TRICHLOROETHANE (UG/L)	8	2	0.80	0.40	2	0.60	0.60	0.60	200.000	200.000	0
1,1-DICHLOROETHANE (UG/L)	8	2	1.0	1.0	2	1.0	1.0	1.0	NR	NR	NA
1,1-DICHLOROETHENE (UG/L)	8	2	1.0	1.0	2	1.0	1.0	1.0	7.000	7.000	0
1,2-DICHLOROETHENE (UG/L)	8	1	1.0	1.0	1	1.0	1.0	1.0	70.000	70.000	0
4-METHYL-2-PENTANONE (UG/L)	8	1	2.0	2.0	1	2.0	2.0	2.0	NR	NR	NA
CARBON TETRACHLORIDE (UG/L)	8	4	9.0	5.0	4	6.3	6.3	6.3	5.000	5.000	2
CHLOROFORM (UG/L)	8	4	1.0	0.70	4	0.90	0.90	0.90	100.000	100.000	0
TETRACHLOROETHENE (UG/L)	8	4	4.0	2.0	4	3.3	3.3	3.3	5.000	5.000	0
TRICHLOROETHENE (UG/L)	8	4	1.0	0.70	4	0.93	0.93	0.93	5.000	5.000	0



Table 7.28. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid G3

VARIABLE	# SAMPLES DETECTED	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE (MG/L)	8	8	170		4.4		64	250.000	0	0
FLUORIDE (MG/L)	8	4	0.20		0.10		0.18	2.000	0	0
NITRATE NITROGEN (MG/L)	8	7	0.77		0.38		0.52	10.000	0	0
SULFATE (MG/L)	8	8	25		18		21	250.000	0	0
ALUMINUM ICAP (MG/L)	8	7	0.90		0.021		0.24	0.200	2	2
ALUMINUM FILTERED ICAP (MG/L)	8	2	0.11		0.065		0.088	0.200	0	0
BARIUM ICAP (MG/L)	8	8	0.47		0.050		0.24	1.000	0	0
BARIUM FILTERED ICAP (MG/L)	8	8	0.47		0.042		0.25	1.000	0	0
BERYLLIUM ICAP (MG/L)	8	1	0.0008		0.0008		0.0008	0.004**	0	0
BORON ICAP (MG/L)	8	8	0.074		0.017		0.036	NR	NR	NA
BORON FILTERED ICAP (MG/L)	8	8	0.039		0.014		0.031	NR	NR	NA
CADMIUM AAS (MG/L)	8	2	0.020		0.0087		0.014	0.005	2	2
CADMIUM ICAP (MG/L)	8	2	0.020		0.0069		0.013	0.005	2	2
CADMIUM FILTERED AAS (MG/L)	8	2	0.014		0.013		0.014	0.005	2	2
CALCIUM ICAP (MG/L)	8	8	130		44		85	NR	NR	NA
CALCIUM FILTERED ICAP (MG/L)	8	8	130		43		85	NR	NR	NA
CHROMIUM AAS (MG/L)	8	3	0.15		0.015		0.072	0.050	2	2
CHROMIUM ICAP (MG/L)	8	3	0.081		0.014		0.052	0.050	2	2
COPPER ICAP (MG/L)	8	2	0.16		0.0047		0.082	1.000	0	0
IRON ICAP (MG/L)	8	7	1.0		0.058		0.42	0.300	4	4
IRON FILTERED ICAP (MG/L)	8	3	0.19		0.0078		0.070	0.300	0	0
MAGNESIUM ICAP (MG/L)	8	8	14		3.3		8.1	NR	NR	NA
MAGNESIUM FILTERED ICAP (MG/L)	8	8	14		3.2		8.7	NR	NR	NA
MANGANESE ICAP (MG/L)	8	7	0.072		0.0024		0.035	0.050	2	2
MANGANESE FILTERED ICAP (MG/L)	8	5	0.21		0.015		0.070	0.050	2	2
NICKEL ICAP (MG/L)	8	4	0.080		0.024		0.052	0.100**	0	0
NICKEL FILTERED ICAP (MG/L)	8	4	0.052		0.025		0.038	0.100**	0	0
POTASSIUM ICAP (MG/L)	8	8	2.9		1.3		2.0	NR	NR	NA
POTASSIUM FILTERED ICAP (MG/L)	8	8	2.3		1.3		1.8	NR	NR	NA

Table 7.28 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		REFERENCE VALUE	# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
SODIUM	8	8	11	4.5	7.8	NR	NA	NR	NA	
SODIUM	8	8	12	4.5	8.6	NR	NA	NR	NA	
STRONTIUM	8	8	0.27	0.061	0.16	NR	NA	NR	NA	
STRONTIUM	8	8	0.26	0.060	0.17	NR	NA	NR	NA	
URANIUM FILT.	8	2	0.0020	0.0010	0.0015	13.000	0	13.000	0	
ZINC	8	8	0.029	0.0061	0.014	5.000	0	5.000	0	
ZINC	8	8	0.019	0.0046	0.011	5.000	0	5.000	0	
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	820	230	470	NR	NA	NR	NA	
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	8.1	3.6	6.4	NR	NA	NR	NA	
PH, FIELD MMT. (PH UNITS)	8	NA	8.0	6.0	7.0	6.5/8.5	1	6.5/8.5	1	
REDOX, FIELD MMT. (MV)	8	NA	360	120	220	NR	NA	NR	NA	
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	23	15	18	NR	0	NR	0	
ALKALINITY-HCO3 (MG/L)	8	8	170	110	140	NR	NA	NR	NA	
CONDUCTIVITY (UMHOS/CM)	8	8	830	290	530	NR	NA	NR	NA	
DISSOLVED SOLIDS (MG/L)	8	8	570	190	340	500.000	1	500.000	1	
PH	8	NA	8.1	7.3	7.6	6.5/8.5	0	6.5/8.5	0	
TOTAL SUSPENDED SOLIDS (MG/L)	8	7	41	2.0	11	NR	NA	NR	NA	
TURBIDITY (NTU)	8	8	24	2.5	9.5	1.000	8	1.000	8	
GROSS ALPHA (PCI/L)	8	8	4.5	-2.6	0.94	15.000	0	15.000	0	
GROSS BETA (PCI/L)	8	8	3.5	-2.0	1.6	50.000	0	50.000	0	
4-METHYL-2-PENTANONE (UG/L)	8	1	2.0	2.0	2.0	BJ	BJ	NR	NA	
CHLOROFORM (UG/L)	8	4	9.0	4.0	5.5	J	J	100.000	0	
METHYLENE CHLORIDE (UG/L)	8	1	0.90	0.90	0.90	JB	JB	NR	NA	

Table 7.29. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid H2

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	8	8	4.1		2.8		3.5	250.000	0
FLUORIDE	8	4	0.10		0.10		0.10	2.000	0
SULFATE	8	8	13		5.0		8.6	250.000	0
ALUMINUM	8	6	24		0.023		4.2	0.200	2
ALUMINUM	8	3	0.27		0.020		0.10	0.200	1
BARIUM	8	8	1.1		0.36		0.48	1.000	1
BARIUM	8	8	0.42		0.36		0.39	1.000	0
BERYLLIUM	8	1	0.0016		0.0016		0.0016	0.004**	0
BERYLLIUM	8	2	0.0015		0.0005		0.0010	0.004**	0
BORON	8	8	0.056		0.010		0.022	NR	NA
BORON	8	8	0.041		0.0076		0.019	NR	NA
CALCIUM	8	8	74		51		61	NR	NA
CALCIUM	8	8	69		52		60	NR	NA
CHROMIUM	8	1	0.089		0.089		0.089	0.050	1
CHROMIUM	8	1	0.067		0.067		0.067	0.050	1
COBALT	8	2	0.023		0.0077		0.015	NR	NA
COPPER	8	4	0.051		0.0044		0.019	1.000	0
COPPER	8	2	0.0074		0.0054		0.0064	1.000	0
IRON	8	8	32		0.048		4.4	0.300	2
IRON	8	5	0.34		0.036		0.11	0.300	1
LEAD	8	1	0.021		0.021		0.021	0.050	0
MAGNESIUM	8	8	13		5.8		7.3	NR	NA
MAGNESIUM	8	8	7.2		5.7		6.4	NR	NA
MANGANESE	8	8	1.8		0.027		0.26	0.050	2
MANGANESE	8	8	0.054		0.017		0.030	0.050	1
NICKEL	8	1	0.031		0.031		0.031	0.100**	0
POTASSIUM	8	8	8.4		0.87		2.5	NR	NA
POTASSIUM	8	7	3.0		1.1		1.8	NR	NA
SODIUM	8	8	4.9		4.1		4.5	NR	NA

Table 7.29 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
SODIUM	8	8	4.6	4.2	4.4	NR	NR	NA	NA	
STRONTIUM	8	8	0.14	0.10	0.13	NR	NR	NA	NA	
STRONTIUM	8	8	0.15	0.10	0.13	NR	NR	NA	NA	
URANIUM	8	2	0.0010	0.0010	0.0010	13.000	13.000	0	0	
VANADIUM	8	1	0.038	0.038	0.038	NR	NR	NA	NA	
ZINC	8	8	0.23	0.0028	0.050	5.000	5.000	0	0	
ZINC	8	8	0.022	0.0028	0.011	5.000	5.000	0	0	
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	380	290	340	NR	NR	NA	NA	
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	5.3	0.40	1.9	NR	NR	NA	NA	
PH, FIELD MMT. (PH UNITS)	8	NA	7.9	7.1	7.4	6.5/8.5	6.5/8.5	0	0	
REDOX, FIELD MMT. (MV)	8	NA	220	12	110	NR	NR	NA	NA	
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	23	15	17	NR	NR	0	0	
ALKALINITY-HCO3 (MG/L)	8	8	200	160	180	NR	NR	NA	NA	
CONDUCTIVITY (UMHOS/CM)	8	8	420	320	360	NR	NR	NA	NA	
DISSOLVED SOLIDS (MG/L)	8	8	320	200	240	500.000	500.000	0	0	
PH	8	NA	8.2	7.3	7.7	6.5/8.5	6.5/8.5	0	0	
TOTAL SUSPENDED SOLIDS (MG/L)	8	6	22	2.0	10	NR	NR	NA	NA	
TURBIDITY (NTU)	8	8	150	0.90	40	1.000	1.000	7	7	
GROSS ALPHA (PCI/L)	8	8	1.2	-2.0	-0.27	15.000	15.000	0	0	
GROSS BETA (PCI/L)	8	8	2.7	-3.0	-0.26	50.000	50.000	0	0	
4-METHYL-2-PENTANONE (UG/L)	8	3	2.0	2.0	2.0	BJ	BJ	NA	NA	
METHYLENE CHLORIDE (UG/L)	8	1	2.0	2.0	2.0	BJ	BJ	NA	NA	

Table 7.30. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid H3

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.		
CHLORIDE	8	8	41		22		31		250.000	0
NITRATE NITROGEN	8	8	1.4		0.35		0.81		10.000	0
SULFATE	8	8	40		25		33		250.000	0
ALUMINUM	8	7	0.91		0.025		0.31		0.200	3
ALUMINUM	8	3	0.057		0.027		0.040		0.200	0
BARIUM	8	8	0.17		0.073		0.12		1.000	0
BARIUM	8	8	0.16		0.066		0.11		1.000	0
BERYLLIUM	8	1	0.0006		0.0006		0.0006		0.004**	0
BERYLLIUM	8	1	0.0005		0.0005		0.0005		0.004**	0
BORON	8	8	0.047		0.014		0.027		NR	NA
BORON	8	8	0.040		0.011		0.026		NR	NA
CALCIUM	8	8	94		70		82		NR	NA
CALCIUM	8	8	92		68		80		NR	NA
CHROMIUM	8	3	0.31		0.018		0.16		0.050	2
CHROMIUM	8	3	0.31		0.019		0.15		0.050	2
COBALT	8	3	0.0089		0.0060		0.0073		NR	NA
COBALT	8	1	0.0083		0.0083		0.0083		NR	NA
COPPER	8	4	0.019		0.0063		0.011		1.000	0
COPPER	8	2	0.013		0.0072		0.010		1.000	0
IRON	8	8	2.8		0.018		0.84		0.300	4
IRON	8	4	0.23		0.0075		0.075		0.300	0
MAGNESIUM	8	8	6.7		4.6		5.7		NR	NA
MAGNESIUM	8	8	6.6		4.4		5.5		NR	NA
MANGANESE	8	8	0.099		0.0033		0.033		0.050	2
MANGANESE	8	8	0.021		0.0025		0.012		0.050	0
MOLYBDENUM	8	2	0.012		0.011		0.012		NR	NA
NICKEL	8	4	0.33		0.15		0.23		0.100**	4
NICKEL	8	4	0.32		0.13		0.21		0.100**	4
POTASSIUM	8	8	3.8		2.2		3.0		NR	NA

Table 7.30 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	MINIMUM		AVERAGE		# MMTS. >
			DETECTED	MMT.		DETECTED	MMT.	DETECTED	MMTS.	
POTASSIUM	8	8	3.9	2.1	8	8	2.8	NR	NR	NA
SODIUM	8	8	11	3.8	8	8	7.5	NR	NR	NA
SODIUM	8	8	11	3.7	8	8	7.3	NR	NR	NA
STRONTIUM	8	8	0.20	0.14	8	8	0.17	NR	NR	NA
STRONTIUM	8	8	0.20	0.14	8	8	0.17	NR	NR	NA
URANIUM	8	2	0.0010	0.0010	8	2	0.0010	13.000	13.000	0
URANIUM FILT.	8	3	0.0020	0.0010	8	3	0.0013	13.000	13.000	0
ZINC	8	7	0.050	0.0032	8	7	0.023	5.000	5.000	0
ZINC	8	7	0.064	0.0036	8	7	0.022	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	570	390	8	NA	460	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	9.5	0.80	8	NA	4.2	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	8	NA	7.6	7.1	8	NA	7.5	6.5/8.5	6.5/8.5	0
REDOX, FIELD MMT. (MV)	8	NA	190	12	8	NA	140	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	20	18	8	NA	19	NR	NR	0
ALKALINITY-HCO3 (MG/L)	8	8	200	160	8	8	180	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	8	8	570	430	8	8	500	NR	NR	NA
DISSOLVED SOLIDS (MG/L)	8	8	360	250	8	8	310	500.000	500.000	0
PH	8	NA	8.2	7.5	8	NA	7.7	6.5/8.5	6.5/8.5	0
TOTAL SUSPENDED SOLIDS (MG/L)	8	6	140	3.0	8	6	36	NR	NR	NA
TURBIDITY (NTU)	8	8	28	0.70	8	8	11	1.000	1.000	7
GROSS ALPHA (PCI/L)	8	8	1.8	-0.83	8	8	0.32	15.000	15.000	0
GROSS BETA (PCI/L)	8	8	5.9	-2.9	8	8	0.59	50.000	50.000	0
4-METHYL-2-PENTANONE (UG/L)	8	2	2.0	1.0	8	2	1.5	NR	NR	NA
CARBON TETRACHLORIDE (UG/L)	8	1	1.0	1.0	8	1	1.0	5.000	5.000	0
CHLOROFORM (UG/L)	8	6	2.0	0.90	8	6	1.3	100.000	100.000	0
METHYLENE CHLORIDE (UG/L)	8	1	3.0	3.0	8	1	3.0	NR	NR	NA
TETRACHLOROETHENE (UG/L)	8	5	3.0	0.60	8	5	1.9	5.000	5.000	0
TRICHLOROETHENE (UG/L)	8	8	5.0	3.0	8	8	4.0	5.000	5.000	0

Table 7.31. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid I1

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	8	8	21	(MG/L)	2.9	(MG/L)	8.2	250.000	0	0
FLUORIDE	8	8	0.40	(MG/L)	0.20	(MG/L)	0.29	2.000	0	0
NITRATE NITROGEN	8	4	0.40	(MG/L)	0.23	(MG/L)	0.30	10.000	0	0
SULFATE	8	8	31	(MG/L)	12	(MG/L)	21	250.000	0	0
ALUMINUM	8	8	0.75	(MG/L)	0.021	(MG/L)	0.27	0.200	4	4
ALUMINUM	8	3	0.031	(MG/L)	0.027	(MG/L)	0.030	0.200	0	0
BARIUM	8	8	0.28	(MG/L)	0.15	(MG/L)	0.22	1.000	0	0
BARIUM	8	8	0.27	(MG/L)	0.10	(MG/L)	0.19	1.000	0	0
BERYLLIUM	8	1	0.0009	(MG/L)	0.0009	(MG/L)	0.0009	0.004**	0	0
BERYLLIUM	8	1	0.0015	(MG/L)	0.0015	(MG/L)	0.0015	0.004**	0	0
BORON	8	8	0.11	(MG/L)	0.050	(MG/L)	0.082	NR	NR	NA
BORON	8	8	0.10	(MG/L)	0.048	(MG/L)	0.075	NR	NR	NA
CALCIUM	8	8	58	(MG/L)	36	(MG/L)	46	NR	NR	NA
CALCIUM	8	8	59	(MG/L)	36	(MG/L)	46	NR	NR	NA
CHROMIUM	8	1	0.010	(MG/L)	0.010	(MG/L)	0.010	0.050	0	0
COBALT	8	1	0.0063	(MG/L)	0.0063	(MG/L)	0.0063	NR	NR	NA
COPPER	8	3	0.0067	(MG/L)	0.0050	(MG/L)	0.0061	1.000	0	0
COPPER	8	1	0.0061	(MG/L)	0.0061	(MG/L)	0.0061	1.000	0	0
IRON	8	8	7.2	(MG/L)	0.060	(MG/L)	2.1	0.300	4	4
IRON	8	6	0.20	(MG/L)	0.0051	(MG/L)	0.055	0.300	0	0
LEAD	8	1	0.034	(MG/L)	0.034	(MG/L)	0.034	0.050	0	0
MAGNESIUM	8	8	15	(MG/L)	6.5	(MG/L)	10	NR	NR	NA
MAGNESIUM	8	8	15	(MG/L)	6.6	(MG/L)	10	NR	NR	NA
MANGANESE	8	8	4.0	(MG/L)	0.016	(MG/L)	1.4	0.050	4	4
MANGANESE	8	8	1.8	(MG/L)	0.012	(MG/L)	0.54	0.050	4	4
NICKEL	8	1	0.012	(MG/L)	0.012	(MG/L)	0.012	0.100**	0	0
NICKEL	8	1	0.017	(MG/L)	0.017	(MG/L)	0.017	0.100**	0	0
POTASSIUM	8	8	2.9	(MG/L)	2.1	(MG/L)	2.6	NR	NR	NA
POTASSIUM	8	8	3.0	(MG/L)	2.1	(MG/L)	2.6	NR	NR	NA

Table 7.31 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
SODIUM	8	8	71	6.2	37	NR	NR	NA	
SODIUM	8	8	69	6.1	37	NR	NR	NA	
STRONTIUM	8	8	0.68	0.13	0.40	NR	NR	NA	
STRONTIUM	8	8	0.67	0.13	0.40	NR	NR	NA	
URANIUM	8	4	0.0010	0.0010	0.0010	13.000	13.000	0	
URANIUM FILT.	8	3	0.0010	0.0010	0.0010	13.000	13.000	0	
ZINC	8	8	0.17	0.0030	0.036	5.000	5.000	0	
ZINC	8	7	0.18	0.0034	0.041	5.000	5.000	0	
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	600	320	460	NR	NR	NA	
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	8.9	1.3	3.8	NR	NR	NA	
PH, FIELD MMT. (PH UNITS)	8	NA	8.3	6.1	7.0	6.5/8.5	6.5/8.5	3	
REDOX, FIELD MMT. (MV)	8	NA	200	16	130	NR	NR	NA	
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	19	12	15	NR	NR	0	
ALKALINITY-HCO3 (MG/L)	8	8	260	150	210	NR	NR	NA	
CONDUCTIVITY (UMHOS/CM)	8	8	510	380	450	NR	NR	NA	
DISSOLVED SOLIDS (MG/L)	8	8	340	220	300	500.000	500.000	0	
PH (PH UNITS)	8	NA	8.0	6.5	7.3	6.5/8.5	6.5/8.5	0	
TOTAL SUSPENDED SOLIDS (MG/L)	8	6	630	2.0	120	NR	NR	NA	
TURBIDITY (NTU)	8	8	3900	1.0	490	1.000	1.000	7	
GROSS ALPHA (PCI/L)	8	8	6.9	-3.4	0.81	15.000	15.000	0	
GROSS BETA (PCI/L)	8	8	15	-7.4	4.9	50.000	50.000	0	
METHYLENE CHLORIDE (UG/L)	8	1	0.90	0.90	0.90	NR	NR	NA	



Table 7.32. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid I2

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE (MG/L)	8	8	5.4	2.3	3.5	250.000	0	0		
FLUORIDE (MG/L)	8	2	0.10	0.10	0.10	2.000	0	0		
NITRATE NITROGEN (MG/L)	8	1	0.25	0.25	0.25	10.000	0	0		
SULFATE (MG/L)	8	8	14	3.0	7.7	250.000	0	0		
ALUMINUM ICAP (MG/L)	8	8	0.46	0.027	0.13	0.200	2	2		
ALUMINUM FILTERED ICAP (MG/L)	8	6	0.092	0.025	0.050	0.200	0	0		
BARIUM ICAP (MG/L)	8	8	0.25	0.048	0.16	1.000	0	0		
BARIUM FILTERED ICAP (MG/L)	8	8	0.23	0.047	0.14	1.000	0	0		
BORON ICAP (MG/L)	8	8	0.044	0.0086	0.026	NR	NR	NR	NA	
BORON FILTERED ICAP (MG/L)	8	8	0.040	0.014	0.026	NR	NR	NR	NA	
CALCIUM ICAP (MG/L)	8	8	46	2.3	20	NR	NR	NR	NA	
CALCIUM FILTERED ICAP (MG/L)	8	8	42	2.4	18	NR	NR	NR	NA	
CHROMIUM AAS (MG/L)	8	2	0.047	0.017	0.032	0.050	0	0		
COBALT ICAP (MG/L)	8	1	0.0065	0.0065	0.0065	NR	NR	NR	NA	
COPPER ICAP (MG/L)	8	4	0.0080	0.0050	0.0066	1.000	0	0		
COPPER FILTERED ICAP (MG/L)	8	1	0.014	0.014	0.014	1.000	0	0		
IRON ICAP (MG/L)	8	8	1.3	0.017	0.26	0.300	2	2		
IRON FILTERED ICAP (MG/L)	8	6	0.028	0.0074	0.015	0.300	0	0		
MAGNESIUM ICAP (MG/L)	8	8	7.3	1.0	3.9	NR	NR	NR	NA	
MAGNESIUM FILTERED ICAP (MG/L)	8	8	7.1	1.1	3.7	NR	NR	NR	NA	
MANGANESE ICAP (MG/L)	8	8	0.15	0.0049	0.052	0.050	3	3		
MANGANESE FILTERED ICAP (MG/L)	8	7	0.099	0.0032	0.047	0.050	3	3		
NICKEL ICAP (MG/L)	8	3	0.016	0.011	0.013	0.100**	0	0		
NICKEL FILTERED ICAP (MG/L)	8	4	0.028	0.013	0.018	0.100**	0	0		
POTASSIUM ICAP (MG/L)	8	7	4.6	0.80	2.8	NR	NR	NR	NA	
POTASSIUM FILTERED ICAP (MG/L)	8	7	5.4	0.85	3.0	NR	NR	NR	NA	
SODIUM ICAP (MG/L)	8	8	12	2.4	7.1	NR	NR	NR	NA	
SODIUM FILTERED ICAP (MG/L)	8	8	13	2.3	7.3	NR	NR	NR	NA	
STRONTIUM ICAP (MG/L)	8	8	0.53	0.011	0.23	NR	NR	NR	NA	

Table 7.32 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
STRONTIUM FILTERED ICAP (MG/L)	8	8	0.50	0.011	0.23	NR	NA	NA		
URANIUM FILT. FLUORIMETRIC (MG/L)	8	2	0.0010	0.0010	0.0010	13.000	0	0	13.000	0
ZINC ICAP (MG/L)	8	7	0.16	0.0043	0.048	5.000	0	0	5.000	0
ZINC FILTERED ICAP (MG/L)	8	7	0.20	0.0024	0.066	5.000	0	0	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	270	33	150	NR	NA	NA	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	6.7	1.5	4.1	NR	NA	NA	NR	NA
PH, FIELD MMT. (PH UNITS)	8	NA	10	4.8	7.2	6.5/8.5	7	7	6.5/8.5	7
REDOX, FIELD MMT. (MV)	8	NA	290	11	170	NR	NA	NA	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	22	12	18	NR	0	0	NR	0
ALKALINITY-CO3 (MG/L)	8	4	26	4.0	14	NR	NA	NA	NR	NA
ALKALINITY-HCO3 (MG/L)	8	8	130	7.0	56	NR	NA	NA	NR	NA
CONDUCTIVITY (UMHOS/CM)	8	8	280	39	140	NR	NA	NA	NR	NA
DISSOLVED SOLIDS (MG/L)	8	8	200	32	110	500.000	0	0	500.000	0
PH (PH UNITS)	8	NA	9.4	5.5	7.3	6.5/8.5	7	7	6.5/8.5	7
TOT. PETROLEUM HYDROCARBONS (MG/L)	8	2	0.0070	0.0038	0.0054	1.000	0	0	1.000	0
TOTAL SUSPENDED SOLIDS (MG/L)	8	7	64	1.0	16	NR	NA	NA	NR	NA
TURBIDITY (NTU)	8	8	7.4	0.50	2.4	1.000	7	7	1.000	7
GROSS ALPHA (PCI/L)	8	8	4.0	-2.3	0.52	15.000	0	0	15.000	0
GROSS BETA (PCI/L)	8	8	6.3	-6.9	1.7	50.000	0	0	50.000	0
2-BUTANONE (UG/L)	8	1	4.0	BJ	4.0	NR	NA	NA	NR	NA
4-METHYL-2-PENTANONE (UG/L)	8	2	2.0	BJ	2.0	NR	NA	NA	NR	NA
ACETONE (UG/L)	8	2	2.0	BJ	1.5	NR	NA	NA	NR	NA
METHYLENE CHLORIDE (UG/L)	8	1	1.0	JB	1.0	NR	NA	NA	NR	NA

Table 7.33. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid J Primary

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	8	8	47	24	33	250.000	0	0	
FLUORIDE	8	5	0.30	0.10	0.20	2.000	0	0	
SULFATE	8	7	18	2.0	11	250.000	0	0	
ALUMINUM	8	7	0.95	0.24	0.60	0.200	7	0	
ALUMINUM	8	4	0.13	0.021	0.051	0.200	0	0	
BARIUM	8	8	0.64	0.065	0.35	1.000	0	0	
BARIUM	8	8	0.64	0.066	0.34	1.000	0	0	
BERYLLIUM	8	1	0.0003	0.0003	0.0003	0.004**	0	0	
BORON	8	8	0.11	0.010	0.064	NR	NA	NA	
BORON	8	8	0.12	0.014	0.064	NR	NA	NA	
CALCIUM	8	8	120	73	93	NR	NA	NA	
CALCIUM	8	8	120	69	92	NR	NA	NA	
COPPER	8	1	0.011	0.011	0.011	1.000	0	0	
COPPER	8	3	0.023	0.0047	0.012	1.000	0	0	
IRON	8	8	22	0.58	9.9	0.300	8	8	
IRON	8	8	23	0.041	9.1	0.300	4	4	
LEAD	8	2	0.0043	0.0040	0.0042	0.050	0	0	
MAGNESIUM	8	8	25	11	18	NR	NA	NA	
MAGNESIUM	8	8	26	12	18	NR	NA	NA	
MANGANESE	8	8	1.4	0.20	0.80	0.050	8	8	
MANGANESE	8	8	1.4	0.15	0.75	0.050	8	8	
POTASSIUM	8	7	4.9	0.94	3.0	NR	NA	NA	
POTASSIUM	8	8	4.7	0.73	2.5	NR	NA	NA	
SODIUM	8	8	11	8.0	9.1	NR	NA	NA	
SODIUM	8	8	11	8.0	9.2	NR	NA	NA	
STRONTIUM	8	8	0.82	0.20	0.49	NR	NA	NA	
STRONTIUM	8	8	0.83	0.20	0.48	NR	NA	NA	
ZINC	8	7	0.035	0.0052	0.014	5.000	0	0	
ZINC	8	7	0.028	0.0076	0.013	5.000	0	0	

Table 7.33 (continued)

VARIABLE	# SAMPLES DETECTED	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	670		500		600		NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	2.9		0.40		1.6		NR	NA
PH, FIELD MMT. (PH UNITS)	8	NA	7.3		6.3		6.9	6.5/8.5	1	NA
REDOX, FIELD MMT. (MV)	8	NA	110		-70		-4.8		NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	22		7.9		17		NR	0
ALKALINITY-HCO3 (MG/L)	8	8	320		260		300		NR	NA
CONDUCTIVITY (UMHOS/CM)	8	8	720		590		660		NR	NA
DISSOLVED SOLIDS (MG/L)	8	8	430		330		380	500.000	0	0
PH	8	NA	7.6		6.9		7.3	6.5/8.5	0	0
TOTAL SUSPENDED SOLIDS (MG/L)	8	8	53		8.0		28		NR	NA
TURBIDITY (NTU)	8	8	46		7.5		26	1.000	8	8
GROSS ALPHA (PCI/L)	8	8	3.9		-3.4		-0.082	15.000	0	0
GROSS BETA (PCI/L)	8	8	6.1		-4.2		2.4	50.000	0	0
1,1-DICHLOROETHENE (UG/L)	8	2	12	J	2.0		7.0	7.000	1	1
1,2-DICHLOROETHENE (UG/L)	8	7	120		42		79	70.000	5	5
4-METHYL-2-PENTANONE (UG/L)	8	1	24	BJ	24		24	NR	NR	NA
METHYLENE CHLORIDE (UG/L)	8	2	11	J	1.0		6.0	NR	NR	NA
TETRACHLOROETHENE (UG/L)	8	8	1000		5.0		490	5.000	7	7
TRICHLOROETHENE (UG/L)	8	7	46	J	1.0		20	5.000	4	4
VINYL CHLORIDE (UG/L)	8	4	59		35		47	2.000	4	4

Table 7.34. Constituents in groundwater at the Y-12 Plant site  
HGR=EF area=Grid J1

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	8	8	45	6.0	24	250.000	0	0	0	0
FLUORIDE	8	5	0.70	0.10	0.46	2.000	0	0	0	0
SULFATE	8	8	36	16	27	250.000	0	0	0	0
ALUMINUM	8	7	47	0.35	11	0.200	7	7	0	0
ALUMINUM	8	2	0.10	0.028	0.064	0.200	0	0	0	0
BARIUM	8	8	0.55	0.14	0.23	1.000	0	0	0	0
BARIUM	8	8	0.20	0.075	0.12	1.000	0	0	0	0
BERYLLIUM	8	5	0.0026	0.0003	0.0009	0.004**	0	0	0	0
BORON	8	8	0.13	0.023	0.080	NR	NA	NA	NA	NA
BORON	8	8	0.12	0.018	0.071	NR	NA	NA	NA	NA
CADMIUM	8	2	0.019	0.0063	0.013	0.005	2	2	0	0
CALCIUM	8	8	54	22	31	NR	NA	NA	NA	NA
CALCIUM	8	8	29	19	26	NR	NA	NA	NA	NA
CHROMIUM	8	4	0.12	0.012	0.042	0.050	1	1	0	0
CHROMIUM	8	2	0.093	0.051	0.072	0.050	2	2	0	0
COBALT	8	4	0.048	0.0061	0.023	NR	NA	NA	NA	NA
COBALT	8	2	0.015	0.0093	0.012	NR	NA	NA	NA	NA
COPPER	8	6	0.061	0.0073	0.020	1.000	0	0	0	0
COPPER	8	2	0.011	0.011	0.011	1.000	0	0	0	0
IRON	8	8	110	0.049	22	0.300	7	7	0	0
IRON	8	6	1.3	0.012	0.34	0.300	2	2	0	0
LEAD	8	4	0.042	0.0045	0.015	0.050	0	0	0	0
MAGNESIUM	8	8	14	4.3	7.4	NR	NA	NA	NA	NA
MAGNESIUM	8	8	6.3	4.0	5.4	NR	NA	NA	NA	NA
MANGANESE	8	8	3.0	0.020	0.98	0.050	6	6	0	0
MANGANESE	8	8	3.0	0.0060	0.89	0.050	4	4	0	0
NICKEL	8	3	0.079	0.018	0.056	0.100**	0	0	0	0
NICKEL	8	1	0.019	0.019	0.019	0.100**	0	0	0	0
POTASSIUM	8	8	9.2	2.7	4.2	NR	NA	NA	NA	NA

Table 7.34 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
POTASSIUM	8	8	3.5	1.0	2.1	2.1	2.1	NR	NR	NA
SODIUM	8	8	81	16	47	47	47	NR	NR	NA
SODIUM	8	8	79	16	47	47	47	NR	NR	NA
STRONTIUM	8	8	0.91	0.090	0.43	0.43	0.43	NR	NR	NA
STRONTIUM	8	8	0.93	0.080	0.39	0.39	0.39	NR	NR	NA
URANIUM	8	2	0.0020	0.0010	0.0015	0.0015	0.0015	13.000	13.000	0
URANIUM FILT.	8	2	0.0010	0.0010	0.0010	0.0010	0.0010	13.000	13.000	0
VANADIUM	8	4	0.087	0.0095	0.034	0.034	0.034	NR	NR	NA
ZINC	8	8	0.15	0.014	0.046	0.046	0.046	5.000	5.000	0
ZINC	8	8	0.019	0.0042	0.011	0.011	0.011	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	430	250	350	350	350	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	7.9	0.90	4.0	4.0	4.0	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	8	NA	8.2	5.4	6.8	6.8	6.8	6.5/8.5	6.5/8.5	4
REDOX, FIELD MMT. (MV)	8	NA	200	23	110	110	110	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	20	13	16	16	16	NR	NR	0
ALKALINITY-CO3 (MG/L)	8	1	2.0	2.0	2.0	2.0	2.0	NR	NR	NA
ALKALINITY-HCO3 (MG/L)	8	8	220	54	140	140	140	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	8	8	480	280	390	390	390	NR	NR	NA
DISSOLVED SOLIDS (MG/L)	8	8	310	170	250	250	250	500.000	500.000	0
PH (PH UNITS)	8	NA	8.4	5.9	7.1	7.1	7.1	6.5/8.5	6.5/8.5	4
TOTAL SUSPENDED SOLIDS (MG/L)	8	7	1700	12	530	530	530	NR	NR	NA
TURBIDITY (NTU)	8	8	1500	2.7	330	330	330	1.000	1.000	8
GROSS ALPHA (PCI/L)	8	8	18	-3.7	2.1	2.1	2.1	15.000	15.000	1
GROSS BETA (PCI/L)	8	8	39	-8.9	5.9	5.9	5.9	50.000	50.000	0
2-BUTANONE (UG/L)	8	1	8.0	8.0	8.0	8.0	8.0	NR	NR	NA
4-METHYL-2-PENTANONE (UG/L)	8	1	1.0	1.0	1.0	1.0	1.0	NR	NR	NA
ACETONE (UG/L)	8	1	2.0	2.0	2.0	2.0	2.0	NR	NR	NA
METHYLENE CHLORIDE (UG/L)	8	1	3.0	3.0	3.0	3.0	3.0	NR	NR	NA

Table 7.35. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid J2

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	8	8	4.5		2.6		3.4		250.000	0
FLUORIDE	8	1	0.10		0.10		0.10		2.000	0
SULFATE	8	8	17		9.0		13		250.000	0
ALUMINUM	8	5	4.2		0.031		1.5		0.200	4
ALUMINUM	8	3	0.039		0.024		0.032		0.200	0
BARIUM	8	8	0.31		0.20		0.25		1.000	0
BARIUM	8	8	0.26		0.19		0.23		1.000	0
BERYLLIUM	8	1	0.0003		0.0003		0.0003		0.004**	0
BORON	8	8	0.041		0.017		0.032		NR	NA
BORON	8	8	0.041		0.024		0.032		NR	NA
CALCIUM	8	8	61		41		54		NR	NA
CALCIUM	8	8	61		38		54		NR	NA
COPPER	8	3	0.013		0.0053		0.0083		1.000	0
COPPER	8	2	0.014		0.0057		0.0099		1.000	0
IRON	8	8	5.0		0.16		1.2		0.300	4
IRON	8	8	0.44		0.077		0.19		0.300	2
MAGNESIUM	8	8	10		8.8		9.3		NR	NA
MAGNESIUM	8	8	9.9		8.1		9.1		NR	NA
MANGANESE	8	8	1.0		0.032		0.42		0.050	4
MANGANESE	8	8	0.88		0.032		0.40		0.050	4
NICKEL	8	1	0.012		0.012		0.012		0.100**	0
POTASSIUM	8	8	2.3		1.6		1.9		NR	NA
POTASSIUM	8	8	2.1		1.6		1.8		NR	NA
SELENIUM	8	2	0.083		0.068		0.076		0.050	2
SODIUM	8	8	12		4.6		7.9		NR	NA
SODIUM	8	8	12		4.6		7.9		NR	NA
STRONTIUM	8	8	0.43		0.12		0.26		NR	NA
STRONTIUM	8	8	0.43		0.11		0.26		NR	NA
URANIUM	8	2	0.0010		0.0010		0.0010		13.000	0

Table 7.35 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.			
URANIUM FILT. FLUORIMETRIC (MG/L)	8	1	0.0010	0.0010	0.0010	0.0010	13.000	0	0.0010	13.000	0
ZINC ICAP (MG/L)	8	8	0.024	0.0036	0.0036	0.012	5.000	0	0.012	5.000	0
ZINC FILTERED ICAP (MG/L)	8	8	0.015	0.0064	0.0064	0.010	5.000	0	0.010	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	400	210	210	320	NR	NA	320	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	7.3	0.40	0.40	2.9	NR	NA	2.9	NR	NA
PH, FIELD MMT. (PH UNITS)	8	NA	7.8	5.8	5.8	7.1	6.5/8.5	1	7.1	6.5/8.5	1
REDOX, FIELD MMT. (MV)	8	NA	73	-85	-85	-24	NR	NA	-24	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	20	13	13	16	NR	0	16	NR	0
ALKALINITY-HCO3 (MG/L)	8	8	200	91	91	160	NR	NA	160	NR	NA
CONDUCTIVITY (UMHOS/CM)	8	8	400	190	190	330	NR	NA	330	NR	NA
DISSOLVED SOLIDS (MG/L)	8	8	260	140	140	210	500.000	0	210	500.000	0
PH (PH UNITS)	8	NA	7.8	6.3	6.3	7.3	6.5/8.5	1	7.3	6.5/8.5	1
TOTAL SUSPENDED SOLIDS (MG/L)	8	7	110	2.0	2.0	31	NR	NA	31	NR	NA
TURBIDITY (NTU)	8	8	35	1.0	1.0	11	1.000	7	11	1.000	7
GROSS ALPHA (PCI/L)	8	8	3.1	-4.5	-4.5	0.16	15.000	0	0.16	15.000	0
GROSS BETA (PCI/L)	8	8	6.9	-8.6	-8.6	1.2	50.000	0	1.2	50.000	0
2-BUTANONE (UG/L)	8	1	10	10	10	10	B	NA	10	NR	NA
ACETONE (UG/L)	8	1	3.0	3.0	3.0	3.0	BJ	NA	3.0	NR	NA
METHYLENE CHLORIDE (UG/L)	8	2	3.0	1.0	1.0	2.0	J	NA	2.0	NR	NA



Table 7.36. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid J3

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. >	REFERENCE VALUE	REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.			
CHLORIDE	8	8	54	8.0	28	250.000	0	0	NA	NA	
SULFATE	8	8	9.1	3.9	5.8	250.000	0	0	NA	NA	
ALUMINUM	8	8	0.91	0.027	0.26	0.200	3	3	NA	NA	
ALUMINUM	8	3	0.057	0.028	0.041	0.200	0	0	NA	NA	
BARIUM	8	8	0.57	0.12	0.33	1.000	0	0	NA	NA	
BARIUM	8	8	0.56	0.11	0.32	1.000	0	0	NA	NA	
BERYLLIUM	8	2	0.0008	0.0006	0.0007	0.004**	0	0	NA	NA	
BERYLLIUM	8	1	0.0006	0.0006	0.0006	0.004**	0	0	NA	NA	
BORON	8	8	0.045	0.0097	0.031	NR	NA	NA	NA	NA	
BORON	8	8	0.042	0.012	0.028	NR	NA	NA	NA	NA	
CALCIUM	8	8	56	28	42	NR	NA	NA	NA	NA	
CALCIUM	8	8	57	28	41	NR	NA	NA	NA	NA	
CHROMIUM	8	1	0.011	0.011	0.011	0.050	0	0	NA	NA	
COBALT	8	2	0.0066	0.0051	0.0059	NR	NA	NA	NA	NA	
COBALT	8	3	0.0078	0.0067	0.0073	NR	NA	NA	NA	NA	
COPPER	8	2	0.0061	0.0050	0.0056	1.000	0	0	NA	NA	
IRON	8	8	1.6	0.18	0.70	0.300	4	4	NA	NA	
IRON	8	8	0.93	0.12	0.40	0.300	4	4	NA	NA	
MAGNESIUM	8	8	9.8	3.4	6.5	NR	NA	NA	NA	NA	
MAGNESIUM	8	8	9.7	3.4	6.4	NR	NA	NA	NA	NA	
MANGANESE	8	8	1.9	0.011	0.89	0.050	4	4	NA	NA	
MANGANESE	8	8	1.9	0.011	0.87	0.050	4	4	NA	NA	
NICKEL	8	3	0.029	0.021	0.025	0.100**	0	0	NA	NA	
NICKEL	8	3	0.025	0.013	0.019	0.100**	0	0	NA	NA	
POTASSIUM	8	8	3.4	1.5	2.5	NR	NA	NA	NA	NA	
POTASSIUM	8	8	3.2	1.5	2.5	NR	NA	NA	NA	NA	
SODIUM	8	8	9.2	7.8	8.5	NR	NA	NA	NA	NA	
SODIUM	8	8	9.0	7.8	8.4	NR	NA	NA	NA	NA	
STRONTIUM	8	8	0.46	0.077	0.26	NR	NA	NA	NA	NA	

Table 7.36 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
STRONTIUM	8	8	0.47		0.075		0.26		NR	NA
FILTERED ICAP (MG/L)										
URANIUM	8	1	0.0010		0.0010		0.0010		13.000	0
FLUORIMETRIC (MG/L)										
URANIUM FILT.	8	2	0.0010		0.0010		0.0010		13.000	0
FLUORIMETRIC (MG/L)										
ZINC	8	7	0.029		0.0055		0.013		5.000	0
ICAP (MG/L)										
ZINC	8	7	0.014		0.0048		0.0096		5.000	0
FILTERED ICAP (MG/L)										
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	370		230		320		NR	NA
FIELD MMT (UMHOS/CM)										
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	5.0		0.30		1.7		NR	NA
PH, FIELD MMT. (PH UNITS)	8	NA	7.5		4.7		6.3		6.5/8.5	4
PH (PH UNITS)										
REDOX, FIELD MMT. (MV)	8	NA	140		-76		80		NR	NA
FIELD MMT. (MV)										
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	21		13		16		NR	0
FIELD MMT (DEG. CENT.)										
ALKALINITY-HCO3 (MG/L)	8	8	180		45		120		NR	NA
(MG/L)										
CONDUCTIVITY (UMHOS/CM)	8	8	390		250		330		NR	NA
(UMHOS/CM)										
DISSOLVED SOLIDS (MG/L)	8	8	250		160		200		500.000	0
(MG/L)										
PH (PH UNITS)	8	NA	8.0		5.8		6.9		6.5/8.5	4
(PH UNITS)										
TOTAL SUSPENDED SOLIDS (MG/L)	8	7	19		2.0		9.1		NR	NA
(MG/L)										
TURBIDITY (NTU)	8	8	14		1.6		5.7		1.000	8
(NTU)										
GROSS ALPHA (PCI/L)	8	8	2.4		-1.5		0.35		15.000	0
(PCI/L)										
GROSS BETA (PCI/L)	8	8	3.4		-6.1		0.38		50.000	0
(PCI/L)										
ACETONE (UG/L)	8	1	42		42		42		NR	NA
(UG/L)										
METHYLENE CHLORIDE (UG/L)	8	1	1.0		1.0		1.0		NR	NA
(UG/L)										

Table 7.37. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid K1

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	12	12	16		3.2		7.7	250.000	0	0
FLUORIDE	12	6	0.20		0.10		0.12	2.000	0	0
NITRATE NITROGEN	12	4	0.61		0.40		0.49	10.000	0	0
SULFATE	12	12	30		18		25	250.000	0	0
ALUMINUM	12	10	20		0.021		2.4	0.200	5	5
ALUMINUM	12	5	1.3		0.021		0.28	0.200	1	1
BARIUM	12	12	0.22		0.079		0.15	1.000	0	0
BARIUM	12	12	0.20		0.079		0.14	1.000	0	0
BERYLLIUM	12	2	0.0010		0.0005		0.0007	0.004**	0	0
BORON	12	12	0.094		0.0086		0.048	NR	NR	NA
BORON	12	12	0.072		0.017		0.047	NR	NR	NA
CADMIUM	12	2	0.018		0.0076		0.013	0.005	2	2
CALCIUM	12	12	60		10		41	NR	NR	NA
CALCIUM	12	12	59		12		40	NR	NR	NA
CHROMIUM	12	3	0.20		0.013		0.084	0.050	1	1
CHROMIUM	12	2	0.18		0.036		0.11	0.050	1	1
COBALT	12	2	0.019		0.014		0.017	NR	NR	NA
COPPER	12	7	0.048		0.0052		0.015	1.000	0	0
COPPER	12	3	0.014		0.0044		0.0089	1.000	0	0
IRON	12	12	18		0.11		2.2	0.300	4	4
IRON	12	10	0.86		0.011		0.21	0.300	1	1
LEAD	12	1	0.010		0.010		0.010	0.050	0	0
MAGNESIUM	12	12	10		3.8		7.9	NR	NR	NA
MAGNESIUM	12	12	10		4.1		7.4	NR	NR	NA
MANGANESE	12	12	0.78		0.033		0.24	0.050	10	10
MANGANESE	12	12	0.78		0.029		0.24	0.050	8	8
MOLYBDENUM	12	1	0.019		0.019		0.019	NR	NR	NA
NICKEL	12	3	0.044		0.013		0.030	0.100**	0	0
NICKEL	12	2	0.028		0.028		0.028	0.100**	0	0

Table 7.37 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	# DETECTED	MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.			DETECTED	MMT.	DETECTED	MMTS.	
POTASSIUM	12	12	3.7	1.2	12	2.8	NR	NR	NA	NA	NA
POTASSIUM	12	12	3.6	1.1	12	2.5	NR	NR	NA	NA	NA
SELENIUM	12	2	0.072	0.070	2	0.071	0.050	0.050	2	2	2
SODIUM	12	12	30	5.8	12	18	NR	NR	NA	NA	NA
SODIUM	12	12	30	5.8	12	19	NR	NR	NA	NA	NA
STRONTIUM	12	12	1.1	0.046	12	0.55	NR	NR	NA	NA	NA
STRONTIUM	12	12	1.1	0.050	12	0.54	NR	NR	NA	NA	NA
URANIUM	12	3	0.0020	0.0010	3	0.0013	13.000	13.000	0	0	0
URANIUM FILT.	12	2	0.0010	0.0010	2	0.0010	13.000	13.000	0	0	0
VANADIUM	12	2	0.029	0.010	2	0.020	NR	NR	NA	NA	NA
ZINC	12	12	0.099	0.040	12	0.041	5.000	5.000	0	0	0
ZINC	12	12	0.083	0.0025	12	0.031	5.000	5.000	0	0	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	12	NA	410	120	12	310	NR	NR	NA	NA	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	12	NA	8.7	0.30	12	3.7	NR	NR	NA	NA	NA
PH, FIELD MMT. (PH UNITS)	12	NA	7.6	5.5	12	6.9	6.5/8.5	6.5/8.5	3	3	3
REDOX, FIELD MMT. (MV)	12	NA	230	-97	12	74	NR	NR	NA	NA	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	12	NA	21	12	12	16	NR	NR	0	0	0
ALKALINITY-HCO3 (MG/L)	12	12	200	32	12	140	NR	NR	NA	NA	NA
CONDUCTIVITY (UMHOS/CM)	12	12	450	140	12	340	NR	NR	NA	NA	NA
DISSOLVED SOLIDS (MG/L)	12	12	300	100	12	220	500.000	500.000	0	0	0
PH (PH UNITS)	12	NA	8.1	5.9	12	7.1	6.5/8.5	6.5/8.5	3	3	3
TOTAL SUSPENDED SOLIDS (MG/L)	12	6	410	2.0	12	75	NR	NR	NA	NA	NA
TURBIDITY (NTU)	12	12	230	1.0	12	49	1.000	1.000	11	11	11
GROSS ALPHA (PCI/L)	12	12	4.7	-3.6	12	0.39	15.000	15.000	0	0	0
GROSS BETA (PCI/L)	12	12	6.4	-1.4	12	2.1	50.000	50.000	0	0	0
2-BUTANONE (UG/L)	12	1	10	10	12	10	B	NR	NR	NA	NA
4-METHYL-2-PENTANONE (UG/L)	12	1	2.0	2.0	12	2.0	BJ	NR	NR	NA	NA
ACETONE (UG/L)	12	1	5.0	5.0	12	5.0	BJ	NR	NR	NA	NA
METHYLENE CHLORIDE (UG/L)	12	7	3.0	0.60	12	1.5	J	NR	NR	NA	NA

Table 7.38. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Grid K2

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.		
CHLORIDE	16	16	38		3.4		12	250.000	0	0
FLUORIDE	16	8	0.20		0.10		0.15	2.000	0	0
NITRATE NITROGEN	16	2	7.1		0.45		3.8	10.000	0	0
SULFATE	16	16	81		17		33	250.000	0	0
ALUMINUM	16	12	6.3		0.021		1.1	0.200	6	6
ALUMINUM	16	5	0.034		0.022		0.026	0.200	0	0
BARIUM	16	16	0.81		0.12		0.31	1.000	0	0
BARIUM	16	16	0.79		0.11		0.30	1.000	0	0
BORON	16	16	0.18		0.019		0.056	NR	NR	NA
BORON	16	16	0.10		0.010		0.057	NR	NR	NA
CALCIUM	16	16	110		51		77	NR	NR	NA
CALCIUM	16	16	110		53		77	NR	NR	NA
CHROMIUM	16	1	0.014		0.014		0.014	0.050	0	0
CHROMIUM	16	1	0.014		0.014		0.014	0.050	0	0
COBALT	16	2	0.0060		0.0058		0.0059	NR	NR	NA
COPPER	16	8	0.041		0.0060		0.013	1.000	0	0
COPPER	16	6	0.018		0.0048		0.0083	1.000	0	0
IRON	16	16	5.1		0.11		0.99	0.300	9	9
IRON	16	11	0.26		0.012		0.14	0.300	0	0
MAGNESIUM	16	16	12		7.7		10	NR	NR	NA
MAGNESIUM	16	16	13		7.6		10	NR	NR	NA
MANGANESE	16	16	1.4		0.013		0.27	0.050	9	9
MANGANESE	16	16	0.93		0.012		0.20	0.050	6	6
POTASSIUM	16	16	5.5		0.95		2.8	NR	NR	NA
POTASSIUM	16	16	5.7		0.74		2.6	NR	NR	NA
SELENIUM	16	2	0.056		0.053		0.055	0.050	2	2
SELENIUM	16	2	0.067		0.053		0.060	0.050	2	2
SODIUM	16	16	30		4.6		13	NR	NR	NA
SODIUM	16	16	30		4.6		13	NR	NR	NA

Table 7.38 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	# DETECTED	MINIMUM		AVERAGE		# MMTS. > REFERENCE	VALUE	REFERENCE
			DETECTED	MMT.			DETECTED	MMT.	DETECTED	MMTS.			
STRONTIUM	16	16	0.84	0.18	16	16	0.45	NR	NR	NA	NA	NA	NA
STRONTIUM	16	16	0.82	0.18	16	16	0.45	NR	NR	NA	NA	NA	NA
URANIUM	16	4	0.0040	0.0020	16	4	0.0028	13.000	13.000	0	0	0	0
URANIUM FILT.	16	6	0.0030	0.0010	16	6	0.0018	13.000	13.000	0	0	0	0
VANADIUM	16	3	0.013	0.0052	16	3	0.0090	NR	NR	NA	NA	NA	NA
ZINC	16	15	0.091	0.0042	16	15	0.026	5.000	5.000	0	0	0	0
ZINC	16	15	0.079	0.0044	16	15	0.020	5.000	5.000	0	0	0	0
CONDUCTIVITY, FIELD MMT	16	NA	670	380	16	NA	480	NR	NR	NA	NA	NA	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	16	NA	6.5	0.40	16	NA	3.0	NR	NR	NA	NA	NA	NA
PH, FIELD MMT. (PH UNITS)	16	NA	7.8	6.7	16	NA	7.4	6.5/8.5	6.5/8.5	0	0	0	0
REDOX, FIELD MMT. (MV)	16	NA	180	-85	16	NA	52	NR	NR	NA	NA	NA	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	16	NA	20	12	16	NA	16	NR	NR	0	0	0	0
ALKALINITY-HCO3 (MG/L)	16	16	270	200	16	16	220	NR	NR	NA	NA	NA	NA
CONDUCTIVITY (UMHOS/CM)	16	16	700	440	16	16	510	NR	NR	NA	NA	NA	NA
DISSOLVED SOLIDS (MG/L)	16	16	540	260	16	16	340	500.000	500.000	1	1	1	1
PH (PH UNITS)	16	NA	8.0	7.3	16	NA	7.6	6.5/8.5	6.5/8.5	0	0	0	0
TOTAL SUSPENDED SOLIDS (MG/L)	16	10	140	1.0	16	10	30	NR	NR	NA	NA	NA	NA
TURBIDITY (NTU)	16	16	1800	0.60	16	16	130	1.000	1.000	12	12	12	12
GROSS ALPHA (PCI/L)	16	16	5.7	-1.3	16	16	0.45	15.000	15.000	0	0	0	0
GROSS BETA (PCI/L)	16	16	14	-0.88	16	16	3.5	50.000	50.000	0	0	0	0
4-METHYL-2-PENTANONE (UG/L)	16	2	2.0	2.0	16	2	2.0	BJ	BJ	NR	NR	NR	NR
ACETONE (UG/L)	16	1	1.0	1.0	16	1	1.0	BJ	BJ	NR	NR	NR	NR
METHYLENE CHLORIDE (UG/L)	16	3	1.0	1.0	16	3	1.0	JB	JB	NR	NR	NR	NR

Table 7.39. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=New Hope Pond

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. >
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	36	36	360		2.0		51	250.000	1
FLUORIDE	36	25	3.2		0.10		0.61	2.000	4
NITRATE NITROGEN	36	21	4.0		0.34		1.7	10.000	0
SULFATE	36	36	58		5.3		19	250.000	0
ALUMINUM	36	25	8.6		0.022		0.74	0.200	12
ALUMINUM	36	8	0.045		0.020		0.030	0.200	0
ARSENIC	36	1	0.056		0.056		0.056	0.050	1
BARIUM	36	36	0.60		0.027		0.20	1.000	0
BARIUM	36	36	0.59		0.028		0.19	1.000	0
BERYLLIUM	36	7	0.0055		0.0003		0.0022	0.004**	2
BERYLLIUM	36	2	0.0005		0.0003		0.0004	0.004**	0
BORON	36	36	0.89		0.011		0.16	NR	NA
BORON	36	36	0.89		0.012		0.17	NR	NA
CADMIUM	36	2	0.0065		0.0037		0.0051	0.005	1
CADMIUM	36	6	0.0075		0.0040		0.0059	0.005	4
CADMIUM	36	2	0.0041		0.0033		0.0037	0.005	0
CALCIUM	36	36	99		1.1		57	NR	NA
CALCIUM	36	36	97		0.86		54	NR	NA
CHROMIUM	36	5	4.0		0.021		1.2	0.050	4
CHROMIUM	36	6	2.5		0.010		0.70	0.050	4
CHROMIUM	36	2	0.032		0.017		0.025	0.050	0
COBALT	36	4	0.074		0.0052		0.023	NR	NA
COBALT	36	2	0.073		0.011		0.042	NR	NA
COPPER	36	13	0.074		0.0056		0.016	1.000	0
COPPER	36	8	0.091		0.0043		0.018	1.000	0
IRON	36	34	28		0.012		2.0	0.300	26
IRON	36	26	14		0.013		1.0	0.300	13
LEAD	36	2	0.023		0.0055		0.014	0.050	0
MAGNESIUM	36	36	28		0.23		17	NR	NA

Table 7.39 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
MAGNESIUM	36	36	28	0.20	16	NR	NA	NA	
MANGANESE	36	33	0.81	0.0017	0.15	0.050	17	0.050	
MANGANESE	36	31	1.0	0.0011	0.15	0.050	14	0.050	
MERCURY	36	1	0.0004	0.0004	0.0004	0.002	0	0.002	
MOLYBDENUM	36	2	0.011	0.010	0.011	NR	NA	NR	
NICKEL	36	6	3.9	0.017	0.82	0.100**	5	0.100**	
NICKEL	36	6	4.0	0.015	0.80	0.100**	3	0.100**	
POTASSIUM	36	36	5.2	0.86	2.3	NR	NA	NR	
POTASSIUM	36	36	11	0.70	2.3	NR	NA	NR	
SELENIUM	36	2	0.072	0.063	0.068	0.050	2	0.050	
SODIUM	36	36	180	3.7	43	NR	NA	NR	
SODIUM	36	36	270	3.5	51	NR	NA	NR	
STRONTIUM	36	36	0.58	0.032	0.29	NR	NA	NR	
STRONTIUM	36	36	0.58	0.029	0.27	NR	NA	NR	
URANIUM	36	14	0.0070	0.0010	0.0023	13.000	0	13.000	
URANIUM FILT.	36	15	0.0050	0.0010	0.0019	13.000	0	13.000	
VANADIUM	36	4	0.011	0.0067	0.0080	NR	NA	NR	
ZINC	36	35	0.031	0.0021	0.0099	5.000	0	5.000	
ZINC	36	31	0.18	0.0023	0.015	5.000	0	5.000	
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	36	NA	940	400	540	NR	NA	NR	
DISSOLVED OXYGEN, FIELD MMT. (PPM)	36	NA	11	0.20	2.9	NR	NA	NR	
PH, FIELD MMT. (PH UNITS)	36	NA	9.1	5.6	7.4	6.5/8.5	5	6.5/8.5	
REDOX, FIELD MMT. (MV)	36	NA	210	-110	61	NR	NA	NR	
WATER TEMP, FIELD MMT (DEG. CENT.)	36	NA	23	13	16	NR	0	NR	
ALKALINITY-CO3 (MG/L)	36	4	54	46	50	NR	NA	NR	
ALKALINITY-HCO3 (MG/L)	36	36	330	78	220	NR	NA	NR	
CONDUCTIVITY (UMHOS/CM)	36	36	1200	480	610	NR	NA	NR	
DISSOLVED SOLIDS (MG/L)	36	36	590	260	360	500.000	1	500.000	
PH (PH UNITS)	36	NA	9.2	6.7	7.7	6.5/8.5	4	6.5/8.5	
TOTAL SUSPENDED SOLIDS (MG/L)	36	30	410	1.0	26	NR	NA	NR	



Table 7.39 (continued)

VARIABLE	# SAMPLES DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE		# MMTS. > REFERENCE VALUE
				DETECTED MMTS.	REFERENCE VALUE	
TURBIDITY (NTU)	36	280	0.50	18	1,000	33
GROSS ALPHA (PCI/L)	36	3.9	-4.9	0.59	15,000	0
GROSS BETA (PCI/L)	36	19	-8.5	2.0	50,000	0
1,2-DICHLOROETHENE (UG/L)	36	84	7.0	61	70,000	4
4-METHYL-2-PENTANONE (UG/L)	36	78	2.0	15	NR	NA
ACETONE (UG/L)	36	52	1.0	14	NR	NA
CARBON TETRACHLORIDE (UG/L)	36	7000	3.0	2100	5,000	20
CHLOROFORM (UG/L)	36	950	0.80	190	100,000	8
METHYLENE CHLORIDE (UG/L)	36	80	1.0	17	NR	NA
TETRACHLOROETHENE (UG/L)	36	400	0.60	120	5,000	16
TRICHLOROETHENE (UG/L)	36	130	2.0	35	5,000	8

Table 7.40. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=S2 Site

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE (MG/L)	12	12	12	1.0	1.0	5.6	250.000	0	
FLUORIDE (MG/L)	12	6	1.6	0.20	0.20	1.0	2.000	0	
NITRATE NITROGEN (MG/L)	12	12	240	0.47	0.47	39	10.000	4	
SULFATE (MG/L)	12	12	22	1.0	1.0	11	250.000	0	
ALUMINUM ICAP (MG/L)	12	12	29	0.27	0.27	7.6	0.200	12	
ALUMINUM FILTERED ICAP (MG/L)	12	6	0.43	0.021	0.021	0.14	0.200	2	
BARIUM ICAP (MG/L)	12	12	0.22	0.010	0.010	0.082	1.000	0	
BARIUM FILTERED ICAP (MG/L)	12	12	0.15	0.0094	0.0094	0.052	1.000	0	
BERYLLIUM ICAP (MG/L)	12	8	0.0033	0.0003	0.0003	0.0014	0.004**	0	
BERYLLIUM FILTERED ICAP (MG/L)	12	2	0.0019	0.0005	0.0005	0.0012	0.004**	0	
BORON ICAP (MG/L)	12	12	0.084	0.012	0.012	0.031	NR	NA	
BORON FILTERED ICAP (MG/L)	12	12	0.084	0.0045	0.0045	0.027	NR	NA	
CADMIUM AAS (MG/L)	12	6	0.20	0.0023	0.0023	0.088	0.005	4	
CADMIUM ICAP (MG/L)	12	5	0.18	0.0077	0.0077	0.10	0.005	5	
CADMIUM AAS (MG/L)	12	4	0.20	0.072	0.072	0.12	0.005	4	
CALCIUM ICAP (MG/L)	12	12	120	7.2	7.2	62	NR	NA	
CALCIUM FILTERED ICAP (MG/L)	12	12	130	5.0	5.0	62	NR	NA	
CHROMIUM AAS (MG/L)	12	9	0.050	0.011	0.011	0.025	0.050	0	
CHROMIUM ICAP (MG/L)	12	7	0.042	0.011	0.011	0.024	0.050	0	
CHROMIUM FILTERED AAS (MG/L)	12	1	0.010	0.010	0.010	0.010	0.050	0	
COBALT ICAP (MG/L)	12	7	0.039	0.0055	0.0055	0.022	NR	NA	
COBALT FILTERED ICAP (MG/L)	12	4	0.036	0.0063	0.0063	0.022	NR	NA	
COPPER ICAP (MG/L)	12	9	0.95	0.0059	0.0059	0.31	1.000	0	
COPPER FILTERED ICAP (MG/L)	12	5	0.46	0.0044	0.0044	0.24	1.000	0	
IRON ICAP (MG/L)	12	12	39	0.40	0.40	9.7	0.300	12	
IRON FILTERED ICAP (MG/L)	12	5	0.26	0.0055	0.0055	0.089	0.300	0	
LEAD AAS (MG/L)	12	10	0.077	0.0056	0.0056	0.033	0.050	3	
LEAD ICAP (MG/L)	6	3	0.075	0.051	0.051	0.060	0.050	3	
MAGNESIUM ICAP (MG/L)	12	12	43	3.9	3.9	22	NR	NA	

Table 7.40 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
					DETECTED MMTS.	DETECTED MMTS.		
MAGNESIUM	12	12	31	2.7	20	NR	NR	NA
FILTERED ICAP (MG/L)	12	12	5.4	0.012	1.6	0.050	0.050	10
MANGANESE	12	12	5.2	0.0016	1.4	0.050	0.050	4
FILTERED ICAP (MG/L)	12	10	0.0004	0.0002	0.0003	0.002	0.002	0
MERCURY	12	4	0.067	0.011	0.038	0.100**	0.100**	0
CVAA (MG/L)	12	8	0.061	0.014	0.041	0.100**	0.100**	0
NICKEL	12	3	7.1	0.92	3.3	NR	NR	NA
FILTERED ICAP (MG/L)	12	11	3.7	0.64	1.8	NR	NR	NA
POTASSIUM	12	11	0.058	0.058	0.058	0.050	0.050	1
FILTERED ICAP (MG/L)	12	1	20	3.1	8.7	NR	NR	NA
ICAP (MG/L)	12	12	20	2.1	8.6	NR	NR	NA
SODIUM	12	12	0.23	0.0067	0.073	NR	NR	NA
FILTERED ICAP (MG/L)	12	12	0.26	0.0058	0.074	NR	NR	NA
STRONTIUM	12	12	0.010	0.0010	0.0039	13.000	13.000	0
FILTERED ICAP (MG/L)	12	8	0.0060	0.0010	0.0030	13.000	13.000	0
URANIUM	12	7	0.051	0.0055	0.021	NR	NR	NA
FLUORIMETRIC (MG/L)	12	7	0.19	0.010	0.076	5.000	5.000	0
FLUORIMETRIC (MG/L)	12	11	0.11	0.0032	0.031	5.000	5.000	0
URANIUM FILT.	12	NA	980	140	500	NR	NR	NA
ICAP (MG/L)	12	NA	12	0.50	5.4	6.5/8.5	6.5/8.5	4
ICAP (MG/L)	12	NA	7.3	6.0	6.7	NR	NR	NA
FILTERED ICAP (MG/L)	12	NA	270	100	200	NR	NR	NA
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	12	NA	23	12	15	NR	NR	0
DISSOLVED OXYGEN, FIELD MMT. (PPM)	12	NA	240	46	170	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	12	12	1100	130	540	NR	NR	NA
(MV)	12	12	720	60	360	500.000	500.000	3
REDUX, FIELD MMT. (DEG. CENT.)	12	NA	7.7	6.7	7.2	6.5/8.5	6.5/8.5	0
WATER TEMP, FIELD MMT. (MG/L)	12	12	1300	4.0	200	NR	NR	NA
ALKALINITY-HCO3 (UMHOS/CM)	12	12	560	8.5	140	1.000	1.000	12
CONDUCTIVITY (PH UNITS)	12	12	22	-0.31	6.2	15.000	15.000	2
DISSOLVED SOLIDS (MG/L)	12	12						
PH	12	12						
TOTAL SUSPENDED SOLIDS (MG/L)	12	12						
TURBIDITY (NTU)	12	12						
GROSS ALPHA (PCI/L)	12	12						

Table 7.40 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
GROSS BETA	12	12	19		-1.1		5.3	50.000	0
1,2-DICHLOROETHENE	12	1	7.0		7.0		7.0	70.000	0
2-BUTANONE	12	1	8.0	BJ	8.0	BJ	8.0	NR	NA
4-METHYL-2-PENTANONE	12	3	1.0	BJ	1.0	BJ	1.0	NR	NA
ACETONE	12	2	11		6.0	BJ	8.5	NR	NA
CARBON TETRACHLORIDE	12	3	11		1.0	J	4.7	5.000	1
CHLOROFORM	12	8	8.0		1.0	J	3.0	100.000	0
METHYLENE CHLORIDE	12	4	2.0	JB	1.0	JB	1.8	NR	NA
TETRACHLOROETHENE	12	4	210	E	24		78	5.000	4
TRICHLOROETHENE	12	4	82		7.0		29	5.000	4

Table 7.41. Constituents in groundwater at the Y-12 Plant site

HGR=EF area=Waste Coolant Facilities

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.	
CHLORIDE (MG/L)	8	8	35	5.8	16	250.000	0	0	
FLUORIDE (MG/L)	8	1	0.10	0.10	0.10	2.000	0	0	
NITRATE NITROGEN (MG/L)	8	4	0.60	0.31	0.46	10.000	0	0	
SULFATE (MG/L)	8	8	18	6.2	11	250.000	0	0	
ALUMINUM ICAP (MG/L)	8	8	6.2	0.20	1.9	0.200	7	7	
ALUMINUM FILTERED ICAP (MG/L)	8	4	0.091	0.026	0.049	0.200	0	0	
BARIUM ICAP (MG/L)	8	8	0.37	0.19	0.29	1.000	0	0	
BARIUM FILTERED ICAP (MG/L)	8	8	0.35	0.16	0.25	1.000	0	0	
BERYLLIUM ICAP (MG/L)	8	2	0.0010	0.0007	0.0008	0.004**	0	0	
BORON ICAP (MG/L)	8	8	0.091	0.025	0.042	NR	NA	NA	
BORON FILTERED ICAP (MG/L)	8	8	0.062	0.017	0.035	NR	NA	NA	
CADMIUM AAS (MG/L)	8	2	0.0069	0.0048	0.0059	0.005	1	1	
CADMIUM ICAP (MG/L)	8	3	0.0078	0.0036	0.0053	0.005	1	1	
CADMIUM FILTERED AAS (MG/L)	8	2	0.0068	0.0051	0.0060	0.005	2	2	
CALCIUM ICAP (MG/L)	8	8	100	86	91	NR	NA	NA	
CALCIUM FILTERED ICAP (MG/L)	8	8	97	68	85	NR	NA	NA	
CHROMIUM AAS (MG/L)	8	1	0.028	0.028	0.028	0.050	0	0	
CHROMIUM ICAP (MG/L)	8	2	0.026	0.013	0.020	0.050	0	0	
CHROMIUM FILTERED AAS (MG/L)	8	1	0.013	0.013	0.013	0.050	0	0	
COBALT ICAP (MG/L)	8	2	0.0094	0.0056	0.0075	NR	NA	NA	
COPPER ICAP (MG/L)	8	6	0.027	0.0049	0.013	1.000	0	0	
COPPER FILTERED ICAP (MG/L)	8	3	0.012	0.0045	0.0079	1.000	0	0	
IRON ICAP (MG/L)	8	8	14	0.28	3.3	0.300	7	7	
IRON FILTERED ICAP (MG/L)	8	3	0.10	0.0072	0.039	0.300	0	0	
LEAD AAS (MG/L)	8	2	0.0087	0.0040	0.0064	0.050	0	0	
MAGNESIUM ICAP (MG/L)	8	8	12	8.3	9.9	NR	NA	NA	
MAGNESIUM FILTERED ICAP (MG/L)	8	8	9.8	8.1	9.1	NR	NA	NA	
MANGANESE ICAP (MG/L)	8	8	0.73	0.097	0.29	0.050	8	8	
MANGANESE FILTERED ICAP (MG/L)	8	8	0.30	0.032	0.10	0.050	5	5	

Table 7.41 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
NICKEL	8	3	0.033	0.011	0.019	0.100**	0	0		
NICKEL	8	1	0.010	0.010	0.010	0.100**	0	0		
POTASSIUM	8	8	5.0	1.6	2.7	NR	NA	NA		
POTASSIUM	8	8	3.1	1.0	2.0	NR	NA	NA		
SELENIUM	8	1	0.055	0.055	0.055	0.050	1	1		
SODIUM	8	8	5.9	3.8	4.8	NR	NA	NA		
SODIUM	8	8	6.2	3.7	4.8	NR	NA	NA		
STRONTIUM	8	8	0.26	0.22	0.24	NR	NA	NA		
STRONTIUM	8	8	0.25	0.17	0.22	NR	NA	NA		
URANIUM	8	6	0.0020	0.0010	0.0013	13.000	0	0		
URANIUM FILT.	8	6	0.0010	0.0010	0.0010	13.000	0	0		
VANADIUM	8	2	0.011	0.0085	0.0098	NR	NA	NA		
ZINC	8	8	0.14	0.0099	0.040	5.000	0	0		
ZINC	8	8	0.12	0.0089	0.039	5.000	0	0		
CONDUCTIVITY, FIELD MMT	8	NA	510	420	480	NR	NA	NA		
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	6.5	1.1	3.3	NR	NA	NA		
PH, FIELD MMT. (PH UNITS)	8	NA	7.1	6.3	6.7	6.5/8.5	1	1		
REDOX, FIELD MMT. (MV)	8	NA	240	160	190	NR	NA	NA		
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	23	13	18	NR	0	0		
ALKALINITY-HCO3 (MG/L)	8	8	250	230	240	NR	NA	NA		
CONDUCTIVITY (UMHOS/CM)	8	8	550	390	500	NR	NA	NA		
DISSOLVED SOLIDS (MG/L)	8	8	370	300	330	500.000	0	0		
PH (PH UNITS)	8	NA	7.7	6.9	7.3	6.5/8.5	0	0		
TOTAL SUSPENDED SOLIDS (MG/L)	8	8	580	3.0	82	NR	NA	NA		
TURBIDITY (NTU)	8	8	340	3.8	61	1.000	8	8		
GROSS ALPHA (PCI/L)	8	8	14	-1.2	1.5	15.000	0	0		
GROSS BETA (PCI/L)	8	8	19	-1.9	3.2	50.000	0	0		
1,1,1-TRICHLOROETHANE (UG/L)	8	4	360	330	350	200.000	4	4		
1,1-DICHLOROETHANE (UG/L)	8	4	190	160	170	NR	NA	NA		
1,1-DICHLOROETHENE (UG/L)	8	4	230	210	220	7.000	4	4		

Table 7.41 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
1,2-DICHLOROETHENE	8	4	9300		8100		8500	70,000	4	4
2-BUTANONE	8	1	530	B	530	B	530	NR	NR	NA
4-METHYL-2-PENTANONE	8	1	61	JB	61	JB	61	NR	NR	NA
ACETONE	8	1	240	JB	240	JB	240	NR	NR	NA
METHYLENE CHLORIDE	8	3	110	JB	1.0	JB	57	NR	NR	NA
TETRACHLOROETHENE	8	4	910		760		830	5,000	5,000	4
TRICHLOROETHENE	8	4	1000		960		990	5,000	5,000	4
VINYL CHLORIDE	8	4	340	J	170	J	260	2,000	2,000	4

Table 7.42. Constituents in groundwater at the Y-12 Plant site  
HGR=EF area=Y-12 Salvage Yard

VARIABLE	# SAMPLES	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
		# DETECTED	DETECTED MMT.	DETECTED MMT.	DETECTED MMTS.	VALUE	REFERENCE	
CHLORIDE (MG/L)	16	14	59	1.0	21	250.000	0	
FLUORIDE (MG/L)	16	14	0.30	0.10	0.16	2.000	0	
NITRATE NITROGEN (MG/L)	16	4	0.60	0.27	0.45	10.000	0	
SULFATE (MG/L)	16	16	140	10	47	250.000	0	
ALUMINUM ICAP (MG/L)	16	16	13	0.038	1.3	0.200	11	
ALUMINUM FILTERED ICAP (MG/L)	16	9	0.16	0.021	0.053	0.200	0	
BARIUM ICAP (MG/L)	16	16	0.45	0.024	0.16	1.000	0	
BARIUM FILTERED ICAP (MG/L)	16	16	0.27	0.026	0.13	1.000	0	
BERYLLIUM ICAP (MG/L)	16	2	0.0007	0.0004	0.0005	0.004**	0	
BORON ICAP (MG/L)	16	16	0.18	0.011	0.041	NR	NA	
BORON FILTERED ICAP (MG/L)	16	16	0.075	0.013	0.032	NR	NA	
CADMIUM AAS (MG/L)	16	3	0.0067	0.0030	0.0045	0.005	1	
CADMIUM ICAP (MG/L)	16	3	0.0062	0.0035	0.0049	0.005	1	
CADMIUM FILTERED AAS (MG/L)	16	3	0.0066	0.0025	0.0040	0.005	1	
CALCIUM ICAP (MG/L)	16	16	160	46	80	NR	NA	
CALCIUM FILTERED ICAP (MG/L)	16	16	150	46	79	NR	NA	
CHROMIUM AAS (MG/L)	16	4	5.8	0.049	1.5	0.050	3	
CHROMIUM ICAP (MG/L)	16	4	5.0	0.036	1.3	0.050	3	
CHROMIUM FILTERED AAS (MG/L)	16	1	0.026	0.026	0.026	0.050	0	
COBALT ICAP (MG/L)	16	2	0.048	0.0054	0.027	NR	NA	
COBALT FILTERED ICAP (MG/L)	16	1	0.0091	0.0091	0.0091	NR	NA	
COPPER ICAP (MG/L)	16	7	0.20	0.0045	0.035	1.000	0	
COPPER FILTERED ICAP (MG/L)	16	2	0.034	0.0046	0.019	1.000	0	
IRON ICAP (MG/L)	16	16	37	0.011	3.0	0.300	11	
IRON FILTERED ICAP (MG/L)	16	9	0.79	0.0083	0.15	0.300	1	
LEAD AAS (MG/L)	16	1	0.11	0.11	0.11	0.050	1	
MAGNESIUM ICAP (MG/L)	16	16	42	5.9	18	NR	NA	
MAGNESIUM FILTERED ICAP (MG/L)	16	16	41	5.9	18	NR	NA	
MANGANESE ICAP (MG/L)	16	16	0.75	0.011	0.094	0.050	6	



Table 7.42 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
MANGANESE	16	16	0.21	0.0027	0.048	0.050	5			
FILTERED ICAP (MG/L)										
MOLYBDENUM	16	1	0.051	0.051	0.051	NR	NA			
ICAP (MG/L)										
NICKEL	16	5	2.1	0.011	0.62	0.100**	4			
ICAP (MG/L)										
NICKEL	16	6	0.96	0.012	0.29	0.100**	4			
FILTERED ICAP (MG/L)										
POTASSIUM	16	16	4.7	1.2	2.4	NR	NA			
ICAP (MG/L)										
POTASSIUM	16	16	3.8	1.3	2.2	NR	NA			
FILTERED ICAP (MG/L)										
SODIUM	16	16	29	9.0	18	NR	NA			
ICAP (MG/L)										
SODIUM	16	16	30	9.4	18	NR	NA			
FILTERED ICAP (MG/L)										
STRONTIUM	16	16	0.34	0.087	0.18	NR	NA			
ICAP (MG/L)										
STRONTIUM	16	16	0.34	0.087	0.18	NR	NA			
FILTERED ICAP (MG/L)										
URANIUM	16	8	0.0020	0.0010	0.0011	13.000	0			
FLUORIMETRIC (MG/L)										
URANIUM FILT.	16	7	0.0010	0.0010	0.0010	13.000	0			
FLUORIMETRIC (MG/L)										
VANADIUM	16	2	0.032	0.0057	0.019	NR	NA			
ICAP (MG/L)										
ZINC	16	16	0.075	0.0042	0.021	5.000	0			
ICAP (MG/L)										
ZINC	16	14	0.063	0.0024	0.016	5.000	0			
FILTERED ICAP (MG/L)										
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	16	NA	1000	300	540	NR	NA			
FIELD MMT (UMHOS/CM)										
DISSOLVED OXYGEN, FIELD MMT. (PPM)	16	NA	7.5	1.2	5.6	NR	NA			
PH, FIELD MMT. (PH UNITS)	16	NA	8.1	6.8	7.3	6.5/8.5	0			
REDOX, FIELD MMT. (MV)	16	NA	220	-160	100	NR	NA			
WATER TEMP, FIELD MMT (DEG. CENT.)	16	NA	29	13	18	NR	0			
ALKALINITY-HCO3 (MG/L)	16	16	450	150	240	NR	NA			
CONDUCTIVITY (UMHOS/CM)	16	16	1100	360	580	NR	NA			
CONDUCTIVITY, REP. 2 (UMHOS/CM)	1	1	460	460	460	NR	NA			
DISSOLVED SOLIDS (MG/L)	16	16	740	220	380	500.000	4			
PH (PH UNITS)	16	NA	8.3	7.2	7.7	6.5/8.5	0			
PH, REP. 2 (PH UNITS)	1	NA	7.9	7.9	7.9	6.5/8.5	0			
TOTAL SUSPENDED SOLIDS (MG/L)	16	15	160	1.0	32	NR	NA			
TURBIDITY (NTU)	16	16	230	1.0	41	1.000	15			
GROSS ALPHA (PCI/L)	16	16	8.0	-4.3	0.018	15.000	0			

Table 7.42 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
GROSS BETA (PCI/L)	16	16	39		-4.9		5.1	50.000	0
4-METHYL-2-PENTANONE (UG/L)	16	2	2.0	BJ	2.0	BJ	2.0	NR	NA
ACETONE (UG/L)	16	1	32		32		32	NR	NA
METHYLENE CHLORIDE (UG/L)	16	6	2.0	JB	1.0	J	1.2	NR	NA

Table 7.43. Constituents in groundwater at the Y-12 Plant site

HGR=UST 1 area=Rust Garage Area

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE (MG/L)	28	25	130		5.3		33	250.000	0	0
FLUORIDE (MG/L)	28	13	0.30		0.10		0.20	2.000	0	0
NITRATE NITROGEN (MG/L)	28	17	5500		0.26		860	10.000	9	9
SULFATE (MG/L)	28	22	310		1.0		25	250.000	1	1
ALUMINUM ICAP (MG/L)	28	28	11		0.030		2.4	0.200	22	22
ALUMINUM FILTERED ICAP (MG/L)	28	20	2.0		0.024		0.34	0.200	7	7
BARIUM ICAP (MG/L)	28	28	33		0.063		3.0	1.000	3	3
BARIUM FILTERED ICAP (MG/L)	28	28	37		0.044		3.1	1.000	3	3
BERYLLIUM ICAP (MG/L)	28	16	0.0050		0.0003		0.0017	0.004**	3	3
BERYLLIUM FILTERED ICAP (MG/L)	28	14	0.0061		0.0003		0.0016	0.004**	2	2
BORON ICAP (MG/L)	28	26	0.22		0.011		0.053	NR	NA	NA
BORON FILTERED ICAP (MG/L)	28	26	0.21		0.014		0.049	NR	NA	NA
CADMIUM AAS (MG/L)	28	2	0.0028		0.0023		0.0026	0.005	0	0
CADMIUM ICAP (MG/L)	28	3	0.0063		0.0046		0.0055	0.005	2	2
CADMIUM FILTERED AAS (MG/L)	28	1	0.0020		0.0020		0.0020	0.005	0	0
CALCIUM ICAP (MG/L)	28	28	6600		1.7		600	NR	NA	NA
CALCIUM FILTERED ICAP (MG/L)	28	28	7100		1.7		620	NR	NA	NA
CHROMIUM AAS (MG/L)	28	9	0.39		0.013		0.098	0.050	2	2
CHROMIUM ICAP (MG/L)	28	8	0.48		0.010		0.12	0.050	2	2
COBALT ICAP (MG/L)	28	20	0.22		0.0054		0.068	NR	NA	NA
COBALT FILTERED ICAP (MG/L)	28	18	0.25		0.0069		0.079	NR	NA	NA
COPPER ICAP (MG/L)	28	12	0.023		0.0045		0.0097	1.000	0	0
COPPER FILTERED ICAP (MG/L)	28	7	0.0076		0.0049		0.0062	1.000	0	0
IRON ICAP (MG/L)	28	28	14		0.040		2.6	0.300	22	22
IRON FILTERED ICAP (MG/L)	28	22	2.8		0.0055		0.52	0.300	8	8
LEAD AAS (MG/L)	28	9	0.011		0.0043		0.0070	0.050	0	0
LEAD FILTERED AAS (MG/L)	28	1	0.0049		0.0049		0.0049	0.050	0	0
MAGNESIUM ICAP (MG/L)	28	28	430		1.9		46	NR	NA	NA
MAGNESIUM FILTERED ICAP (MG/L)	28	28	460		1.8		47	NR	NA	NA

Table 7.43 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		REFERENCE VALUE	# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
MANGANESE	28	28	11		0.27		3.2	0.050		28
MANGANESE	28	28	13		0.022		3.2	0.050		26
MERCURY	28	3	0.0002		0.0002		0.0002	0.002		0
MOLYBDENUM	28	2	0.017		0.016		0.017	NR		NA
NICKEL	28	21	0.12		0.012		0.047	0.100**		2
NICKEL	28	23	0.28		0.010		0.049	0.100**		3
POTASSIUM	28	24	5.0		0.64		1.9	NR		NA
POTASSIUM	28	26	14		0.65		2.0	NR		NA
SILVER	28	2	0.0090		0.0075		0.0083	0.100		0
SILVER	28	1	0.0072		0.0072		0.0072	0.100		0
SODIUM	28	28	63		3.5		15	NR		NA
SODIUM	28	28	72		3.4		16	NR		NA
STRONTIUM	28	28	15		0.011		1.4	NR		NA
STRONTIUM	28	28	17		0.011		1.5	NR		NA
URANIUM	28	11	0.014		0.0010		0.0051	13.000		0
URANIUM FILT.	28	13	0.014		0.0010		0.0032	13.000		0
VANADIUM	28	6	0.015		0.0051		0.0086	NR		NA
ZINC	28	26	0.23		0.016		0.063	5.000		0
ZINC	28	27	0.26		0.0031		0.067	5.000		0
CONDUCTIVITY, FIELD MMT	36	NA	27000		68		1800	NR		NA
DISSOLVED OXYGEN, FIELD MMT.	36	NA	7.3		0.90		3.8	NR		NA
PH, FIELD MMT.	36	NA	9.8		3.9		5.5	6.5/8.5		33
REDOX, FIELD MMT.	36	NA	380		41		210	NR		NA
WATER TEMP., FIELD MMT	36	NA	25		13		19	NR		0
ALKALINITY-HCO3	28	28	270		2.0		73	NR		NA
CONDUCTIVITY	28	28	24000		71		2000	NR		NA
DISSOLVED SOLIDS	28	28	26000		46		2700	500.000		4
PH	28	NA	7.5		4.5		5.7	6.5/8.5		23
TOT. PETROLEUM HYDROCARBONS	28	22	1400		0.0000		72	1.000		12

Table 7.43 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.	
TOTAL SUSPENDED SOLIDS	28	26	220	1.0	41	NR	NA	27	
TURBIDITY (NTU)	28	28	220	1.0	28	1.000	1.000	27	
GROSS ALPHA (PCI/L)	28	28	19	-44	2.7	15.000	15.000	3	
GROSS BETA (PCI/L)	28	28	580	-4.7	42	50.000	50.000	3	
1,1-DICHLOROETHANE (UG/L)	28	3	170	2.0	59	NR	NR	NA	
1,1-DICHLOROETHENE (UG/L)	28	5	5.0	0.80	2.0	7.000	7.000	0	
1,2-DICHLOROETHENE (UG/L)	28	9	220	1.0	28	70.000	70.000	1	
2-BUTANONE (UG/L)	28	1	7.0	7.0	7.0	NR	NR	NA	
4-METHYL-2-PENTANONE (UG/L)	28	2	71	2.0	37	NR	NR	NA	
BENZENE (UG/L)	28	20	11000	1.0	3400	5.000	5.000	15	
BROMOFORM (UG/L)	28	2	2.0	1.0	1.5	100.000	100.000	0	
CHLOROMETHANE (UG/L)	28	2	160	130	150	NR	NR	NA	
ETHYLBENZENE (UG/L)	28	13	3100	1.0	1200	700.000	700.000	6	
METHYLENE CHLORIDE (UG/L)	28	9	350	1.0	89	NR	NR	NA	
STYRENE (UG/L)	28	1	53	53	53	100.000	100.000	0	
TETRACHLOROETHENE (UG/L)	28	14	110	0.80	41	5.000	5.000	8	
TOLUENE (UG/L)	28	17	32000	0.80	7800	1000.00	1000.00	7	
TRICHLOROETHENE (UG/L)	28	9	67	1.0	17	5.000	5.000	7	
VINYL ACETATE (UG/L)	28	1	1000	1000	1000	NR	NR	NA	
VINYL CHLORIDE (UG/L)	28	3	57	2.0	36	2.000	2.000	2	
XYLENES (UG/L)	28	17	18000	1.0	5200	10000.0	10000.0	4	

**Table 7.44. Constituents in groundwater at the Y-12 Plant site**  
HGR=UST 2 area=9754/9754-2 Fuel Facility

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	28	28	580		3.2		100	250.000	2	2
FLUORIDE	28	11	0.20		0.10		0.14	2.000	0	0
NITRATE NITROGEN	28	5	0.58		0.30		0.42	10.000	0	0
SULFATE	28	27	45		2.0		18	250.000	0	0
ALUMINUM	28	28	23		0.23		3.6	0.200	28	28
ALUMINUM	28	13	0.17		0.023		0.050	0.200	0	0
BARIUM	28	28	0.60		0.070		0.25	1.000	0	0
BARIUM	28	28	0.56		0.016		0.23	1.000	0	0
BERYLLIUM	28	6	0.0065		0.0006		0.0018	0.004**	1	1
BERYLLIUM	28	1	0.0088		0.0088		0.0088	0.004**	1	1
BORON	28	26	0.082		0.0090		0.034	NR	NR	NA
BORON	28	27	0.055		0.013		0.030	NR	NR	NA
CADMIUM	28	4	0.0067		0.0020		0.0041	0.005	0.005	1
CADMIUM	28	7	0.014		0.0032		0.0073	0.005	0.005	4
CALCIUM	28	28	210		10		100	NR	NR	NA
CALCIUM	28	28	200		7.8		98	NR	NR	NA
CHROMIUM	28	18	1.9		0.010		0.25	0.050	0.050	10
CHROMIUM	28	17	1.7		0.011		0.20	0.050	0.050	10
CHROMIUM	28	1	0.011		0.011		0.011	0.050	0.050	0
COBALT	28	16	0.064		0.0056		0.015	NR	NR	NA
COBALT	28	12	0.029		0.0054		0.012	NR	NR	NA
COPPER	28	14	0.040		0.0043		0.017	1.000	1.000	0
COPPER	28	7	0.011		0.0042		0.0075	1.000	1.000	0
IRON	28	28	35		0.52		7.5	0.300	0.300	28
IRON	28	26	18		0.0063		2.8	0.300	0.300	11
LEAD	28	8	0.034		0.0044		0.014	0.050	0.050	0
MAGNESIUM	28	28	26		2.0		14	NR	NR	NA
MAGNESIUM	28	28	27		0.75		13	NR	NR	NA
MANGANESE	28	28	29		0.073		3.7	0.050	0.050	28

Table 7.44 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
MANGANESE	28	28	28	0.051	0.051	3.5	0.050	28	0.050	28
MERCURY	28	4	0.0010	0.0003	0.0003	0.0006	0.002	0	0.002	0
MOLYBDENUM	28	2	0.022	0.014	0.014	0.018	NR	NA	NR	NA
NICKEL	28	19	1.8	0.011	0.011	0.43	0.100**	14	0.100**	14
NICKEL	28	16	1.4	0.016	0.016	0.56	0.100**	14	0.100**	14
POTASSIUM	28	26	8.5	1.2	1.2	3.1	NR	NA	NR	NA
POTASSIUM	28	26	4.5	0.95	0.95	2.0	NR	NA	NR	NA
SELENIUM	28	2	0.080	0.077	0.077	0.079	0.050	2	0.050	2
SELENIUM	28	1	0.071	0.071	0.071	0.071	0.050	1	0.050	1
SILVER	28	1	0.011	0.011	0.011	0.011	0.100	0	0.100	0
SODIUM	28	28	260	3.9	3.9	30	NR	NA	NR	NA
SODIUM	28	28	300	5.5	5.5	32	NR	NA	NR	NA
STRONTIUM	28	28	0.73	0.031	0.031	0.36	NR	NA	NR	NA
STRONTIUM	28	28	0.72	0.023	0.023	0.36	NR	NA	NR	NA
URANIUM	28	23	0.010	0.0010	0.0010	0.0032	13.000	0	13.000	0
URANIUM FILT.	28	21	0.010	0.0010	0.0010	0.0034	13.000	0	13.000	0
VANADIUM	28	8	0.046	0.0051	0.0051	0.020	NR	NA	NR	NA
VANADIUM	28	1	0.013	0.013	0.013	0.013	NR	NA	NR	NA
ZINC	28	27	0.63	0.0050	0.0050	0.066	5.000	0	5.000	0
ZINC	28	26	0.13	0.0046	0.0046	0.033	5.000	0	5.000	0
CONDUCTIVITY, FIELD MMT	30	NA	1800	110	110	720	NR	NA	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	30	NA	6.3	0.80	0.80	2.8	NR	NA	NR	NA
PH, FIELD MMT. (PH UNITS)	30	NA	7.1	6.2	6.2	6.6	6.5/8.5	9	6.5/8.5	9
REDOX, FIELD MMT. (MV)	30	NA	200	-65	-65	58	NR	NA	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	30	NA	26	11	11	18	NR	0	NR	0
ALKALINITY-HCO3 (MG/L)	28	28	460	33	33	250	NR	NA	NR	NA
CONDUCTIVITY (UMHOS/CM)	28	28	1700	100	100	770	NR	NA	NR	NA
DISSOLVED SOLIDS (MG/L)	28	28	1000	210	210	500	500.000	14	500.000	14
PH (PH UNITS)	28	NA	7.6	6.2	6.2	6.9	6.5/8.5	2	6.5/8.5	2
TOT. PETROLEUM HYDROCARBONS (MG/L)	28	15	1000	0.0075	0.0075	73	1.000	4	1.000	4

Table 7.44 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
TOTAL SUSPENDED SOLIDS	28	28	1100		3.0		140		NR	NA
TURBIDITY (NTU)	28	28	750		2.5		130		1.000	28
GROSS ALPHA (PCI/L)	28	28	11		-1.8		2.5		15.000	0
GROSS BETA (PCI/L)	28	28	25		-1.6		5.0		50.000	0
1,2-DICHLOROETHANE (UG/L)	29	5	1000		7.0		550		5.000	5
1,2-DICHLOROETHENE (UG/L)	29	1	1.0	J	1.0	J	1.0		70.000	0
2-BUTANONE (UG/L)	29	6	10	B	4.0	BJ	6.8		NR	NA
4-METHYL-2-PENTANONE (UG/L)	29	5	2.0	BJ	2.0	BJ	2.0		NR	NA
ACETONE (UG/L)	29	7	20	B	1.0	BJ	4.6		NR	NA
BENZENE (UG/L)	29	13	14000		2.0	J	3300		5.000	12
ETHYLBENZENE (UG/L)	29	11	1500		1.0	J	440		700.000	4
METHYLENE CHLORIDE (UG/L)	29	10	120	JB	0.90	J	14		NR	NA
STYRENE (UG/L)	29	1	1.0	J	1.0	J	1.0		100.000	0
TOLUENE (UG/L)	29	9	9300		6.0		3000		1000.00	4
TRICHLOROETHENE (UG/L)	29	2	2.0	J	2.0	J	2.0		5.000	0
VINYL ACETATE (UG/L)	29	2	63		38	D	51		NR	NA
XYLENES (UG/L)	29	13	7500		1.0	J	1900		10000.0	0



Table 7.45. Constituents in groundwater at the Y-12 Plant site

HGR=UST 2 area=Tank 0134-U

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. >
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	8	8	70		3.4		35	250.000	0
FLUORIDE	8	5	1.9		0.10		1.1	2.000	0
NITRATE NITROGEN	8	3	0.33		0.26		0.29	10.000	0
SULFATE	8	8	67		4.3		48	250.000	0
ALUMINUM	8	8	14		0.067		3.0	0.200	7
ALUMINUM	8	5	0.045		0.022		0.030	0.200	0
BARIUM	8	8	0.37		0.12		0.19	1.000	0
BARIUM	8	8	0.19		0.11		0.16	1.000	0
BERYLLIUM	8	2	0.0013		0.0004		0.0009	0.004**	0
BORON	8	8	0.092		0.017		0.060	NR	NA
BORON	8	8	0.096		0.011		0.050	NR	NA
CADMIUM	8	1	0.0021		0.0021		0.0021	0.005	0
CADMIUM	8	1	0.0022		0.0022		0.0022	0.005	0
CALCIUM	8	8	120		40		83	NR	NA
CALCIUM	8	8	120		39		80	NR	NA
CHROMIUM	8	4	0.072		0.011		0.043	0.050	2
CHROMIUM	8	3	0.069		0.016		0.049	0.050	2
COBALT	8	1	0.022		0.022		0.022	NR	NA
COBALT	8	1	0.0055		0.0055		0.0055	NR	NA
COPPER	8	6	0.035		0.0054		0.012	1.000	0
COPPER	8	2	0.027		0.0062		0.017	1.000	0
IRON	8	8	41		0.28		7.7	0.300	7
IRON	8	8	1.2		0.010		0.43	0.300	3
LEAD	8	3	0.013		0.0043		0.0077	0.050	0
LEAD	8	1	0.0055		0.0055		0.0055	0.050	0
MAGNESIUM	8	8	10		6.4		7.8	NR	NA
MAGNESIUM	8	8	9.3		5.9		6.9	NR	NA
MANGANESE	8	8	2.0		0.33		1.0	0.050	8
MANGANESE	8	8	1.9		0.18		0.81	0.050	8

Table 7.45 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
NICKEL	8	5	0.078	0.013	0.043	0.100**	0	0	
NICKEL	8	4	0.029	0.017	0.022	0.100**	0	0	
POTASSIUM	8	8	8.2	2.2	3.7	NR	NA	NA	
POTASSIUM	8	8	3.6	1.8	2.6	NR	NA	NA	
SILVER	8	1	0.0075	0.0075	0.0075	0.100	0	0	
SODIUM	8	8	51	7.2	18	NR	NA	NA	
SODIUM	8	8	49	7.0	18	NR	NA	NA	
STRONTIUM	8	8	0.23	0.16	0.20	NR	NA	NA	
STRONTIUM	8	8	0.23	0.15	0.19	NR	NA	NA	
URANIUM	8	5	0.21	0.0040	0.10	13.000	0	0	
URANIUM FILT.	8	5	0.19	0.0040	0.097	13.000	0	0	
VANADIUM	8	2	0.025	0.0058	0.015	NR	NA	NA	
ZINC	8	8	0.25	0.021	0.083	5.000	0	0	
ZINC	8	8	0.20	0.0085	0.065	5.000	0	0	
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	8	NA	650	370	510	NR	NA	NA	
DISSOLVED OXYGEN, FIELD MMT. (PPM)	8	NA	8.5	1.1	3.7	NR	NA	NA	
PH, FIELD MMT. (PH UNITS)	8	NA	7.6	6.5	7.0	6.5/8.5	0	0	
REDOX, FIELD MMT. (MV)	8	NA	240	-29	89	NR	NA	NA	
WATER TEMP, FIELD MMT (DEG. CENT.)	8	NA	23	11	19	NR	0	0	
ALKALINITY-HCO3 (MG/L)	8	8	240	160	180	NR	NA	NA	
CONDUCTIVITY (UMHOS/CM)	8	8	670	390	540	NR	NA	NA	
DISSOLVED SOLIDS (MG/L)	8	8	480	190	360	500.000	0	0	
PH (PH UNITS)	8	NA	7.7	6.9	7.4	6.5/8.5	0	0	
TOT. PETROLEUM HYDROCARBONS (MG/L)	8	5	0.44	0.0020	0.11	1.000	0	0	
TOTAL SUSPENDED SOLIDS (MG/L)	8	8	750	3.0	160	NR	NA	NA	
TURBIDITY (NTU)	8	8	380	3.3	100	1.000	8	8	
GROSS ALPHA (PCI/L)	8	8	100	-1.3	32	15.000	4	4	
GROSS BETA (PCI/L)	8	8	39	2.6	19	50.000	0	0	
1,1-DICHLOROETHENE (UG/L)	8	4	1700	1500	1600	7.000	4	4	
1,2-DICHLOROETHENE (UG/L)	8	4	340	230	280	70.000	4	4	

Table 7.45 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
ETHYLBENZENE (UG/L)	8	2	2.0	J	2.0	J	2.0	700.000	0
METHYLENE CHLORIDE (UG/L)	8	2	1.0	J	1.0	J	1.0	NR	NA
TETRACHLOROETHENE (UG/L)	8	2	99	J	81	J	90	5.000	2
TRICHLOROETHENE (UG/L)	8	4	11000	J	8600	J	10000	5.000	4
XYLENES (UG/L)	8	1	2.0	J	2.0	J	2.0	10000.0	0

Table 7.46. Constituents in groundwater at the Y-12 Plant site

HGR=UST 2 area=Tank 2331-U

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	16	16	200		3.3		29	250.000	0
FLUORIDE	16	16	0.60		0.20		0.44	2.000	0
NITRATE NITROGEN	16	5	1.3		0.23		0.48	10.000	0
SULFATE	16	15	45		3.7		20	250.000	0
ALUMINUM	16	12	9.3		0.033		0.95	0.200	4
ALUMINUM	16	7	0.053		0.023		0.032	0.200	0
BARIUM	16	16	0.60		0.036		0.18	1.000	0
BARIUM	16	16	0.58		0.014		0.17	1.000	0
BERYLLIUM	16	3	0.0047		0.0004		0.0019	0.004**	1
BERYLLIUM	16	1	0.0005		0.0005		0.0005	0.004**	0
BORON	16	16	0.15		0.011		0.063	NR	NA
BORON	16	16	0.15		0.0079		0.066	NR	NA
CADMIUM	16	1	0.0061		0.0061		0.0061	0.005	1
CADMIUM	16	4	0.0065		0.0032		0.0044	0.005	1
CALCIUM	16	16	140		41		94	NR	NA
CALCIUM	16	16	140		26		93	NR	NA
CHROMIUM	16	1	0.028		0.028		0.028	0.050	0
CHROMIUM	16	1	0.023		0.023		0.023	0.050	0
COBALT	16	1	0.0056		0.0056		0.0056	NR	NA
COPPER	16	5	0.011		0.0052		0.0083	1.000	0
COPPER	16	1	0.0099		0.0099		0.0099	1.000	0
IRON	16	16	13		0.11		2.9	0.300	12
IRON	16	16	7.7		0.011		1.8	0.300	10
LEAD	16	1	0.0080		0.0080		0.0080	0.050	0
MAGNESIUM	16	16	22		5.0		12	NR	NA
MAGNESIUM	16	16	23		2.2		12	NR	NA
MANGANESE	16	16	1.1		0.097		0.63	0.050	16
MANGANESE	16	16	1.2		0.039		0.64	0.050	15
MOLYBDENUM	16	3	0.028		0.013		0.020	NR	NA

Table 7.46 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE	# MMTS. >
						VALUE	REFERENCE
MOLYBDENUM	16	4	0.025	0.010	0.017	NR	NA
NICKEL	16	3	0.028	0.010	0.016	0.100**	0
NICKEL	16	1	0.010	0.010	0.010	0.100**	0
POTASSIUM	16	16	11	4.8	7.6	NR	NA
POTASSIUM	16	16	12	4.6	7.4	NR	NA
SELENIUM	16	1	0.057	0.057	0.057	0.050	1
SODIUM	16	16	29	2.3	12	NR	NA
SODIUM	16	16	26	2.4	11	NR	NA
STRONTIUM	16	16	0.60	0.12	0.31	NR	NA
STRONTIUM	16	16	0.59	0.077	0.31	NR	NA
URANIUM	16	13	0.086	0.0010	0.017	13.000	0
URANIUM FILT.	16	13	0.080	0.0010	0.017	13.000	0
VANADIUM	16	4	0.019	0.0056	0.011	NR	NA
VANADIUM	16	2	0.017	0.0053	0.011	NR	NA
ZINC	16	16	0.067	0.0039	0.023	5.000	0
ZINC	16	16	0.030	0.0026	0.012	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	17	NA	820	330	610	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	17	NA	7.0	0.50	2.5	NR	NA
PH, FIELD MMT. (PH UNITS)	17	NA	7.9	6.5	7.1	6.5/8.5	0
REDOX, FIELD MMT. (MV)	17	NA	190	-190	-29	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	17	NA	26	14	21	NR	0
ALKALINITY-HCO3 (MG/L)	16	16	460	130	270	NR	NA
CONDUCTIVITY (UMHOS/CM)	16	16	870	350	640	NR	NA
DISSOLVED SOLIDS (MG/L)	16	16	520	220	380	500.000	2
PH (PH UNITS)	16	NA	8.2	6.9	7.4	6.5/8.5	0
TOT. PETROLEUM HYDROCARBONS (MG/L)	16	14	5.2	0.0020	2.2	1.000	8
TOTAL SUSPENDED SOLIDS (MG/L)	16	15	830	1.0	72	NR	NA
TURBIDITY (NTU)	16	16	440	1.2	43	1.000	16
GROSS ALPHA (PCI/L)	16	16	42	-2.2	5.6	15.000	3
GROSS BETA (PCI/L)	16	16	42	3.9	10	50.000	0

Table 7.46 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MTS. > REFERENCE VALUE	# MTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
4-METHYL-2-PENTANONE	16	2	57	BJ	2.0	BJ	30	NR	NR	NA
BENZENE	16	8	2800	E	780		1400	5,000	5,000	8
ETHYLBENZENE	16	8	790		300		600	700,000	700,000	3
METHYLENE CHLORIDE	16	4	63	BJ	2.0	BJ	33	NR	NR	NA
TOLUENE	16	8	700		75	J	220	1000.00	1000.00	0
TRICHLOROETHENE	16	1	1.0	J	1.0	J	1.0	5,000	5,000	0
VINYL ACETATE	16	1	2.0	J	2.0	J	2.0	NR	NR	NA
XYLENES	16	8	2600		300		1400	10000.0	10000.0	0

Table 7.47. Constituents in groundwater at the Y-12 Plant site

HGR=CR area=Ash Disposal Basin

VARIABLE	# SAMPLES DETECTED	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE (MG/L)	16	12	1.8	1.0	1.3	250.000	0			
FLUORIDE (MG/L)	16	3	0.50	0.10	0.23	2.000	0			
NITRATE NITROGEN (MG/L)	16	2	0.26	0.24	0.25	10.000	0			
SULFATE (MG/L)	16	16	9.0	1.0	4.2	250.000	0			
ALUMINUM ICAP (MG/L)	16	13	1.0	0.023	0.30	0.200	6			
ALUMINUM FILTERED ICAP (MG/L)	16	4	0.085	0.020	0.040	0.200	0			
BARIUM ICAP (MG/L)	16	16	0.056	0.0057	0.023	1.000	0			
BARIUM FILTERED ICAP (MG/L)	16	16	0.056	0.0060	0.023	1.000	0			
BERYLLIUM ICAP (MG/L)	16	3	0.0007	0.0004	0.0006	0.004**	0			
BERYLLIUM FILTERED ICAP (MG/L)	16	1	0.0003	0.0003	0.0003	0.004**	0			
BORON ICAP (MG/L)	16	16	0.034	0.0056	0.021	NR	NA			
BORON FILTERED ICAP (MG/L)	16	16	0.047	0.0060	0.018	NR	NA			
CALCIUM ICAP (MG/L)	16	16	41	24	33	NR	NA			
CALCIUM FILTERED ICAP (MG/L)	16	16	41	24	33	NR	NA			
CHROMIUM ICAP (MG/L)	16	1	0.010	0.010	0.010	0.050	0			
COPPER ICAP (MG/L)	16	2	0.0047	0.0041	0.0044	1.000	0			
COPPER FILTERED ICAP (MG/L)	16	1	0.0048	0.0048	0.0048	1.000	0			
IRON ICAP (MG/L)	16	16	1.6	0.018	0.38	0.300	6			
IRON FILTERED ICAP (MG/L)	16	10	0.094	0.0051	0.029	0.300	0			
LEAD AAS (MG/L)	16	1	0.0043	0.0043	0.0043	0.050	0			
LEAD FILTERED AAS (MG/L)	16	1	0.0065	0.0065	0.0065	0.050	0			
MAGNESIUM ICAP (MG/L)	16	16	22	14	19	NR	NA			
MAGNESIUM FILTERED ICAP (MG/L)	16	16	22	13	19	NR	NA			
MANGANESE ICAP (MG/L)	16	16	0.043	0.0018	0.011	0.050	0			
MANGANESE FILTERED ICAP (MG/L)	16	11	0.013	0.0010	0.0055	0.050	0			
NICKEL ICAP (MG/L)	16	1	0.014	0.014	0.014	0.100**	0			
NICKEL FILTERED ICAP (MG/L)	16	2	0.25	0.025	0.14	0.100**	1			
POTASSIUM ICAP (MG/L)	16	13	4.8	0.73	2.1	NR	NA			
POTASSIUM FILTERED ICAP (MG/L)	16	14	4.8	0.67	2.0	NR	NA			

Table 7.47 (continued)

VARIABLE	# SAMPLES DETECTED	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE VALUE	# MMTS. >
						REFERENCE VALUE	REFERENCE
SODIUM ICAP (MG/L)	16	16	1.8	0.37	0.82	NR	NA
SODIUM FILTERED ICAP (MG/L)	16	16	1.9	0.36	0.81	NR	NA
STRONTIUM ICAP (MG/L)	16	16	0.029	0.017	0.021	NR	NA
STRONTIUM FILTERED ICAP (MG/L)	16	16	0.023	0.016	0.020	NR	NA
URANIUM FILT. FLUORIMETRIC (MG/L)	16	2	0.0030	0.0010	0.0020	13.000	0
VANADIUM ICAP (MG/L)	16	1	0.0065	0.0065	0.0065	NR	NA
ZINC ICAP (MG/L)	16	15	0.11	0.0022	0.021	5.000	0
ZINC FILTERED ICAP (MG/L)	16	15	0.10	0.0031	0.023	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	16	NA	360	220	290	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	16	NA	9.2	2.5	6.4	NR	NA
PH, FIELD MMT. (PH UNITS)	16	NA	8.2	6.7	7.6	6.5/8.5	0
REDOX, FIELD MMT. (MV)	16	NA	320	130	220	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	16	NA	18	13	15	NR	0
ALKALINITY-HCO3 (MG/L)	16	16	180	120	160	NR	NA
CONDUCTIVITY (UMHOS/CM)	16	16	350	230	300	NR	NA
DISSOLVED SOLIDS (MG/L)	16	16	200	120	170	500.000	0
PH (PH UNITS)	16	NA	8.2	7.2	7.9	6.5/8.5	0
TOTAL ORGANIC CARBON (MG/L)	16	10	26	1.0	4.7	NR	NA
TOTAL SUSPENDED SOLIDS (MG/L)	16	12	34	1.0	9.7	NR	NA
TURBIDITY (NTU)	16	16	130	1.0	15	1.000	14
GROSS ALPHA (PCI/L)	16	16	3.4	-5.3	-0.10	15.000	0
GROSS BETA (PCI/L)	16	16	5.6	-5.1	0.50	50.000	0
1,1,1-TRICHLOROETHANE (UG/L)	16	3	1.0	1.0	1.0	200.000	0
4-METHYL-2-PENTANONE (UG/L)	16	2	4.0	1.0	2.5	NR	NA
ACETONE (UG/L)	16	1	4.0	4.0	4.0	NR	NA
METHYLENE CHLORIDE (UG/L)	16	3	2.0	0.70	1.2	NR	NA



Table 7.48. Constituents in groundwater at the Y-12 Plant site

HGR=CR area=East CR Waste Pile

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE (MG/L)	16	16	16		2.4		7.8	250.000	0
FLUORIDE (MG/L)	16	1	0.10		0.10		0.10	2.000	0
NITRATE NITROGEN (MG/L)	16	16	3.1		0.27		1.0	10.000	0
SULFATE (MG/L)	16	15	4.5		1.0		3.2	250.000	0
ALUMINUM ICAP (MG/L)	16	9	0.12		0.023		0.052	0.200	0
ALUMINUM FILTERED ICAP (MG/L)	16	9	0.12		0.021		0.044	0.200	0
BARIUM ICAP (MG/L)	16	16	0.22		0.0095		0.086	1.000	0
BARIUM FILTERED ICAP (MG/L)	16	16	0.21		0.0094		0.084	1.000	0
BERYLLIUM ICAP (MG/L)	16	2	0.0008		0.0003		0.0005	0.004**	0
BERYLLIUM FILTERED ICAP (MG/L)	16	4	0.0008		0.0003		0.0005	0.004**	0
BORON ICAP (MG/L)	16	15	0.034		0.0086		0.021	NR	NA
BORON FILTERED ICAP (MG/L)	16	14	0.029		0.0056		0.019	NR	NA
CALCIUM ICAP (MG/L)	16	16	56		44		50	NR	NA
CALCIUM FILTERED ICAP (MG/L)	16	16	56		44		50	NR	NA
CHROMIUM ICAP (MG/L)	16	1	0.025		0.025		0.025	0.050	0
COBALT ICAP (MG/L)	16	1	0.0055		0.0055		0.0055	NR	NA
COPPER ICAP (MG/L)	16	1	0.0082		0.0082		0.0082	1.000	0
COPPER FILTERED ICAP (MG/L)	16	1	0.0051		0.0051		0.0051	1.000	0
IRON ICAP (MG/L)	16	16	7.0		0.0072		1.2	0.300	4
IRON FILTERED ICAP (MG/L)	16	6	0.049		0.014		0.024	0.300	0
MAGNESIUM ICAP (MG/L)	16	16	32		26		29	NR	NA
MAGNESIUM FILTERED ICAP (MG/L)	16	16	32		26		29	NR	NA
MANGANESE ICAP (MG/L)	16	8	0.029		0.0017		0.012	0.050	0
MANGANESE FILTERED ICAP (MG/L)	16	8	0.030		0.0010		0.010	0.050	0
NICKEL ICAP (MG/L)	16	1	0.015		0.015		0.015	0.100**	0
POTASSIUM ICAP (MG/L)	16	16	1.6		0.61		1.1	NR	NA
POTASSIUM FILTERED ICAP (MG/L)	16	14	1.8		0.69		1.2	NR	NA
SODIUM ICAP (MG/L)	16	16	4.6		1.3		3.3	NR	NA
SODIUM FILTERED ICAP (MG/L)	16	16	4.6		1.4		3.3	NR	NA

Table 7.48 (continued)

VARIABLE	# SAMPLES DETECTED	#	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE		# MMTS. > REFERENCE VALUE
					DETECTED MMTS.	DETECTED MMTS.	
STRONTIUM	16	16	0.024	0.015	0.018	0.018	NR NA
STRONTIUM FILTERED	16	16	0.023	0.015	0.018	0.018	NR NA
URANIUM FILT. FLUORIMETRIC	16	3	0.0010	0.0010	0.0010	0.0010	13.000 0
ZINC	16	16	0.081	0.0071	0.019	0.019	5.000 0
ZINC FILTERED	16	16	0.026	0.0065	0.013	0.013	5.000 0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	16	NA	470	370	420	420	NR NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	16	NA	11	5.2	7.7	7.7	NR NA
PH, FIELD MMT. (PH UNITS)	16	NA	8.0	7.3	7.6	7.6	6.5/8.5 0
REDOX, FIELD MMT. (MV)	16	NA	270	35	180	180	NR NA
WATER TEMP, FIELD MMT (DEG. CENT.)	16	NA	20	12	15	15	NR 0
ALKALINITY-HCO3 (MG/L)	16	16	250	210	230	230	NR NA
CONDUCTIVITY (UMHOS/CM)	16	16	500	410	460	460	NR NA
DISSOLVED SOLIDS (MG/L)	16	16	290	220	250	250	500.000 0
PH (PH UNITS)	16	NA	7.9	7.5	7.6	7.6	6.5/8.5 0
TOTAL SUSPENDED SOLIDS (MG/L)	16	9	15	1.0	5.8	5.8	NR NA
TURBIDITY (NTU)	16	16	27	0.40	5.7	5.7	1.000 8
GROSS ALPHA (PCI/L)	16	16	5.2	-1.9	0.48	0.48	15.000 0
GROSS BETA (PCI/L)	16	16	14	-8.1	0.68	0.68	50.000 0
4-METHYL-2-PENTANONE (UG/L)	16	3	2.0	2.0	2.0	2.0	NR NA
ACETONE (UG/L)	16	2	4.0	1.0	2.5	2.5	NR NA
CHLOROFORM (UG/L)	16	1	0.70	0.70	0.70	0.70	100.000 0
METHYLENE CHLORIDE (UG/L)	16	2	1.0	1.0	1.0	1.0	NR NA

Table 7.49. Constituents in groundwater at the Y-12 Plant site

HGR=CR area=Kerr Hollow Quarry

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE VALUE		# MMTS. > REFERENCE
						VALUE	REFERENCE	
CHLORIDE (MG/L)	28	28	13	1.0	4.8	250.000	0	0
FLUORIDE (MG/L)	28	23	3.4	0.10	1.6	2.000	11	11
NITRATE NITROGEN (MG/L)	28	16	1.4	0.30	0.73	10.000	0	0
SULFATE (MG/L)	28	28	71	2.9	21	250.000	0	0
ALUMINUM ICAP (MG/L)	28	22	2.3	0.020	0.33	0.200	7	7
ALUMINUM FILTERED ICAP (MG/L)	28	13	0.046	0.022	0.032	0.200	0	0
BARIUM ICAP (MG/L)	28	28	0.49	0.022	0.13	1.000	0	0
BARIUM FILTERED ICAP (MG/L)	28	28	0.47	0.022	0.12	1.000	0	0
BORON ICAP (MG/L)	28	28	1.0	0.014	0.26	NR	NA	NA
BORON FILTERED ICAP (MG/L)	28	28	1.0	0.0089	0.27	NR	NA	NA
CALCIUM ICAP (MG/L)	28	28	61	27	40	NR	NA	NA
CALCIUM FILTERED ICAP (MG/L)	28	28	50	27	38	NR	NA	NA
CHROMIUM AAS (MG/L)	28	1	0.016	0.016	0.016	0.050	0	0
CHROMIUM ICAP (MG/L)	28	1	0.024	0.024	0.024	0.050	0	0
COPPER ICAP (MG/L)	28	11	0.021	0.0042	0.0077	1.000	0	0
COPPER FILTERED ICAP (MG/L)	28	3	0.0085	0.0043	0.0057	1.000	0	0
IRON ICAP (MG/L)	28	26	64	0.0052	4.3	0.300	17	17
IRON FILTERED ICAP (MG/L)	28	12	1.8	0.0055	0.19	0.300	1	1
LEAD AAS (MG/L)	28	5	0.035	0.0042	0.017	0.050	0	0
MAGNESIUM ICAP (MG/L)	28	28	44	14	25	NR	NA	NA
MAGNESIUM FILTERED ICAP (MG/L)	28	28	35	14	25	NR	NA	NA
MANGANESE ICAP (MG/L)	28	23	0.31	0.0016	0.062	0.050	5	5
MANGANESE FILTERED ICAP (MG/L)	28	20	0.071	0.0012	0.023	0.050	3	3
MOLYBDENUM ICAP (MG/L)	28	5	0.020	0.010	0.016	NR	NA	NA
MOLYBDENUM FILTERED ICAP (MG/L)	28	4	0.016	0.011	0.014	NR	NA	NA
NICKEL ICAP (MG/L)	28	3	0.19	0.011	0.071	0.100**	1	1
NICKEL FILTERED ICAP (MG/L)	28	1	0.013	0.013	0.013	0.100**	0	0
POTASSIUM ICAP (MG/L)	28	28	18	0.89	8.0	NR	NA	NA
POTASSIUM FILTERED ICAP (MG/L)	28	28	18	0.85	7.9	NR	NA	NA

Table 7.49 (continued)

VARIABLE	# SAMPLES	# DETECTED	#	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
				DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.	
SELENIUM	28	1	1	0.063	0.063	0.063	0.063	0.050	0.050	1
SELENIUM	28	1	1	0.054	0.054	0.054	0.054	0.050	0.050	1
SODIUM	28	28	30	30	0.57	0.57	7.3	NR	NR	NA
SODIUM	28	28	30	30	0.58	0.58	7.4	NR	NR	NA
STRONTIUM	28	28	7.6	7.6	0.029	0.029	2.7	NR	NR	NA
STRONTIUM	28	28	7.5	7.5	0.030	0.030	2.6	NR	NR	NA
URANIUM	28	25	0.032	0.032	0.0010	0.0064	0.0064	13.000	13.000	0
URANIUM FILT.	28	25	0.030	0.030	0.0010	0.0065	0.0065	13.000	13.000	0
ZINC	28	26	0.085	0.085	0.0024	0.016	0.016	5.000	5.000	0
ZINC	28	21	0.048	0.048	0.0023	0.011	0.011	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	29	NA	590	240	240	400	400	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	29	NA	9.0	0.40	0.40	5.8	5.8	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	29	NA	8.1	6.7	6.7	7.6	7.6	6.5/8.5	6.5/8.5	0
REDOX, FIELD MMT. (MV)	29	NA	220	-58	-58	140	140	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	29	NA	22	9.1	9.1	15	15	NR	NR	0
ALKALINITY-HCO3 (MG/L)	28	28	240	120	120	190	190	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	28	28	560	230	230	420	420	NR	NR	NA
CONDUCTIVITY, REP. 2 (UMHOS/CM)	26	26	570	240	240	420	420	NR	NR	NA
CONDUCTIVITY, REP. 3 (UMHOS/CM)	26	26	570	230	230	420	420	NR	NR	NA
CONDUCTIVITY, REP. 4 (UMHOS/CM)	26	26	570	220	220	430	430	NR	NR	NA
DISSOLVED SOLIDS (MG/L)	28	28	330	120	120	240	240	500.000	500.000	0
PH	28	NA	8.4	7.5	7.5	8.1	8.1	6.5/8.5	6.5/8.5	0
PH, REP. 2 (PH UNITS)	26	NA	8.4	7.5	7.5	8.1	8.1	6.5/8.5	6.5/8.5	0
PH, REP. 3 (PH UNITS)	26	NA	8.4	7.5	7.5	8.1	8.1	6.5/8.5	6.5/8.5	0
PH, REP. 4 (PH UNITS)	26	NA	8.4	7.6	7.6	8.1	8.1	6.5/8.5	6.5/8.5	0
TOTAL ORGANIC CARBON (MG/L)	28	21	8.0	1.0	1.0	2.6	2.6	NR	NR	NA
TOTAL ORGANIC CARBON, REP 2 (MG/L)	28	22	6.0	1.0	1.0	2.4	2.4	NR	NR	NA
TOTAL ORGANIC CARBON, REP 3 (MG/L)	28	23	9.0	1.0	1.0	2.5	2.5	NR	NR	NA
TOTAL ORGANIC CARBON, REP 4 (MG/L)	28	18	50	1.1	1.1	9.5	9.5	NR	NR	NA
TOTAL ORGANIC HALIDE, REP 2 (UG/L)	28	1	11	11	11	11	11	NR	NR	NA

Table 7.49 (continued)

VARIABLE	# SAMPLES DETECTED	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE VALUE		# MMTS. > REFERENCE
						VALUE	REFERENCE	
TOTAL ORGANIC HALIDE, REP 3 (UG/L)	28	1	11	11	11	NR	NR	NA
TOTAL ORGANIC HALIDE, REP 4 (UG/L)	28	1	11	11	11	NR	NR	NA
TOTAL SUSPENDED SOLIDS (MG/L)	28	23	2000	1.0	110	NR	NR	NA
TURBIDITY (NTU)	28	28	800	0.40	67	1.000	1.000	24
GROSS ALPHA (PCI/L)	28	28	15	-0.80	5.3	15.000	15.000	0
GROSS BETA (PCI/L)	28	28	23	-4.9	9.6	50.000	50.000	0
2-BUTANONE (UG/L)	28	7	10	7.0	8.9	NR	NR	NA
4-METHYL-2-PENTANONE (UG/L)	28	2	2.0	1.0	1.5	NR	NR	NA
ACETONE (UG/L)	28	3	10	3.0	6.3	NR	NR	NA
BENZENE (UG/L)	28	3	1.0	1.0	1.0	5.000	5.000	0
CARBON TETRACHLORIDE (UG/L)	28	3	3.0	0.80	2.3	5.000	5.000	0
CHLOROFORM (UG/L)	28	4	4.0	0.70	1.6	100.000	100.000	0
METHYLENE CHLORIDE (UG/L)	28	6	2.0	1.0	1.2	NR	NR	NA
TRICHLOROETHENE (UG/L)	28	1	1.0	1.0	1.0	5.000	5.000	0

Table 7.50. Constituents in groundwater at the Y-12 Plant site  
HGR=CR area=Rogers Quarry

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.		DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	16	16	240		16	1.0	41	250.000	0	0
FLUORIDE	16	12	1.5		16	0.10	0.59	2.000	0	0
NITRATE NITROGEN	16	4	6.9		16	2.0	4.0	10.000	0	0
SULFATE	16	16	84		16	16	38	250.000	0	0
ALUMINUM	16	5	3.8		16	0.033	0.96	0.200	2	2
ALUMINUM	16	2	0.024		16	0.022	0.023	0.200	0	0
BARIUM	16	16	0.37		16	0.019	0.12	1.000	0	0
BARIUM	16	16	0.38		16	0.018	0.12	1.000	0	0
BERYLLIUM	16	1	0.0006		16	0.0006	0.0006	0.004**	0	0
BORON	16	16	0.64		16	0.025	0.22	NR	NR	NA
BORON	16	16	0.79		16	0.023	0.23	NR	NR	NA
CALCIUM	16	16	110		16	32	67	NR	NR	NA
CALCIUM	16	16	110		16	31	67	NR	NR	NA
COBALT	16	1	0.0050		16	0.0050	0.0050	NR	NR	NA
COPPER	16	5	0.0076		16	0.0056	0.0066	1.000	0	0
COPPER	16	4	0.011		16	0.0050	0.0093	1.000	0	0
IRON	16	16	4.9		16	0.014	0.66	0.300	7	7
IRON	16	10	0.99		16	0.0074	0.35	0.300	4	4
LEAD	16	1	0.0058		16	0.0058	0.0058	0.050	0	0
MAGNESIUM	16	16	34		16	6.9	21	NR	NR	NA
MAGNESIUM	16	16	34		16	7.0	21	NR	NR	NA
MANGANESE	16	15	0.44		16	0.0027	0.076	0.050	6	6
MANGANESE	16	16	0.15		16	0.0012	0.043	0.050	5	5
MERCURY	16	1	0.0002		16	0.0002	0.0002	0.002	0	0
POTASSIUM	16	16	5.3		16	1.4	2.4	NR	NR	NA
POTASSIUM	16	16	3.7		16	1.3	2.2	NR	NR	NA
SELENIUM	16	1	0.056		16	0.056	0.056	0.050	1	1
SODIUM	16	16	240		16	1.5	49	NR	NR	NA
SODIUM	16	16	250		16	1.5	50	NR	NR	NA

Table 7.50 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
STRONTIUM	16	16	1.9	0.14	1.1	NR	NR	NA	
STRONTIUM FILTERED	16	16	1.9	0.14	1.1	NR	NR	NA	
URANIUM FLUORIMETRIC	16	2	0.0040	0.0010	0.0025	13.000	13.000	0	
VANADIUM ICAP	16	2	0.0081	0.0056	0.0069	NR	NR	NA	
ZINC ICAP	16	11	0.079	0.0033	0.015	5.000	5.000	0	
ZINC FILTERED ICAP	16	13	0.020	0.0022	0.0081	5.000	5.000	0	
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	16	NA	1500	320	650	NR	NR	NA	
DISSOLVED OXYGEN, FIELD MMT. (PPM)	16	NA	8.3	0.20	2.9	NR	NR	NA	
PH, FIELD MMT. (PH UNITS)	16	NA	8.4	6.9	7.4	6.5/8.5	6.5/8.5	0	
REDOX, FIELD MMT. (MV)	16	NA	190	-300	-69	NR	NR	NA	
WATER TEMP, FIELD MMT (DEG. CENT.)	16	NA	20	13	16	NR	NR	0	
ALKALINITY-HCO3 (MG/L)	16	16	410	160	270	NR	NR	NA	
CONDUCTIVITY (UMHOS/CM)	16	16	1600	370	700	NR	NR	NA	
DISSOLVED SOLIDS (MG/L)	16	16	940	230	420	500.000	500.000	7	
PH (PH UNITS)	16	NA	8.2	7.3	7.8	6.5/8.5	6.5/8.5	0	
TOTAL SUSPENDED SOLIDS (MG/L)	16	9	40	1.0	7.2	NR	NR	NA	
TURBIDITY (NTU)	16	16	34	0.50	9.6	1.000	1.000	13	
GROSS ALPHA (PCI/L)	16	16	0.69	-6.1	-1.9	15.000	15.000	0	
GROSS BETA (PCI/L)	16	16	8.1	-6.1	0.52	50.000	50.000	0	
BIS(2-ETHYLHEXYL) PHTHALATE (UG/L)	13	2	2.0	1.0	1.5	6.000**	6.000**	0	
BUTYL BENZYL PHTHALATE (UG/L)	13	1	2.0	2.0	2.0	NR	NR	NA	
DI-N-BUTYL PHTHALATE (UG/L)	13	5	14	2.0	6.8	NR	NR	NA	
METHYLENE CHLORIDE (UG/L)	16	7	2.0	0.90	1.1	NR	NR	NA	

Table 7.51. Constituents in groundwater at the Y-12 Plant site

HGR=CR area=Security Pits

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.		
CHLORIDE (MG/L)	41	37	3.0		1.0		2.1		250.000	0
NITRATE NITROGEN (MG/L)	41	20	3.1		0.24		1.1		10.000	0
SULFATE (MG/L)	41	38	13		1.0		5.2		250.000	0
ALUMINUM ICAP (MG/L)	41	21	4.5		0.020		0.28		0.200	4
ALUMINUM FILTERED ICAP (MG/L)	41	17	0.041		0.021		0.027		0.200	0
ARSENIC ICAP (MG/L)	41	2	0.061		0.058		0.060		0.050	2
BARIUM ICAP (MG/L)	41	41	0.16		0.0074		0.034		1.000	0
BARIUM FILTERED ICAP (MG/L)	41	41	0.11		0.0076		0.031		1.000	0
BERYLLIUM ICAP (MG/L)	41	4	0.0005		0.0003		0.0004		0.004**	0
BERYLLIUM FILTERED ICAP (MG/L)	41	1	0.0004		0.0004		0.0004		0.004**	0
BORON ICAP (MG/L)	41	40	0.15		0.0045		0.046		NR	NA
BORON FILTERED ICAP (MG/L)	41	40	0.19		0.0053		0.041		NR	NA
CADMIUM ICAP (MG/L)	41	1	0.0034		0.0034		0.0034		0.005	0
CALCIUM ICAP (MG/L)	41	41	89		27		41		NR	NA
CALCIUM FILTERED ICAP (MG/L)	41	41	59		28		39		NR	NA
CHROMIUM ICAP (MG/L)	41	1	0.046		0.046		0.046		0.050	0
COPPER ICAP (MG/L)	41	7	0.062		0.0049		0.014		1.000	0
COPPER FILTERED ICAP (MG/L)	41	5	0.0065		0.0041		0.0049		1.000	0
IRON ICAP (MG/L)	41	35	7.9		0.0058		1.1		0.300	12
IRON FILTERED ICAP (MG/L)	41	11	1.0		0.0063		0.14		0.300	2
MAGNESIUM ICAP (MG/L)	41	41	37		16		23		NR	NA
MAGNESIUM FILTERED ICAP (MG/L)	41	41	35		16		23		NR	NA
MANGANESE ICAP (MG/L)	41	31	0.17		0.0010		0.021		0.050	4
MANGANESE FILTERED ICAP (MG/L)	41	26	0.10		0.0011		0.011		0.050	2
NICKEL ICAP (MG/L)	41	2	0.043		0.022		0.033		0.100**	0
NICKEL FILTERED ICAP (MG/L)	41	1	0.016		0.016		0.016		0.100**	0
POTASSIUM ICAP (MG/L)	41	33	4.4		0.66		1.6		NR	NA
POTASSIUM FILTERED ICAP (MG/L)	41	34	4.5		0.62		1.6		NR	NA
SELENIUM ICAP (MG/L)	41	1	0.052		0.052		0.052		0.050	1



Table 7.51 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
SELENIUM	41	1	0.054	0.054	0.054	0.054	0.054	0.050	1	1
SODIUM	41	41	2.4	0.48	0.48	1.1	NR	NR	NA	NA
SODIUM	41	41	4.6	0.54	0.54	1.2	NR	NR	NA	NA
STRONTIUM	41	41	0.052	0.011	0.011	0.020	NR	NR	NA	NA
STRONTIUM	41	41	0.043	0.011	0.011	0.019	NR	NR	NA	NA
URANIUM	41	15	0.0030	0.0010	0.0010	0.0013	13.000	13.000	0	0
URANIUM FILT.	41	14	0.0020	0.0010	0.0010	0.0012	13.000	13.000	0	0
VANADIUM	41	1	0.0094	0.0094	0.0094	0.0094	NR	NR	NA	NA
ZINC	41	37	0.058	0.0020	0.0020	0.013	5.000	5.000	0	0
ZINC	41	36	0.039	0.0025	0.0025	0.011	5.000	5.000	0	0
CONDUCTIVITY, FIELD MMT	41	NA	620	240	240	340	NR	NR	NA	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	41	NA	10	0.30	0.30	7.0	NR	NR	NA	NA
PH, FIELD MMT. (PH UNITS)	41	NA	8.7	6.9	6.9	7.7	6.5/8.5	6.5/8.5	1	1
REDOX, FIELD MMT. (MV)	41	NA	560	-59	-59	200	NR	NR	NA	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	41	NA	19	11	11	15	NR	NR	0	0
ALKALINITY-HCO3 (MG/L)	41	41	280	140	140	180	NR	NR	NA	NA
CONDUCTIVITY (UMHOS/CM)	41	41	540	260	260	350	NR	NR	NA	NA
DISSOLVED SOLIDS (MG/L)	41	41	290	110	110	190	500.000	500.000	0	0
PH (PH UNITS)	41	NA	8.4	7.5	7.5	7.9	6.5/8.5	6.5/8.5	0	0
TOTAL SUSPENDED SOLIDS (MG/L)	41	24	140	1.0	1.0	11	NR	NR	NA	NA
TURBIDITY (NTU)	41	41	2900	0.50	0.50	75	1.000	1.000	36	36
GROSS ALPHA (PCI/L)	41	41	7.2	-5.2	-5.2	0.71	15.000	15.000	0	0
GROSS BETA (PCI/L)	41	41	14	-14	-14	0.89	50.000	50.000	0	0
1,1,1-TRICHLOROETHANE (UG/L)	41	18	29	0.70	0.70	7.9	200.000	200.000	0	0
1,1-DICHLOROETHANE (UG/L)	41	8	16	1.0	1.0	6.4	NR	NR	NA	NA
1,1-DICHLOROETHENE (UG/L)	41	6	4.0	0.60	0.60	2.1	7.000	7.000	0	0
1,2-DICHLOROETHENE (UG/L)	41	5	24	0.60	0.60	11	70.000	70.000	0	0
2-BUTANONE (UG/L)	41	7	11	8.0	8.0	8.7	NR	NR	NA	NA
2-HEXANONE (UG/L)	41	2	1.0	0.60	0.60	0.80	NR	NR	NA	NA
4-METHYL-2-PENTANONE (UG/L)	41	5	2.0	1.0	1.0	1.6	NR	NR	NA	NA

Table 7.51 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
ACETONE	41	7	4.0	BJ	2.0	BJ	3.1	NR	NR	NA
CARBON TETRACHLORIDE	41	1	0.20	J	0.20	J	0.20	5.000	5.000	0
METHYLENE CHLORIDE	41	11	4.0	JB	0.50	JB	1.9	NR	NR	NA
TETRACHLOROETHENE	41	12	27	J	1.0	J	9.3	5.000	5.000	7
TRICHLOROETHENE	41	2	3.0	J	1.0	J	2.0	5.000	5.000	0

**Table 7.52. Constituents in groundwater at the Y-12 Plant site**  
HGR=CR area=Sediment Disposal Basin

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	32	23	2.6		1.0		1.6	250.000	0	0
FLUORIDE	32	5	1.0		0.10		0.75	2.000	0	0
NITRATE NITROGEN	32	9	0.39		0.20		0.28	10.000	0	0
SULFATE	32	32	170		1.0		28	250.000	0	0
ALUMINUM	32	24	9.1		0.029		2.1	0.200	16	16
ALUMINUM	32	10	3.9		0.021		0.42	0.200	1	1
ARSENIC	32	1	0.066		0.066		0.066	0.050	1	1
BARIUM	32	32	0.066		0.0076		0.024	1.000	0	0
BARIUM	32	32	0.055		0.0070		0.020	1.000	0	0
BERYLLIUM	32	9	0.0035		0.0003		0.0010	0.004**	0	0
BERYLLIUM	32	2	0.0004		0.0004		0.0004	0.004**	0	0
BORON	32	31	0.15		0.0057		0.027	NR	NR	NR
BORON	32	29	0.15		0.0055		0.034	NR	NR	NR
CADMIUM	32	1	0.0037		0.0037		0.0037	0.005	0	0
CALCIUM	32	32	87		23		45	NR	NR	NR
CALCIUM	32	32	74		21		42	NR	NR	NR
CHROMIUM	32	2	0.013		0.010		0.012	0.050	0	0
CHROMIUM	32	3	0.018		0.010		0.015	0.050	0	0
COBALT	32	3	0.0080		0.0051		0.0062	NR	NR	NR
COPPER	32	12	0.026		0.0051		0.012	1.000	0	0
COPPER	32	5	0.013		0.0048		0.0070	1.000	0	0
IRON	32	32	15		0.020		2.1	0.300	22	22
IRON	32	16	1.8		0.0071		0.21	0.300	2	2
LEAD	32	9	0.036		0.0041		0.016	0.050	0	0
LEAD	32	1	0.011		0.011		0.011	0.050	0	0
MAGNESIUM	32	32	50		15		26	NR	NR	NR
MAGNESIUM	32	32	41		13		25	NR	NR	NR
MANGANESE	32	32	0.40		0.0026		0.062	0.050	7	7
MANGANESE	32	23	0.022		0.0013		0.0069	0.050	0	0

Table 7.52 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
MERCURY	32	1	0.0002	0.0002	0.0002	0.0002	0.0002	0.002	0	0
NICKEL	32	9	0.029	0.011	0.011	0.020	0.100**	0.100**	0	0
NICKEL	32	1	0.011	0.011	0.011	0.011	0.100**	0.100**	0	0
POTASSIUM	32	32	9.6	0.79	0.79	3.0	NR	NR	NA	NA
POTASSIUM	32	32	10	0.82	0.82	3.0	NR	NR	NA	NA
SELENIUM	32	1	0.051	0.051	0.051	0.051	0.050	0.050	1	1
SELENIUM	32	1	0.064	0.064	0.064	0.064	0.050	0.050	1	1
SODIUM	32	32	7.6	0.50	0.50	2.2	NR	NR	NA	NA
SODIUM	32	32	7.6	0.52	0.52	2.2	NR	NR	NA	NA
STRONTIUM	32	32	3.1	0.018	0.018	0.40	NR	NR	NA	NA
STRONTIUM	32	32	3.1	0.016	0.016	0.39	NR	NR	NA	NA
URANIUM	32	23	0.0070	0.0010	0.0010	0.0017	13.000	13.000	0	0
URANIUM FILT.	32	18	0.0040	0.0010	0.0010	0.0016	13.000	13.000	0	0
VANADIUM	32	6	0.033	0.0054	0.0054	0.017	NR	NR	NA	NA
ZINC	32	28	0.23	0.0023	0.0023	0.041	5.000	5.000	0	0
ZINC	32	23	0.069	0.0023	0.0023	0.016	5.000	5.000	0	0
CONDUCTIVITY, FIELD MMT	34	NA	640	220	220	380	NR	NR	NA	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	34	NA	9.9	0.10	0.10	5.9	NR	NR	NA	NA
PH, FIELD MMT. (PH UNITS)	34	NA	9.0	7.1	7.1	7.8	6.5/8.5	6.5/8.5	2	2
REDOX, FIELD MMT. (MV)	34	NA	250	-170	-170	120	NR	NR	NA	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	34	NA	20	9.3	9.3	15	NR	NR	0	0
ALKALINITY-CO3 (MG/L)	32	7	8.0	2.0	2.0	3.7	NR	NR	NA	NA
ALKALINITY-HCO3 (MG/L)	32	32	360	100	100	190	NR	NR	NA	NA
CONDUCTIVITY (UMHOS/CM)	34	34	660	230	230	400	NR	NR	NA	NA
CONDUCTIVITY, REP. 2 (UMHOS/CM)	32	32	650	230	230	390	NR	NR	NA	NA
CONDUCTIVITY, REP. 3 (UMHOS/CM)	32	32	660	230	230	390	NR	NR	NA	NA
CONDUCTIVITY, REP. 4 (UMHOS/CM)	32	32	650	230	230	390	NR	NR	NA	NA
DISSOLVED SOLIDS (MG/L)	32	32	480	140	140	250	500.000	500.000	0	0
PH (PH UNITS)	34	NA	8.7	7.7	7.7	8.1	6.5/8.5	6.5/8.5	3	3

Table 7.52 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE VALUE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
PH, REP. 2 (PH UNITS)	32	NA	8.7	7.6	8.1	6.5/8.5	3			
PH, REP. 3 (PH UNITS)	32	NA	8.6	7.6	8.1	6.5/8.5	2			
PH, REP. 4 (PH UNITS)	32	NA	8.7	7.5	8.1	6.5/8.5	3			
TOTAL ORGANIC CARBON (MG/L)	32	20	11	1.0	2.5	NR	NA			
TOTAL ORGANIC CARBON, REP 2 (MG/L)	32	22	8.0	1.0	2.1	NR	NA			
TOTAL ORGANIC CARBON, REP 3 (MG/L)	32	22	11	1.0	3.0	NR	NA			
TOTAL ORGANIC CARBON, REP 4 (MG/L)	32	18	35	1.0	4.2	NR	NA			
TOTAL ORGANIC HALIDE (UG/L)	32	2	12	10	11	NR	NA			
TOTAL ORGANIC HALIDE, REP 2 (UG/L)	32	2	13	12	13	NR	NA			
TOTAL ORGANIC HALIDE, REP 3 (UG/L)	32	1	11	11	11	NR	NA			
TOTAL ORGANIC HALIDE, REP 4 (UG/L)	32	3	16	11	14	NR	NA			
TOTAL SUSPENDED SOLIDS (MG/L)	32	28	590	1.0	86	NR	NA			
TURBIDITY (NTU)	32	32	370	1.5	43	1.000	32			
GROSS ALPHA (PCI/L)	32	32	19	-3.2	3.6	15.000	3			
GROSS BETA (PCI/L)	32	32	22	-4.9	2.5	50.000	0			
2-BUTANONE (UG/L)	32	1	9.0	9.0	9.0	NR	NA			
4-METHYL-2-PENTANONE (UG/L)	32	1	2.0	2.0	2.0	NR	NA			
ACETONE (UG/L)	32	1	4.0	4.0	4.0	NR	NA			
BIS(2-ETHYLHEXYL) PHTHALATE (UG/L)	32	10	11	0.70	3.0	6.000**	1			
BUTYL BENZYL PHTHALATE (UG/L)	32	1	0.60	0.60	0.60	NR	NA			
CARBON DISULFIDE (UG/L)	32	1	3.0	3.0	3.0	NR	NA			
DI-N-BUTYL PHTHALATE (UG/L)	32	8	17	0.30	6.1	NR	NA			
DI-N-OCTYL PHTHALATE (UG/L)	32	1	0.20	0.20	0.20	NR	NA			
DIETHYL PHTHALATE (UG/L)	32	2	0.70	0.50	0.60	NR	NA			
ISOPHORONE (UG/L)	32	1	2.0	2.0	2.0	NR	NA			
METHYLENE CHLORIDE (UG/L)	32	11	1.0	1.0	1.0	NR	NA			

Table 7.53. Constituents in groundwater at the Y-12 Plant site

HGR=CR area=United Nuclear Site

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	24	24	28		1.0		11	250.000	0	0
NITRATE NITROGEN	24	24	1.5		0.26		0.79	10.000	0	0
SULFATE	24	21	15		1.0		4.8	250.000	0	0
ALUMINUM	24	16	4.9		0.022		0.47	0.200	6	6
ALUMINUM	24	5	0.042		0.024		0.032	0.200	0	0
BARIIUM	24	24	0.028		0.0074		0.018	1.000	0	0
BARIIUM	24	24	0.028		0.0067		0.016	1.000	0	0
BERYLLIUM	24	1	0.0007		0.0007		0.0007	0.004**	0	0
BORON	24	15	0.037		0.0045		0.017	NR	NR	NA
BORON	24	16	0.034		0.0046		0.015	NR	NR	NA
CALCIUM	24	24	60		28		43	NR	NR	NA
CALCIUM	24	24	57		26		42	NR	NR	NA
CHROMIUM	24	6	0.12		0.022		0.056	0.050	2	2
CHROMIUM	24	6	0.096		0.027		0.049	0.050	2	2
COPPER	24	7	0.019		0.0040		0.0092	1.000	0	0
COPPER	24	4	0.0068		0.0044		0.0054	1.000	0	0
IRON	24	21	5.7		0.014		0.86	0.300	11	11
IRON	24	9	0.050		0.0057		0.018	0.300	0	0
LEAD	24	3	0.030		0.0041		0.013	0.050	0	0
MAGNESIUM	24	24	34		17		25	NR	NR	NA
MAGNESIUM	24	24	33		15		25	NR	NR	NA
MANGANESE	24	19	0.10		0.0010		0.021	0.050	2	2
MANGANESE	24	13	0.0097		0.0011		0.0036	0.050	0	0
NICKEL	24	9	0.20		0.010		0.11	0.100**	5	5
NICKEL	24	9	0.23		0.017		0.093	0.100**	4	4
POTASSIUM	24	22	1.6		0.69		1.0	NR	NR	NA
POTASSIUM	24	20	1.6		0.68		1.0	NR	NR	NA
SODIUM	24	24	9.7		0.41		4.4	NR	NR	NA
SODIUM	24	24	9.6		0.44		4.4	NR	NR	NA

Table 7.53 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. >		
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.			
									REFERENCE	VALUE	REFERENCE
STRONTIUM	24	24	0.025	0.0095	0.017	NR	NR	NR	NA		NA
STRONTIUM	24	24	0.025	0.0089	0.016	NR	NR	NR	NA		NA
URANIUM	24	7	0.0050	0.0010	0.0016	13.000	13.000	0	0		0
URANIUM FILT.	24	4	0.0020	0.0010	0.0013	13.000	13.000	0	0		0
VANADIUM	24	1	0.014	0.014	0.014	NR	NR	NR	NA		NA
ZINC	24	24	0.050	0.0031	0.014	5.000	5.000	0	0		0
ZINC	24	24	0.033	0.0031	0.013	5.000	5.000	0	0		0
CONDUCTIVITY, FIELD MMT	24	NA	590	220	380	NR	NR	NR	NA		NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	24	NA	11	1.3	5.2	NR	NR	NR	NA		NA
PH, FIELD MMT. (PH UNITS)	24	NA	8.0	7.0	7.5	6.5/8.5	7	7	7		7
REDOX, FIELD MMT. (MV)	24	NA	240	49	170	NR	NR	NR	NA		NA
WATER TEMP, FIELD MMT (DEG. CENT.)	24	NA	21	12	16	NR	NR	NR	0		0
ALKALINITY-HCO3 (MG/L)	24	24	260	130	200	NR	NR	NR	NA		NA
CONDUCTIVITY (UMHOS/CM)	24	24	540	260	400	NR	NR	NR	NA		NA
DISSOLVED SOLIDS (MG/L)	24	24	350	150	250	500.000	500.000	0	0		0
PH	24	NA	8.3	7.5	7.8	6.5/8.5	0	0	0		0
TOTAL SUSPENDED SOLIDS (MG/L)	24	17	230	1.0	33	NR	NR	NR	NA		NA
TURBIDITY (NTU)	24	24	200	0.40	23	1.000	17	17	17		17
234-URANIUM (PCI/L)	24	24	120	-4.2	22	20.000	9	9	9		9
235-URANIUM (PCI/L)	24	24	100	-70	13	24.000	8	8	8		8
238-URANIUM (PCI/L)	24	24	120	-9.8	14	24.000	5	5	5		5
CESIUM-137 (PCI/L)	3	3	46	35	40	120.00	0	0	0		0
GROSS ALPHA (PCI/L)	24	24	20	-1.4	1.5	15.000	1	1	1		1
GROSS BETA (PCI/L)	24	24	27	-8.6	1.4	50.000	0	0	0		0
PROTACTINIUM-234 (PCI/L)	1	1	6500	6500	6500	2800	1	1	1		1
RADIUM (PCI/L)	24	24	0.41	0.0070	0.070	4.000	0	0	0		0
RUTHENIUM-106 (PCI/L)	1	1	140	140	140	240	0	0	0		0
2-BUTANONE (UG/L)	24	1	9.0	9.0	9.0	NR	NR	NR	NA		NA
4-METHYL-2-PENTANONE (UG/L)	24	4	2.0	1.0	1.8	NR	NR	NR	NA		NA
CHLOROFORM (UG/L)	24	2	0.70	0.60	0.65	100.000	0	0	0		0
METHYLENE CHLORIDE (UG/L)	24	6	2.0	0.80	1.5	NR	NR	NR	NA		NA

Table 7.54. Constituents in groundwater at the Y-12 Plant site

HGR=CR area=Industrial Landfill II

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.		
CHLORIDE (MG/L)	14	14	32	1.0	9.2	NR	NR	NA	0	0
FLUORIDE (MG/L)	14	7	1.8	0.10	1.5	4.000	4.000	0	0	0
NITRATE NITROGEN (MG/L)	14	3	0.38	0.20	0.30	10.000	10.000	0	0	0
SULFATE (MG/L)	14	14	12	1.2	7.2	NR	NR	NA	0	0
ALUMINUM (MG/L)	15	14	1.4	0.021	0.34	NR	NR	NA	0	0
FILTERED ICAP (MG/L)	13	7	0.055	0.023	0.033	NR	NR	NA	0	0
BARIUM (MG/L)	15	15	0.27	0.0094	0.14	2.000**	2.000**	0	0	0
FILTERED ICAP (MG/L)	13	13	0.26	0.0078	0.13	2.000**	2.000**	0	0	0
BERYLLIUM (MG/L)	13	1	0.0008	0.0008	0.0008	0.004**	0.0008	0	0	0
BORON (MG/L)	15	14	0.038	0.0053	0.018	NR	NR	NA	0	0
FILTERED ICAP (MG/L)	13	11	0.043	0.0042	0.020	NR	NR	NA	0	0
CALCIUM (MG/L)	15	15	54	20	33	NR	NR	NA	0	0
FILTERED ICAP (MG/L)	13	13	37	26	33	NR	NR	NA	0	0
CHROMIUM (MG/L)	15	7	0.23	0.012	0.069	NR	NR	NA	0	0
CHROMIUM (MG/L)	15	7	0.16	0.016	0.055	NR	NR	NA	0	0
FILTERED AAS (MG/L)	13	2	0.022	0.012	0.017	NR	NR	NA	0	0
COBALT (MG/L)	15	1	0.0072	0.0072	0.0072	NR	NR	NA	0	0
FILTERED ICAP (MG/L)	13	3	0.0078	0.0063	0.0070	NR	NR	NA	0	0
COPPER (MG/L)	15	4	0.029	0.0060	0.013	NR	NR	NA	0	0
COPPER (MG/L)	13	4	0.0079	0.0045	0.0063	NR	NR	NA	0	0
IRON (MG/L)	15	14	7.0	0.041	0.98	NR	NR	NA	0	0
FILTERED ICAP (MG/L)	13	4	0.025	0.0070	0.012	NR	NR	NA	0	0
LEAD (MG/L)	15	1	0.014	0.014	0.014	0.050	0.050	0	0	0
MAGNESIUM (MG/L)	15	15	23	14	19	NR	NR	NA	0	0
FILTERED ICAP (MG/L)	13	13	22	14	19	NR	NR	NA	0	0
MANGANESE (MG/L)	15	14	0.11	0.0013	0.014	NR	NR	NA	0	0
FILTERED ICAP (MG/L)	13	8	0.0041	0.0013	0.0020	NR	NR	NA	0	0
NICKEL (MG/L)	15	5	0.26	0.049	0.12	0.100**	0.100**	2	2	2
FILTERED ICAP (MG/L)	13	5	0.081	0.028	0.042	0.100**	0.100**	0	0	0



Table 7.54 (continued)

VARIABLE	# SAMPLES DETECTED		MAXIMUM DETECTED MMT.		MINIMUM DETECTED MMT.		AVERAGE DETECTED MMTS.		REFERENCE VALUE		# MMTS. > REFERENCE	
	#	DETECTED	DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	VALUE	REFERENCE	#	REFERENCE
POTASSIUM	15	15	2.2	0.71	1.3	NR	NR	NR	NR	NR	NR	NA
POTASSIUM	13	11	1.8	0.67	1.2	NR	NR	NR	NR	NR	NR	NA
SODIUM	15	15	17	0.46	5.8	NR	NR	NR	NR	NR	NR	NA
SODIUM	13	13	17	0.42	4.5	NR	NR	NR	NR	NR	NR	NA
STRONTIUM	15	15	0.70	0.019	0.28	NR	NR	NR	NR	NR	NR	NA
STRONTIUM	13	13	0.69	0.018	0.22	NR	NR	NR	NR	NR	NR	NA
URANIUM	14	13	0.0050	0.0010	0.0028	NR	NR	NR	NR	NR	NR	NA
URANIUM FILT.	12	11	0.0060	0.0010	0.0025	NR	NR	NR	NR	NR	NR	NA
ZINC	15	15	0.10	0.0059	0.026	5.000	5.000	5.000	5.000	5.000	5.000	0
ZINC	13	13	0.096	0.0029	0.021	5.000	5.000	5.000	5.000	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	14	NA	350	240	290	NR	NR	NR	NR	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	14	NA	11	4.5	8.5	NR	NR	NR	NR	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	14	NA	9.3	7.8	8.2	6.5/8.5	6.5/8.5	6.5/8.5	6.5/8.5	6.5/8.5	6.5/8.5	1
REDOX, FIELD MMT. (MV)	14	NA	210	86	160	NR	NR	NR	NR	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	14	NA	19	10	14	NR	NR	NR	NR	NR	NR	0
ALKALINITY-HCO3 (MG/L)	14	14	180	140	150	NR	NR	NR	NR	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	14	14	370	310	330	NR	NR	NR	NR	NR	NR	NA
DISSOLVED SOLIDS (MG/L)	14	14	210	140	170	500.000	500.000	500.000	500.000	500.000	500.000	0
PH	14	NA	8.4	7.9	8.2	6.5/8.5	6.5/8.5	6.5/8.5	6.5/8.5	6.5/8.5	6.5/8.5	0
TOTAL ORGANIC CARBON (MG/L)	14	9	16	1.3	3.4	NR	NR	NR	NR	NR	NR	NA
TOTAL ORGANIC CARBON, REP 2 (MG/L)	14	11	19	1.0	3.5	NR	NR	NR	NR	NR	NR	NA
TOTAL ORGANIC CARBON, REP 3 (MG/L)	14	9	13	1.0	2.9	NR	NR	NR	NR	NR	NR	NA
TOTAL ORGANIC CARBON, REP 4 (MG/L)	14	8	16	1.0	3.3	NR	NR	NR	NR	NR	NR	NA
TOTAL ORGANIC HALIDE, REP 2 (UG/L)	14	1	11	11	11	NR	NR	NR	NR	NR	NR	NA
TOTAL ORGANIC HALIDE, REP 3 (UG/L)	14	1	10	10	10	NR	NR	NR	NR	NR	NR	NA
TOTAL ORGANIC HALIDE, REP 4 (UG/L)	14	3	13	10	11	NR	NR	NR	NR	NR	NR	NA
TOTAL SUSPENDED SOLIDS (MG/L)	14	14	420	1.0	36	NR	NR	NR	NR	NR	NR	NA
TURBIDITY (NTU)	14	14	250	0.90	23	1.000	1.000	1.000	1.000	1.000	1.000	13
234-URANIUM (PCI/L)	3	3	16	0.0000	5.8	20.000	20.000	20.000	20.000	20.000	20.000	0
235-URANIUM (PCI/L)	2	2	85	15	50	24.000	24.000	24.000	24.000	24.000	24.000	1

Table 7.54 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	# DETECTED	MINIMUM		AVERAGE	# MMTS. >		
			DETECTED	MMT.			DETECTED	MMT.				
									DETECTED	REFERENCE	VALUE	REFERENCE
238-URANIUM	3	3	11	0.0000				4.0	24.000	0		0
GROSS ALPHA	15	15	4.1	-3.5				1.1	15.000	0		0
GROSS BETA	15	15	5.2	S	-13			0.31	50.000	0		0
PROTACTINIUM-234	2	2	3100	E	-740		F	1200	NR	NA		NA
1,2-DICHLOROETHANE	14	2	2.0		2.0			2.0	5.000	0		0
2-BUTANONE	14	2	12	B	8.0		JB	10	NR	NA		NA
4-METHYL-2-PENTANONE	14	3	2.0	BJ	1.0		BJ	1.7	NR	NA		NA
ACETONE	14	2	6.0	BJ	1.0		BJ	3.5	NR	NA		NA
METHYLENE CHLORIDE	14	5	48		1.0		JB	20	NR	NA		NA

Table 7.55. Constituents in groundwater at the Y-12 Plant site

HGR=CR area=Industrial Landfill III

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	29	24	160	1.0	27	250.000	0	0		
FLUORIDE	29	2	0.10	0.10	0.10	2.000	0	0		
NITRATE NITROGEN	29	16	0.89	0.20	0.44	10.000	0	0		
SULFATE	29	29	26	1.5	8.8	250.000	0	0		
ALUMINUM	29	23	140	0.023	7.6	0.200	12	12		
ALUMINUM	28	14	0.22	0.024	0.071	0.200	1	1		
ARSENIC	29	1	0.69	0.69	0.69	0.050	1	1		
ARSENIC	28	1	0.054	0.054	0.054	0.050	1	1		
BARIUM	29	29	0.41	0.0076	0.032	1.000	0	0		
BARIUM	28	28	0.044	0.0078	0.017	1.000	0	0		
BERYLLIUM	29	7	0.029	0.0006	0.0058	0.004**	2	2		
BERYLLIUM	28	1	0.0005	0.0005	0.0005	0.004**	0	0		
BORON	29	28	0.30	0.0047	0.033	NR	NA	NA		
BORON	28	26	0.12	0.0047	0.023	NR	NA	NA		
CADMIUM	29	1	0.011	0.011	0.011	0.005	1	1		
CADMIUM	29	5	0.022	0.0031	0.0073	0.005	1	1		
CALCIUM	29	29	84	27	44	NR	NA	NA		
CALCIUM	28	28	69	27	39	NR	NA	NA		
CHROMIUM	29	8	58	0.010	7.4	0.050	5	5		
CHROMIUM	29	8	44	0.013	5.6	0.050	6	6		
CHROMIUM	28	1	0.042	0.042	0.042	0.050	0	0		
COBALT	29	5	0.39	0.0061	0.097	NR	NA	NA		
COBALT	28	2	0.073	0.024	0.049	NR	NA	NA		
COPPER	29	12	1.1	0.0042	0.10	1.000	1	1		
COPPER	28	1	0.010	0.010	0.010	1.000	0	0		
IRON	29	29	470	0.0073	19	0.300	15	15		
IRON	28	14	8.6	0.0072	0.71	0.300	3	3		
LEAD	29	12	1.7	0.0045	0.16	0.050	3	3		
LEAD	15	1	1.4	1.4	1.4	0.050	1	1		

Table 7.55 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MNTS. > REFERENCE VALUE	# MNTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
MAGNESIUM	29	29	59	17	26	NR	NR	NA	NA	
MAGNESIUM	28	28	33	16	23	NR	NR	NA	NA	
MANGANESE	29	24	11	0.0013	0.58	0.050	0.050	10	10	
MANGANESE	28	18	1.2	0.0011	0.14	0.050	0.050	4	4	
MERCURY	29	1	0.0030	0.0030	0.0030	0.002	0.002	1	1	
MOLYBDENUM	29	3	0.67	0.011	0.23	NR	NR	NA	NA	
MOLYBDENUM	28	4	0.11	0.011	0.037	NR	NR	NA	NA	
NICKEL	29	10	5.8	0.012	1.0	0.100**	0.100**	5	5	
NICKEL	28	5	3.4	0.013	0.96	0.100**	0.100**	4	4	
POTASSIUM	29	22	16	0.61	2.5	NR	NR	NA	NA	
POTASSIUM	28	21	5.9	0.61	1.7	NR	NR	NA	NA	
SILVER	29	1	0.0064	0.0064	0.0064	0.100	0.100	0	0	
SODIUM	29	29	11	0.43	2.5	NR	NR	NA	NA	
SODIUM	28	28	11	0.37	2.2	NR	NR	NA	NA	
STRONTIUM	29	29	0.13	0.012	0.036	NR	NR	NA	NA	
STRONTIUM	28	28	0.13	0.011	0.032	NR	NR	NA	NA	
URANIUM	29	12	0.0040	0.0010	0.0016	13.000	13.000	0	0	
URANIUM FILT.	28	12	0.0020	0.0010	0.0013	13.000	13.000	0	0	
VANADIUM	29	9	1.1	0.0055	0.14	NR	NR	NA	NA	
ZINC	29	26	3.8	0.0022	0.19	5.000	5.000	0	0	
ZINC	28	21	0.047	0.0038	0.012	5.000	5.000	0	0	
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	29	NA	620	250	370	NR	NR	NA	NA	
DISSOLVED OXYGEN, FIELD MMT. (PPM)	29	NA	8.4	1.9	5.3	NR	NR	NA	NA	
PH, FIELD MMT. (PH UNITS)	29	NA	8.4	7.2	7.7	6.5/8.5	6.5/8.5	0	0	
REDOX, FIELD MMT. (MV)	29	NA	240	-220	120	NR	NR	NA	NA	
WATER TEMP, FIELD MMT (DEG. CENT.)	29	NA	18	13	16	NR	NR	0	0	
ALKALINITY-HCO3 (MG/L)	29	29	240	86	170	NR	NR	NA	NA	
CHEMICAL OXYGEN DEMAND (MG/L)	29	2	7.0	7.0	7.0	NR	NR	NA	NA	
CONDUCTIVITY (UMHOS/CM)	29	29	750	270	400	NR	NR	NA	NA	

Table 7.55 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM DETECTED MMT.	MINIMUM DETECTED MMT.	AVERAGE DETECTED MMTS.	REFERENCE VALUE	# MMTS. >
						REFERENCE VALUE	REFERENCE
DISSOLVED SOLIDS	29	29	550	110	240	500.000	2
PH	29	NA	8.4	6.7	7.8	6.5/8.5	0
TOTAL ORGANIC CARBON	29	19	4.0	1.0	1.8	NR	NA
TOTAL ORGANIC CARBON, REP 2	29	16	2.9	1.0	1.5	NR	NA
TOTAL ORGANIC CARBON, REP 3	29	17	5.0	1.0	2.0	NR	NA
TOTAL ORGANIC CARBON, REP 4	28	17	2.2	1.0	1.6	NR	NA
TOTAL ORGANIC HALIDE	29	6	14	10	12	NR	NA
TOTAL ORGANIC HALIDE, REP 2	29	3	29	21	24	NR	NA
TOTAL ORGANIC HALIDE, REP 3	29	5	15	10	12	NR	NA
TOTAL ORGANIC HALIDE, REP 4	29	6	14	10	12	NR	NA
TOTAL SUSPENDED SOLIDS	29	20	3600	1.0	240	NR	NA
TURBIDITY	29	29	5200	0.50	280	1.000	24
234-URANIUM	5	5	12	0.46	6.4	20.000	0
235-URANIUM	5	5	27	0.049	13	24.000	2
238-URANIUM	5	5	5.9	0.0000	2.0	24.000	0
99-TECHNETIUM	5	5	89	-560	-89	4000.00	0
CESIUM-137	3	3	34	-23	15	120.00	0
GROSS ALPHA	29	29	110	-3.3	8.4	15.000	3
GROSS BETA	29	29	120	-6.8	12	50.000	3
PROTACTINIUM-234	1	1	4400	4400	4400	2800	1
STRONTIUM	5	5	90	-16	6.0	8.000	1
THORIUM-228	3	3	1100	14	710	16.00	1
1,1-DICHLOROETHENE	29	1	1.0	1.0	1.0	7.000	0
1,2-DICHLOROETHENE	29	1	1.0	1.0	1.0	70.000	0
2-BUTANONE	29	2	2.0	1.0	1.5	NR	NA
4-METHYL-2-PENTANONE	29	3	3.0	1.0	2.0	NR	NA
ACETONE	29	2	3.0	2.0	2.5	NR	NA
METHYLENE CHLORIDE	29	11	3.0	1.0	1.6	NR	NA
TETRACHLOROETHENE	29	1	1.0	1.0	1.0	5.000	0
XYLENES	29	1	2.0	2.0	2.0	10000.0	0

**Table 7.56. Constituents in groundwater at the Y-12 Plant site**  
HGR=CR area=Industrial Landfill IV

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.	
CHLORIDE	20	20	2.8		1.0		1.6	NR	NA
NITRATE NITROGEN	20	14	0.55		0.20		0.39	10.000	0
SULFATE	20	14	13		1.0		4.6	NR	NA
ALUMINUM	20	19	1.0		0.022		0.34	NR	NA
ALUMINUM	20	5	0.097		0.020		0.040	NR	NA
BARIIUM	20	20	0.029		0.0070		0.014	2.000**	0
BARIIUM	20	20	0.027		0.0058		0.013	2.000**	0
BERYLLIUM	20	6	0.0011		0.0004		0.0006	0.004**	0
BERYLLIUM	20	3	0.0008		0.0004		0.0006	0.004**	0
BORON	20	18	0.15		0.0046		0.044	NR	NA
BORON	20	16	0.15		0.0041		0.044	NR	NA
CALCIUM	20	20	75		24		36	NR	NA
CALCIUM	20	20	61		25		32	NR	NA
COBALT	20	3	0.0084		0.0057		0.0067	NR	NA
COBALT	20	3	0.0085		0.0050		0.0062	NR	NA
COPPER	20	10	0.025		0.0044		0.0097	NR	NA
COPPER	20	3	0.0049		0.0043		0.0047	NR	NA
IRON	20	20	2.2		0.016		0.49	NR	NA
IRON	20	4	0.12		0.0072		0.040	NR	NA
LEAD	20	3	0.027		0.0042		0.013	0.050	0
MAGNESIUM	20	20	44		14		22	NR	NA
MAGNESIUM	20	20	36		15		20	NR	NA
MANGANESE	20	17	0.054		0.0032		0.017	NR	NA
MANGANESE	20	9	0.016		0.0011		0.0036	NR	NA
NICKEL	20	1	0.033		0.033		0.033	0.100**	0
NICKEL	20	1	0.049		0.049		0.049	0.100**	0
POTASSIUM	20	18	4.5		0.61		1.5	NR	NA
POTASSIUM	20	12	4.4		0.63		1.9	NR	NA
SODIUM	20	20	5.0		0.51		1.6	NR	NA

Table 7.56 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
SODIUM	20	20	4.9	0.44	1.8	NR	NR	NA		NA
STRONTIUM	20	20	0.030	0.0090	0.014	NR	NR	NA		NA
STRONTIUM	20	20	0.029	0.0089	0.014	NR	NR	NA		NA
URANIUM	20	1	0.0010	0.0010	0.0010	NR	NR	NA		NA
URANIUM FILT.	20	1	0.0010	0.0010	0.0010	NR	NR	NA		NA
VANADIUM	20	3	0.0077	0.0050	0.0061	NR	NR	NA		NA
ZINC	20	20	0.11	0.0040	0.024	5.000	5.000	0		0
ZINC	20	20	0.041	0.0040	0.013	5.000	5.000	0		0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	20	NA	470	210	300	NR	NR	NA		NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	20	NA	11	4.9	7.4	NR	NR	NA		NA
PH, FIELD MMT. (PH UNITS)	20	NA	8.2	6.8	7.7	6.5/8.5	6.5/8.5	0		0
REDOX, FIELD MMT. (MV)	20	NA	250	130	200	NR	NR	NA		NA
WATER TEMP, FIELD MMT (DEG. CENT.)	20	NA	17	13	15	NR	NR	0		0
ALKALINITY-HCO3 (MG/L)	20	20	260	130	160	NR	NR	NA		NA
CONDUCTIVITY (UMHOS/CM)	20	20	500	240	320	NR	NR	NA		NA
DISSOLVED SOLIDS (MG/L)	20	20	270	100	170	500.000	500.000	0		0
PH	20	NA	8.3	7.3	7.9	6.5/8.5	6.5/8.5	0		0
TOTAL ORGANIC CARBON (MG/L)	20	9	5.0	1.0	2.4	NR	NR	NA		NA
TOTAL ORGANIC CARBON, REP 2 (MG/L)	20	9	3.6	1.0	1.8	NR	NR	NA		NA
TOTAL ORGANIC CARBON, REP 3 (MG/L)	20	8	3.0	1.0	1.9	NR	NR	NA		NA
TOTAL ORGANIC CARBON, REP 4 (MG/L)	20	9	4.0	1.0	1.7	NR	NR	NA		NA
TOTAL ORGANIC HALIDE, REP 3 (UG/L)	20	1	11	11	11	NR	NR	NA		NA
TOTAL SUSPENDED SOLIDS (MG/L)	20	16	250	1.0	35	NR	NR	NA		NA
TURBIDITY (NTU)	20	20	110	1.0	16	1.000	1.000	19		19
GROSS ALPHA (PCI/L)	20	20	5.7	-2.7	-0.12	15.000	15.000	0		0
GROSS BETA (PCI/L)	20	20	9.4	-12	-1.2	50.000	50.000	0		0
1,1,1-TRICHLOROETHANE (UG/L)	20	4	4.0	2.0	3.0	200.000	200.000	0		0
2-BUTANONE (UG/L)	20	2	13	13	13	NR	NR	NA		NA
4-METHYL-2-PENTANONE (UG/L)	20	6	2.0	1.0	1.8	NR	NR	NA		NA
ACETONE (UG/L)	20	7	6.0	2.0	4.0	NR	NR	NA		NA
METHYLENE CHLORIDE (UG/L)	20	7	3.0	1.0	1.6	NR	NR	NA		NA

Table 7.57. Constituents in groundwater at the Y-12 Plant site  
HGR=CR area=Industrial Landfill V

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MTS. > REFERENCE VALUE	# MTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	15	10	2.0		1.0		1.3		NR	NA
NITRATE NITROGEN	15	6	1.1		0.60		0.83	10.000		0
SULFATE	15	14	4.2		1.0		2.2		NR	NA
ALUMINUM	15	14	2.8		0.027		0.40		NR	NA
ALUMINUM	15	3	0.057		0.027		0.045		NR	NA
ARSENIC	15	1	0.068		0.068		0.068	0.050		1
BARIUM	15	15	0.018		0.0016		0.0079	2.000**		0
BARIUM	15	15	0.011		0.0016		0.0069	2.000**		0
BORON	15	14	0.039		0.0041		0.018		NR	NA
BORON	15	13	0.075		0.0052		0.023		NR	NA
CALCIUM	15	15	59		17		31		NR	NA
CALCIUM	15	15	38		18		30		NR	NA
COPPER	15	2	0.010		0.0072		0.0086		NR	NA
COPPER	15	3	0.018		0.0049		0.012		NR	NA
IRON	15	15	3.3		0.012		0.42		NR	NA
IRON	15	6	0.028		0.0050		0.013		NR	NA
LEAD	15	2	0.0095		0.0045		0.0070	0.050		0
MAGNESIUM	15	15	21		9.5		17		NR	NA
MAGNESIUM	15	15	21		9.6		17		NR	NA
MANGANESE	15	13	0.11		0.0011		0.013		NR	NA
MANGANESE	15	2	0.0020		0.0012		0.0016		NR	NA
NICKEL	15	3	0.017		0.011		0.013	0.100**		0
NICKEL	15	1	0.015		0.015		0.015	0.100**		0
POTASSIUM	15	15	3.4		1.0		1.7		NR	NA
POTASSIUM	15	15	4.3		0.74		1.8		NR	NA
SODIUM	15	15	4.0		0.43		1.2		NR	NA
SODIUM	15	15	4.1		0.50		1.2		NR	NA
STRONTIUM	15	15	0.042		0.012		0.019		NR	NA
STRONTIUM	15	15	0.031		0.012		0.017		NR	NA



Table 7.57 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
URANIUM	15	2	0.0010	0.0010	0.0010	0.0010	0.0010	NR	NR	NA
URANIUM FILT.	15	3	0.0010	0.0010	0.0010	0.0010	0.0010	NR	NR	NA
ZINC ICAP	15	15	0.034	0.034	0.0043	0.012	0.012	5.000	5.000	0
ZINC FILTERED ICAP	15	11	0.032	0.032	0.0039	0.014	0.014	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	19	NA	300	300	150	250	250	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	19	NA	12	12	5.9	8.9	8.9	NR	NR	NA
PH, FIELD MMT. (PH UNITS)	19	NA	9.3	9.3	7.4	8.0	8.0	6.5/8.5	6.5/8.5	3
REDOX, FIELD MMT. (MV)	19	NA	280	280	29	190	190	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	19	NA	19	19	13	16	16	NR	NR	0
ALKALINITY-CO3 (MG/L)	15	1	16	16	16	16	16	NR	NR	NA
ALKALINITY-HCO3 (MG/L)	15	15	170	170	73	140	140	NR	NR	NA
CONDUCTIVITY (UMHOS/CM)	15	15	910	910	180	310	310	NR	NR	NA
DISSOLVED SOLIDS (MG/L)	15	15	200	200	78	150	150	500.000	500.000	0
PH (PH UNITS)	15	NA	9.1	9.1	7.8	8.2	8.2	6.5/8.5	6.5/8.5	2
TOTAL ORGANIC CARBON (MG/L)	15	10	12	12	1.0	4.0	4.0	NR	NR	NA
TOTAL ORGANIC CARBON, REP 2 (MG/L)	15	9	13	13	1.0	3.7	3.7	NR	NR	NA
TOTAL ORGANIC CARBON, REP 3 (MG/L)	15	10	13	13	1.0	3.5	3.5	NR	NR	NA
TOTAL ORGANIC CARBON, REP 4 (MG/L)	15	8	14	14	1.0	3.4	3.4	NR	NR	NA
TOTAL SUSPENDED SOLIDS (MG/L)	15	10	100	100	1.0	16	16	NR	NR	NA
TURBIDITY (NTU)	15	15	58	58	1.5	10	10	1.000	1.000	15
234-URANIUM (PCI/L)	15	15	56	56	-0.81	9.5	9.5	20.000	20.000	1
235-URANIUM (PCI/L)	15	15	47	47	-37	12	12	24.000	24.000	3
237-NEPTUNIUM (PCI/L)	1	1	160	160	160	160	160	1.000	1.000	1
238-URANIUM (PCI/L)	15	15	17	17	0.0000	4.1	4.1	24.000	24.000	0
CESIUM-137 (PCI/L)	15	15	35	35	-21	3.6	3.6	120	120	0
GROSS ALPHA (PCI/L)	15	15	1.4	1.4	-5.1	-0.97	-0.97	15.000	15.000	0
GROSS BETA (PCI/L)	15	15	4.6	4.6	-5.3	-1.6	-1.6	50.000	50.000	0
POTASSIUM-40 (PCI/L)	1	1	570	570	570	570	570	NR	NR	NA
PROTACTINIUM-234 (PCI/L)	15	15	8400	8400	-2200	2800	2800	2800	2800	6
THORIUM-228 (PCI/L)	2	2	1800	1800	1400	1600	1600	16.000	16.000	2

Table 7.57 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.			
1,1,1-TRICHLOROETHANE	15	3	2.0	J	2.0	J	2.0	200.000	0	200.000	0
2-BUTANONE	15	2	8.0	B	4.0	BJ	6.0	NR	NR	NR	NA
4-METHYL-2-PENTANONE	15	2	1.0	BJ	1.0	BJ	1.0	NR	NR	NR	NA
ACETONE	15	2	7.0	J	3.0	JB	5.0	NR	NR	NR	NA
CARBON DISULFIDE	15	1	1.0	J	1.0	J	1.0	NR	NR	NR	NA
METHYLENE CHLORIDE	15	3	1.0	JB	0.90	JB	0.97	NR	NR	NR	NA
TRICHLOROETHENE	15	1	3.0	J	3.0	J	3.0	5.000	5.000	5.000	0

Table 7.58. Constituents in groundwater at the Y-12 Plant site

HGR=CR area=Const. Debris Landfill VI

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. >	
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMT.		
CHLORIDE	28	26	13		1.0		3.1		NR	NA
FLUORIDE	28	1	0.10		0.10		0.10	4.000	0	0
NITRATE NITROGEN	28	13	0.90		0.20		0.48	10.000	0	0
SULFATE	28	28	18		2.0		7.6	NR	NR	NA
ALUMINUM	28	22	54		0.024		3.6	NR	NR	NA
ALUMINUM	28	9	0.70		0.022		0.19	NR	NR	NA
ARSENIC	28	2	0.11		0.051		0.081	0.050	2	2
BARIUM	28	28	0.32		0.0044		0.025	2.000**	0	0
BARIUM	28	28	0.019		0.0035		0.0095	2.000**	0	0
BERYLLIUM	28	9	0.0059		0.0003		0.0012	0.004**	1	1
BERYLLIUM	28	6	0.0007		0.0004		0.0006	0.004**	0	0
BORON	28	27	0.11		0.0068		0.035	NR	NR	NA
BORON	28	28	0.11		0.0069		0.032	NR	NR	NA
CADMIUM	28	2	0.0037		0.0021		0.0029	0.005	0	0
CADMIUM	28	1	0.022		0.022		0.022	0.005	1	1
CADMIUM	28	1	0.0027		0.0027		0.0027	0.005	0	0
CALCIUM	28	28	330		14		51	NR	NR	NA
CALCIUM	28	28	49		6.1		35	NR	NR	NA
CHROMIUM	28	5	0.18		0.010		0.051	NR	NR	NA
CHROMIUM	28	7	0.46		0.010		0.083	NR	NR	NA
CHROMIUM	28	3	0.014		0.011		0.013	NR	NR	NA
COBALT	28	2	0.048		0.012		0.030	NR	NR	NA
COPPER	28	4	0.29		0.0067		0.092	NR	NR	NA
COPPER	28	2	0.0051		0.0045		0.0048	NR	NR	NA
IRON	28	27	76		0.0094		4.2	NR	NR	NA
IRON	28	9	0.043		0.0058		0.018	NR	NR	NA
LEAD	28	7	0.57		0.0051		0.11	0.050	2	2
LEAD	14	2	0.50		0.13		0.32	0.050	2	2
MAGNESIUM	28	28	68		4.2		23	NR	NR	NA

Table 7.58 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM	AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.		DETECTED	MMTS.	
MAGNESIUM	28	28	28	0.023	18	NR	NR	NA
MANGANESE	28	19	1.8	0.0010	0.15	NR	NR	NA
MANGANESE	28	7	0.0066	0.0017	0.0026	NR	NR	NA
MERCURY	28	1	0.0005	0.0005	0.0005	0.002	0.0005	0
MOLYBDENUM	28	6	0.061	0.027	0.039	NR	NR	NA
MOLYBDENUM	28	7	0.037	0.010	0.029	NR	NR	NA
NICKEL	28	8	0.28	0.011	0.050	0.100**	0.100**	1
NICKEL	28	3	0.016	0.010	0.014	0.100**	0.100**	0
POTASSIUM	28	25	26	0.62	4.4	NR	NR	NA
POTASSIUM	28	26	23	0.64	3.8	NR	NR	NA
SELENIUM	28	1	0.061	0.061	0.061	NR	NR	NA
SODIUM	28	28	8.0	0.41	2.5	NR	NR	NA
SODIUM	28	28	7.6	0.44	2.5	NR	NR	NA
STRONTIUM	28	28	0.37	0.015	0.042	NR	NR	NA
STRONTIUM	28	28	0.054	0.015	0.026	NR	NR	NA
URANIUM	28	12	0.0040	0.0010	0.0019	NR	NR	NA
URANIUM FILT.	28	7	0.0030	0.0010	0.0019	NR	NR	NA
VANADIUM	28	6	0.15	0.0054	0.039	NR	NR	NA
VANADIUM	28	3	0.014	0.0055	0.011	NR	NR	NA
ZINC	28	28	0.31	0.0076	0.048	5.000	5.000	0
ZINC	28	24	0.060	0.0038	0.021	5.000	5.000	0
CONDUCTIVITY, FIELD MMT	28	NA	430	190	310	NR	NR	NA
DISSOLVED OXYGEN, FIELD MMT.	28	NA	8.5	1.7	6.1	NR	NR	NA
PH, FIELD MMT.	28	NA	11	6.4	8.0	6.5/8.5	6.5/8.5	5
REDOX, FIELD MMT.	28	NA	250	39	180	NR	NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	28	NA	19	11	15	NR	NR	0
ALKALINITY-CO3	28	5	54	4.0	30	NR	NR	NA
ALKALINITY-HCO3	28	24	230	100	180	NR	NR	NA
CONDUCTIVITY	28	28	640	120	330	NR	NR	NA
DISSOLVED SOLIDS	28	28	270	78	170	500.000	500.000	0

Table 7.58 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	# DETECTED	MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.			DETECTED	MMT.	DETECTED	MMTS.		
PH	28	NA	83	6.4	NA	83	6.4	11	6.5/8.5	6	NA	
TOTAL ORGANIC CARBON	28	16	7.0	1.0	16	7.0	1.0	1.9	NR	NA	NA	
TOTAL ORGANIC CARBON, REP 2	28	17	3.0	1.0	17	3.0	1.0	1.7	NR	NA	NA	
TOTAL ORGANIC CARBON, REP 3	28	19	3.0	1.0	19	3.0	1.0	1.5	NR	NA	NA	
TOTAL ORGANIC CARBON, REP 4	28	18	35	1.0	18	35	1.0	3.9	NR	NA	NA	
TOTAL SUSPENDED SOLIDS	28	25	2300	1.0	25	2300	1.0	130	NR	NA	NA	
TURBIDITY	28	28	900	1.0	28	900	1.0	48	1.000	26	26	
234-URANIUM	21	21	22	-7.6	21	22	-7.6	6.3	20.000	2	2	
235-URANIUM	21	21	54	-31	21	54	-31	10	24.000	5	5	
238-URANIUM	21	21	31	-5.5	21	31	-5.5	5.4	24.000	2	2	
CESIUM-137	21	21	64	-46	21	64	-46	1.3	120	0	0	
GROSS ALPHA	28	28	14	-4.3	28	14	-4.3	0.83	15.000	0	0	
GROSS BETA	28	28	18	-12	28	18	-12	0.64	50.000	0	0	
POTASSIUM-40	3	3	420	280	3	420	280	370	280	NA	NA	
PROTACTINIUM-234	21	21	8100	210	21	8100	210	3200	2800	10	10	
RUTHENIUM-106	3	3	170	120	3	170	120	140	240.00	0	0	
2-BUTANONE	28	3	10	4.0	3	10	4.0	7.7	NR	NA	NA	
4-METHYL-2-PENTANONE	28	2	3.0	3.0	2	3.0	3.0	3.0	NR	NA	NA	
ACETONE	28	2	3.0	3.0	2	3.0	3.0	3.0	NR	NA	NA	
METHYLENE CHLORIDE	28	8	2.0	1.0	8	2.0	1.0	1.1	NR	NA	NA	

**Table 7.59. Constituents in groundwater at the Y-12 Plant site**  
HGR=CR area=Const. Debris Landfill VII

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		# MMTS. > REFERENCE VALUE	# MMTS. REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
CHLORIDE	12	7	2.0		1.0		1.4	NR	NA	NA
FLUORIDE	12	1	0.20		0.20		0.20	4.000	0	0
NITRATE NITROGEN	12	8	0.69		0.20		0.46	10.000	0	0
SULFATE	12	11	9.0		1.0		2.8	NR	NA	NA
ALUMINUM	12	8	3.8		0.021		0.66	NR	NA	NA
ALUMINUM	12	4	0.043		0.023		0.033	NR	NA	NA
BARIUM	12	12	0.24		0.0082		0.066	2.000**	0	0
BARIUM	12	12	0.24		0.0080		0.064	2.000**	0	0
BERYLLIUM	12	1	0.0006		0.0006		0.0006	0.004**	0	0
BORON	12	11	0.063		0.0059		0.023	NR	NA	NA
BORON	12	12	0.063		0.0081		0.020	NR	NA	NA
CALCIUM	12	12	40		24		33	NR	NA	NA
CALCIUM	12	12	39		24		33	NR	NA	NA
COPPER	12	2	0.014		0.0064		0.010	NR	NA	NA
COPPER	12	1	0.0050		0.0050		0.0050	NR	NA	NA
IRON	12	11	3.9		0.014		0.54	NR	NA	NA
IRON	12	1	0.18		0.18		0.18	NR	NA	NA
LEAD	12	1	0.0041		0.0041		0.0041	0.050	0	0
MAGNESIUM	12	12	22		13		16	NR	NA	NA
MAGNESIUM	12	12	21		13		16	NR	NA	NA
MANGANESE	12	7	0.096		0.0010		0.022	NR	NA	NA
MANGANESE	12	3	0.0023		0.0010		0.0017	NR	NA	NA
NICKEL	12	3	0.029		0.017		0.021	0.100**	0	0
NICKEL	12	3	0.029		0.012		0.020	0.100**	0	0
POTASSIUM	12	11	3.4		0.95		1.6	NR	NA	NA
POTASSIUM	12	10	3.9		0.96		1.6	NR	NA	NA
SODIUM	12	12	0.87		0.44		0.64	NR	NA	NA
SODIUM	12	12	0.76		0.45		0.63	NR	NA	NA
STRONTIUM	12	12	0.024		0.016		0.019	NR	NA	NA

Table 7.59 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		MINIMUM		AVERAGE		REFERENCE VALUE	# MMTS. > REFERENCE
			DETECTED	MMT.	DETECTED	MMT.	DETECTED	MMTS.		
STRONTIUM	12	12	0.024		0.016		0.019		NR	NA
URANIUM	12	1	0.0010		0.0010		0.0010		NR	NA
URANIUM FILT.	12	2	0.0010		0.0010		0.0010		NR	NA
VANADIUM	12	1	0.0070		0.0070		0.0070		NR	NA
ZINC	12	12	0.055		0.0069		0.019	5.000	5.000	0
ZINC	12	9	0.049		0.0030		0.019	5.000	5.000	0
CONDUCTIVITY, FIELD MMT (UMHOS/CM)	15	NA	310		230		260		NR	NA
DISSOLVED OXYGEN, FIELD MMT. (PPM)	15	NA	8.8		5.8		7.2		NR	NA
PH, FIELD MMT. (PH UNITS)	15	NA	7.9		7.1		7.5	6.5/8.5	6.5/8.5	0
REDOX, FIELD MMT. (MV)	15	NA	230		140		190		NR	NA
WATER TEMP, FIELD MMT (DEG. CENT.)	15	NA	17		13		15		NR	0
ALKALINITY-HCO3 (MG/L)	12	12	180		120		150		NR	NA
CONDUCTIVITY (UMHOS/CM)	12	12	340		240		280		NR	NA
DISSOLVED SOLIDS (MG/L)	12	12	240		140		170	500.000	500.000	0
PH (PH UNITS)	12	NA	8.2		7.6		7.9	6.5/8.5	6.5/8.5	0
TOT. PETROLEUM HYDROCARBONS (MG/L)	12	1	0.0070		0.0070		0.0070	1.000	1.000	0
TOTAL ORGANIC CARBON (MG/L)	12	6	2.2		1.0		1.5		NR	NA
TOTAL ORGANIC CARBON, REP 2 (MG/L)	12	7	2.0		1.0		1.3		NR	NA
TOTAL ORGANIC CARBON, REP 3 (MG/L)	12	4	28		1.1		8.3		NR	NA
TOTAL ORGANIC CARBON, REP 4 (MG/L)	12	6	4.0		1.0		1.6		NR	NA
TOTAL SUSPENDED SOLIDS (MG/L)	12	9	40		1.0		8.4		NR	NA
TURBIDITY (NTU)	12	12	95		0.90		12	1.000	1.000	10
234-URANIUM (PCI/L)	12	12	34		-7.4		9.1	20.000	20.000	3
235-URANIUM (PCI/L)	12	12	62		-15		23	24.000	24.000	4
237-NEPTUNIUM (PCI/L)	1	1	91	I	91		91	1.000	1.000	1
238-URANIUM (PCI/L)	12	12	40		0.0000		6.4	24.000	24.000	1
CESIUM-137 (PCI/L)	12	12	23	E	-20		-2.8	120.00	120.00	0
GROSS ALPHA (PCI/L)	12	12	1.2		-4.0		-1.2	15.000	15.000	0
GROSS BETA (PCI/L)	12	12	2.1		-6.0		-1.4	50.000	50.000	0
POTASSIUM-40 (PCI/L)	2	2	330	I	270		300	280	280	NA

Table 7.59 (continued)

VARIABLE	# SAMPLES	# DETECTED	MAXIMUM		#	MINIMUM		AVERAGE		# MMTS. > REFERENCE
			DETECTED	MMT.		DETECTED	MMT.	DETECTED	MMTS.	
PROFRACTINIUM-234	12	12	8000		I	-1500	F	3600	2800	9
THORIUM-228	1	1	980		I	980	I	980	16.000	1
2-BUTANONE	12	5	14		B	3.0	BJ	9.2	NR	NA
4-METHYL-2-PENTANONE	12	5	2.0		BJ	1.0	JB	1.8	NR	NA
ACETONE	12	5	17			4.0	JB	7.4	NR	NA
BENZENE	12	2	1.0		JB	0.80	JB	0.90	5.000	0
METHYLENE CHLORIDE	12	4	2.0		BJ	2.0	BJ	2.0	NR	NA
TRICHLOROETHENE	12	1	7.0			7.0		7.0	5.000	1



Table 7.60. Constituents in Waste Area Grouping (WAG) 1 groundwater at ORNL,  
May 19-June 25, 1993

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Downgradient Wells						
Anions, unfiltered (mg/L)						
Bromide	1/23	1.1	<1.0	-1.0	d	[d]
Chloride	20/23	110	<2.0	-18	250	0[3]
Fluoride	7/23	3.2	<0.10	-0.41	4	0[2]
Nitrate	2/23	10	<1.0	-1.5	10	0[2]
Sulfate, as SO <sub>4</sub>	19/23	120	<10	-34	250	0[3]
Base neutral/acid extractable organics, unfiltered (µg/L)						
Benzyl butyl phthalate	6/23	U5.0	JB1.0	-4.1	d	[d]
Bis(2-ethylhexyl) phthalate	12/23	B47	JB2.0	-11	d	[d]
Diethyl phthalate	5/23	5.0	JB2.0	-4.6	d	[d]
Field measurements, unfiltered						
Conductivity (mS/cm)	23/23	1.3	0.32	0.67	d	[d]
Dissolved oxygen (mg/L)	23/23	13	9.5	11	d	[d]
Redox (mV)	23/23	630	110	350	d	[d]
Temperature (°C)	23/23	22	13	16	30.5	0[1]
Turbidity (JTU)	23/23	2,100	2.1	230	1	23[2]
pH (SU)	23/23	9.1	6.8	7.3	(6.5, 8.5)	1[3]
Metals, unfiltered (mg/L)						
Aluminum, total	10/23	3.0	<0.050	-0.50	0.2	7[3]
Antimony, total	2/23	0.0070	<0.0050	-0.0051	d	[d]
Arsenic, total	1/23	0.011	<0.010	-0.010	0.05	0[1]
Barium, total	23/23	0.67	0.012	0.13	2	0[2]
Boron, total	9/23	1.0	<0.080	-0.19	d	[d]
Calcium, total	23/23	150	1.1	82	d	[d]
Chromium, total	5/23	0.0086	<0.0040	-0.0046	0.05	0[1]
Iron, total	19/23	11	<0.050	-2.1	0.3	14[3]
Magnesium, total	23/23	98	0.50	19	d	[d]
Manganese, total	21/23	5.7	<0.0010	-1.0	0.05	11[3]
Mercury, total	1/23	0.000060	<0.000050	-0.000050	0.002	0[1]
Nickel, total	4/23	0.024	<0.010	-0.011	d	[d]
Potassium, total	12/23	5.8	<1.0	-1.7	d	[d]
Silicon, total	23/23	12	3.2	5.7	d	[d]
Sodium, total	23/23	280	2.0	37	d	[d]
Vanadium, total	7/23	0.0049	<0.0020	-0.0024	d	[d]
Zinc, total	9/23	0.052	<0.0050	-0.0098	5	0[3]
Others, unfiltered						
Alkalinity (mg/L)	23/23	470	180	310	d	[d]
Total organic carbon (mg/L)	23/23	3.4	0.50	1.4	d	[d]
Total organic halides (µg/L)	14/23	120	<5.0	-19	d	[d]
Total suspended solids (mg/L)	11/23	130	<5.0	-14	d	[d]
Radionuclides, filtered (pCi/L) <sup>a</sup>						
Co-60	4/23	12*	-1.6	2.2*	200	0[4]
Cs-137	1/23	3.8	-4.6	0.38	120	0[4]
Gross alpha	9/23	200*	-0.62	10	15	1[2]
Gross beta	15/23	11,000*	-0.81	490	50	3[2]
H-3	22/23	15,000*	160	3,000*	20,000	0[2]
Th-230	1/1	6.8*	6.8*	6.8	12	0[4]
Th-232	1/1	0.57*	0.57*	0.57	2	0[4]
Total rad Sr	10/23	7,600*	-0.027	340	8	5[2]
U-234	1/1	180*	180*	180	20	1[4]
U-235	1/1	5.4*	5.4*	5.4	24	0[4]
U-238	1/1	30*	30*	30	24	1[4]
Radionuclides, unfiltered (pCi/L) <sup>a</sup>						
Co-60	3/23	16*	-5.4	1.3	200	0[4]
Cs-137	1/23	5.9*	-2.2	1.6*	120	0[4]

Table 7.60 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
<b>Radionuclides, unfiltered (pCi/L)*</b>						
Gross alpha	7/23	490*	-1.7	23	15	1[2]
Gross beta	21/23	14,000*	1.1	650	50	3[2]
H-3	20/23	17,000*	-160	3,000*	20,000	0[2]
Th-228	1/1	1.1*	1.1*	1.1	16	0[4]
Th-230	1/1	7.8*	7.8*	7.8	12	0[4]
Th-232	1/1	1.0*	1.0*	1.0	2	0[4]
Total rad Sr	10/23	7,000*	-1.1	310	8	5[2]
U-234	1/1	410*	410*	410	20	1[4]
U-235	1/1	6.2*	6.2*	6.2	24	0[4]
U-238	1/1	11*	11*	11	24	0[4]
<b>Volatile organics, unfiltered (µg/L)</b>						
1,1,1-Trichloroethane	1/23	16	U5.0	-5.5	200	0[1]
1,2-Dichloroethene	1/23	7.4	U5.0	-5.1	70	0[2]
Carbon disulfide	3/23	U5.0	J1.4	-4.6	d	[d]
Chloroform	2/23	15	U5.0	-5.5	100	0[2]
Trichloroethene	1/23	U5.0	J4.4	-5.0	5	0[1]
<b>Upgradient Wells</b>						
<b>Anions, unfiltered (mg/L)</b>						
Chloride	2/3	13	<2.0	-6.7	250	0[3]
Fluoride	1/3	1.2	<0.10	-0.47	4	0[2]
Nitrate	1/3	5.4	<1.0	-2.5	10	0[2]
Sulfate, as SO <sub>4</sub>	3/3	34	13	25	250	0[3]
<b>Base neutral/acid extractable organics, unfiltered (µg/L)</b>						
4-Methylphenol	1/3	U5.0	J3.0	-4.3	d	[d]
<b>Field measurements, unfiltered</b>						
Conductivity (mS/cm)	3/3	0.77	0.59	0.67	d	[d]
Dissolved oxygen (mg/L)	3/3	10	7.5	9.1	d	[d]
Redox (mV)	3/3	670	290	430	d	[d]
Temperature (°C)	3/3	16	15	15	30.5	0[1]
Turbidity (JTU)	3/3	340	8.4	120	1	3[2]
pH (SU)	3/3	8.1	7.1	7.5	(6.5, 8.5)	0[3]
<b>Metals, unfiltered (mg/L)</b>						
Aluminum, total	1/3	4.2	<0.050	-1.4	0.2	1[3]
Barium, total	3/3	0.21	0.080	0.15	2	0[2]
Boron, total	1/3	0.25	<0.080	-0.14	d	[d]
Calcium, total	3/3	110	35	83	d	[d]
Chromium, total	1/3	0.0063	<0.0040	-0.0048	0.05	0[1]
Iron, total	2/3	5.5	<0.050	-1.9	0.3	1[3]
Magnesium, total	3/3	28	10	21	d	[d]
Manganese, total	3/3	0.17	0.0060	0.061	0.05	1[3]
Nickel, total	1/3	0.024	<0.010	-0.015	d	[d]
Selenium, total	1/3	<0.0050	0.0040	-0.0047	0.01	0[1]
Silicon, total	3/3	9.5	6.0	7.7	d	[d]
Sodium, total	3/3	37	5.3	19	d	[d]
Vanadium, total	1/3	0.0082	<0.0020	-0.0041	d	[d]
Zinc, total	1/3	0.0054	<0.0050	-0.0051	5	0[3]
<b>Others, unfiltered</b>						
Alkalinity (mg/L)	3/3	300	240	280	d	[d]
Total organic carbon (mg/L)	3/3	1.2	0.50	0.84	d	[d]
Total organic halides (µg/L)	1/3	<7.3	<5.0	-5.8	d	[d]
Total suspended solids (mg/L)	2/3	170	<5.0	-64	d	[d]
<b>Radionuclides, filtered (pCi/L)*</b>						
Gross beta	2/3	4.9*	1.4	3.2*	50	0[2]
H-3	3/3	3,000*	840*	1,900*	20,000	0[2]

Table 7.60 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Radionuclides, unfiltered (pCi/L) <sup>d</sup>						
Cs-137	2/3	5.9*	0.81	3.4	120	0[4]
Gross beta	1/3	4.9*	0.27	2.0	50	0[2]
H-3	3/3	2,600*	920*	1,800*	20,000	0[2]

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; "J" indicates the value was estimated at or below the analytical detection limit by the laboratory; "B" indicates the compound was found in the laboratory blank; "JB" indicates the value was estimated at or below the analytical detection limit and was found in the laboratory blank; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>c</sup>If a reference limit exists, the source is coded as:

- 1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.
- 2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.
- 3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.
- 4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

<sup>d</sup>Not applicable.

<sup>e</sup>Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

Table 7.61. Constituents in Waste Area Grouping (WAG) 2 groundwater at ORNL,  
January 25-February 12, 1993

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Downgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	4/8	22	<2.0	-6.3	250	0[3]
Fluoride	2/8	2.0	<0.10	-0.35	4	0[2]
Phosphate	6/8	1.4	<1.0	-1.1	d	[d]
Sulfate, as SO <sub>4</sub>	4/8	37	<10	-16	250	0[3]
Base neutral/acid extractable organics, unfiltered (µg/L)						
Benzyl butyl phthalate	3/8	B10	B4.0	-9.0	d	[d]
Bis(2-ethylhexyl) phthalate	4/8	U10	B6.0	-8.4	d	[d]
Field measurements, unfiltered						
Conductivity (mS/cm)	8/8	0.85	0.24	0.56	d	[d]
Dissolved oxygen (mg/L)	8/8	11	8.2	9.2	d	[d]
Redox (mV)	8/8	510	220	420	d	[d]
Temperature (°C)	8/8	17	14	15	30.5	0[1]
Turbidity (JTU)	8/8	21	4.2	19	1	8[2]
pH (SU)	8/8	9.8	6.8	7.6	(6.5, 8.5)	2[3]
Metals, filtered (mg/L)						
Arsenic	2/8	0.030	<0.010	-0.013	0.05	0[1]
Barium	8/8	0.94	0.028	0.28	2	0[2]
Boron	3/8	1.1	<0.080	-0.23	d	[d]
Calcium	8/8	130	0.61	65	d	[d]
Iron	4/8	20	<0.050	-4.4	0.3	3[3]
Magnesium	8/8	20	0.17	8.8	d	[d]
Manganese	8/8	0.98	0.0033	0.20	0.05	4[3]
Nickel	1/8	0.036	<0.010	-0.013	d	[d]
Potassium	7/8	2.4	<1.0	-1.6	d	[d]
Silicon	8/8	10	3.8	7.1	d	[d]
Sodium	8/8	220	4.0	55	d	[d]
Vanadium	3/8	0.022	<0.0020	-0.0046	d	[d]
Zinc	4/8	0.0078	<0.0050	-0.0057	5	0[3]
Metals, unfiltered (mg/L)						
Aluminum, total	3/8	1.9	<0.050	-0.47	0.2	2[3]
Arsenic, total	1/8	0.036	<0.010	-0.013	0.05	0[1]
Barium, total	8/8	0.86	0.046	0.28	2	0[2]
Boron, total	3/8	1.1	<0.080	-0.22	d	[d]
Calcium, total	8/8	130	1.2	62	d	[d]
Chromium, total	3/8	0.91	<0.0040	-0.12	0.05	1[1]
Cobalt, total	1/8	0.0084	<0.0040	-0.0046	d	[d]
Iron, total	8/8	20	0.053	6.9	0.3	6[3]
Magnesium, total	8/8	18	0.32	8.4	d	[d]
Manganese, total	8/8	0.94	0.0047	0.20	0.05	5[3]
Nickel, total	2/8	0.085	<0.010	-0.019	d	[d]
Potassium, total	6/8	2.2	<1.0	-1.6	d	[d]
Selenium, total	1/8	0.0050	<0.0050	-0.0050	0.01	0[1]
Silicon, total	8/8	12	3.8	7.8	d	[d]
Sodium, total	8/8	210	3.9	52	d	[d]
Vanadium, total	2/8	0.022	<0.0020	-0.0045	d	[d]
Zinc, total	7/8	0.027	<0.0050	-0.014	5	0[3]
Others, filtered						
Alkalinity (mg/L)	8/8	470	110	300	d	[d]
Total dissolved solids (mg/L)	8/8	570	140	360	500	1[1]
Others, unfiltered						
Alkalinity (mg/L)	8/8	480	110	300	d	[d]
Ammonia (mg/L)	8/8	9.5	0.070	1.3	d	[d]
Total organic carbon (mg/L)	8/8	4.9	0.55	1.5	d	[d]

Table 7.61 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
<b>Others, unfiltered</b>						
Total organic halides (µg/L)	1/8	<5.3	<5.0	-5.0	d	[d]
Total suspended solids (mg/L)	4/8	100	<5.0	-28	d	[d]
<b>Radionuclides, filtered (pCi/L)*</b>						
Co-60	1/8	8.6*	0.27	2.4*	200	0[4]
Gross alpha	4/8	18*	0.41	4.5*	15	1[2]
Gross beta	7/8	1,500*	1.6	200	50	1[2]
H-3	7/8	190,000*	-430	50,000*	20,000	3[2]
Total rad Sr	4/8	840*	0.38	110	8	1[2]
<b>Radionuclides, unfiltered (pCi/L)*</b>						
Co-60	1/8	5.4*	-0.27	1.7*	200	0[4]
Gross alpha	7/8	10*	-0.27	5.2*	15	0[2]
Gross beta	8/8	1,400*	4.9*	190	50	1[2]
H-3	7/8	190,000*	-140	50,000	20,000	3[2]
Total rad Sr	3/8	840*	-0.41	110	8	1[2]
<b>Upgradient Wells</b>						
<b>Anions, unfiltered (mg/L)</b>						
Chloride	5/12	4.5	<2.0	-2.6	250	0[3]
Fluoride	6/12	0.30	<0.10	-0.16	4	0[2]
Nitrate	2/12	11	<1.0	-1.8	10	1[2]
Phosphate	5/12	1.3	<1.0	-1.1	d	[d]
Sulfate, as SO <sub>4</sub>	9/12	97	<10	-36	250	0[3]
<b>Base neutral/acid extractable organics, unfiltered (µg/L)</b>						
Benzyl butyl phthalate	5/12	U10	B2.0	-6.8	d	[d]
Bis(2-ethylhexyl) phthalate	3/12	U10	B3.0	-8.7	d	[d]
Diethyl phthalate	1/12	U10	J4.0	-9.5	d	[d]
<b>Field measurements, unfiltered</b>						
Conductivity (mS/cm)	12/12	0.70	0.27	0.53	d	[d]
Dissolved oxygen (mg/L)	12/12	11	7.7	9.8	d	[d]
Redox (mV)	12/12	630	320	500	d	[d]
Temperature (°C)	12/12	14	11	13	30.5	0[1]
Turbidity (JTU)	12/12	110	6.3	25	1	12[2]
pH (SU)	12/12	9.4	6.6	7.6	(6.5, 8.5)	1[3]
<b>Metals, filtered (mg/L)</b>						
Aluminum	1/12	0.052	<0.050	-0.050	0.2	0[3]
Antimony	3/12	0.0070	<0.0050	-0.0054	d	[d]
Barium	12/12	0.51	0.041	0.18	2	0[2]
Boron	7/12	0.88	<0.080	-0.21	d	[d]
Calcium	12/12	130	0.93	59	d	[d]
Cobalt	2/12	0.021	<0.0040	-0.0056	d	[d]
Iron	5/12	3.8	<0.050	-0.40	0.3	2[3]
Magnesium	12/12	28	0.27	13	d	[d]
Manganese	12/12	11	0.0029	1.1	0.05	5[3]
Nickel	1/12	0.022	<0.010	-0.011	d	[d]
Potassium	11/12	7.1	<1.0	-2.7	d	[d]
Silicon	12/12	10	3.0	7.1	d	[d]
Sodium	12/12	190	4.7	48	d	[d]
Vanadium	6/12	0.0032	<0.0020	-0.0023	d	[d]
Zinc	5/12	0.014	<0.0050	-0.0068	5	0[3]
<b>Metals, unfiltered (mg/L)</b>						
Aluminum, total	5/12	0.17	<0.050	-0.072	0.2	0[3]
Barium, total	12/12	0.50	0.042	0.19	2	0[2]
Boron, total	7/12	0.87	<0.080	-0.22	d	[d]
Calcium, total	12/12	110	0.91	55	d	[d]
Cobalt, total	2/12	0.018	<0.0040	-0.0054	d	[d]
Iron, total	9/12	3.9	<0.050	-0.49	0.3	3[3]

Table 7.61 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Number of values	
					Reference value	exceeding reference [ref] <sup>c</sup>
Metals, unfiltered (mg/L)						
Magnesium, total	12/12	24	0.26	12	d	[d]
Manganese, total	12/12	10	0.0041	1.0	0.05	7[3]
Nickel, total	1/12	0.023	<0.010	-0.011	d	[d]
Potassium, total	12/12	7.3	1.0	2.8	d	[d]
Silicon, total	12/12	11	3.2	7.1	d	[d]
Sodium, total	12/12	180	4.3	46	d	[d]
Zinc, total	12/12	0.16	0.0075	0.026	5	0[3]
Others, filtered						
Alkalinity (mg/L)	12/12	400	130	270	d	[d]
Total dissolved solids (mg/L)	12/12	470	170	340	500	0[1]
Others, unfiltered						
Alkalinity (mg/L)	12/12	390	130	270	d	[d]
Ammonia (mg/L)	12/12	0.45	0.10	0.18	d	[d]
Total organic carbon (mg/L)	11/12	2.0	<0.50	-1.0	d	[d]
Total organic halides (µg/L)	1/12	9.5	<5.0	-5.4	d	[d]
Total suspended solids (mg/L)	4/12	20	<5.0	-7.1	d	[d]
Radionuclides, filtered (pCi/L)*						
Co-60	2/12	250*	-5.7	21	200	1[4]
Gross alpha	11/12	12*	0.97	4.2*	15	0[2]
Gross beta	11/12	700*	2.4	91	50	2[2]
H-3	11/12	240,000*	-300	24,000	20,000	2[2]
Total rad Sr	4/12	3.8*	-0.73	1.1*	8	0[2]
Radionuclides, unfiltered (pCi/L)*						
Co-60	2/12	270*	-2.7	23	200	1[4]
Cs-137	2/12	3.8*	-5.1	0.023	120	0[4]
Gross alpha	10/12	9.7*	0.30	2.9*	15	0[2]
Gross beta	12/12	840*	5.4*	92	50	2[2]
H-3	11/12	240,000*	-540	24,000	20,000	2[2]
Total rad Sr	6/12	5.9*	0.081	2.3*	8	0[2]
Volatile organics, unfiltered (µg/L)						
Acetone	1/12	83	U10	-16	d	[d]
Carbon disulfide	1/12	35	U5.0	-7.5	d	[d]

\*Prefix '<' indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; 'J' indicates the value was estimated at or below the analytical detection limit by the laboratory; 'B' indicates the compound was found in the laboratory blank; 'JB' indicates the value was estimated at or below the analytical detection limit and was found in the laboratory blank; and 'U' indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>c</sup>If a reference limit exists, the source is coded as:

1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.

2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.

3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.

4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

\*Not applicable.

\*Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

Table 7.62. Constituents in Waste Area Grouping (WAG) 3 groundwater at ORNL,  
October 22–November 12, 1993

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Downgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	10/10	330	2.1	73	250	2[3]
Fluoride	1/10	0.50	<0.10	-0.14	4	0[2]
Nitrate	3/10	2.2	<1.0	-1.1	10	0[2]
Sulfate, as SO <sub>4</sub>	10/10	80	3.0	35	250	0[3]
Field measurements, unfiltered						
Conductivity (mS/cm)	10/10	1.8	0.59	0.96	d	[d]
Dissolved oxygen (mg/L)	10/10	14	11	12	d	[d]
Temperature (°C)	10/10	16	13	14	30.5	0[1]
Turbidity (NTU)	10/10	15	0	3.6	1	7[2]
pH (SU)	10/10	8.0	6.6	7.2	(6.5, 8.5)	0[3]
Metals, unfiltered (mg/L)						
Aluminum, total	2/10	0.58	<0.050	-0.10	0.2	1[3]
Barium, total	10/10	0.79	0.043	0.20	2	0[2]
Boron, total	8/10	1.1	<0.080	-0.31	d	[d]
Calcium, total	10/10	160	42	110	d	[d]
Chromium, total	2/10	0.0091	<0.0040	-0.0050	0.05	0[1]
Copper, total	1/10	0.010	<0.0070	-0.0073	1.3	0[2]
Iron, total	7/10	2.4	<0.050	-0.60	0.3	6[3]
Magnesium, total	10/10	50	6.8	26	d	[d]
Manganese, total	10/10	0.85	0.0014	0.17	0.05	4[3]
Nickel, total	2/10	0.14	<0.010	-0.023	d	[d]
Potassium, total	9/10	11	1.8	-3.6	d	[d]
Silicon, total	10/10	8.3	4.1	6.0	d	[d]
Sodium, total	10/10	100	5.4	37	d	[d]
Vanadium, total	5/10	0.0030	<0.0020	-0.0024	d	[d]
Zinc, total	8/10	0.012	<0.0050	-0.0078	5	0[3]
Others, unfiltered						
Alkalinity (mg/L)	10/10	440	240	330	d	[d]
Total organic carbon (mg/L)	10/10	6.4	0.50	1.9	d	[d]
Total organic halides (µg/L)	5/10	77	<5.0	-21	d	[d]
Total suspended solids (mg/L)	2/10	13	<5.0	-5.9	d	[d]
Radionuclides, filtered (pCi/L)*						
Co-60	3/10	4.6*	-1.4	1.6*	200	0[4]
Cs-137	2/10	6.8*	-1.1	1.9*	120	0[4]
Gross alpha	5/10	15*	-0.57	4.0*	15	0[2]
Gross beta	10/10	1,300*	3.2*	190	50	4[2]
H-3	9/10	27,000*	160	3,600	20,000	1[2]
Total rad Sr	7/10	730*	1.6	100	8	4[2]
Radionuclides, unfiltered (pCi/L)*						
Cs-137	1/10	3.5*	-1.9	0.89	120	0[4]
Gross alpha	7/10	11*	-0.70	3.4*	15	0[2]
Gross beta	10/10	1,600*	4.6*	230	50	4[2]
H-3	10/10	30,000*	700*	4,000	20,000	1[2]
Total rad Sr	6/10	680*	0.59	97	8	4[2]
Volatile organics, unfiltered (µg/L)						
1,2-Dichloroethene	2/10	16	0.5	-6.1	70	0[2]
Trichloroethene	1/10	11	0.5	-5.6	5	1[1]
Upgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	3/3	1.8	1.3	1.6	250	0[3]
Sulfate, as SO <sub>4</sub>	3/3	16	6.7	9.9	250	0[3]

Table 7.62 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Field measurements, unfiltered						
Conductivity (mS/cm)	3/3	0.68	0.34	0.55	d	[d]
Dissolved oxygen (mg/L)	3/3	13	12	12	d	[d]
Temperature (°C)	3/3	15	13	14	30.5	0[1]
Turbidity (NTU)	3/3	38	10	25	1	3[2]
pH (SU)	3/3	7.2	6.5	7.0	(6.5, 8.5)	1[3]
Metals, unfiltered (mg/L)						
Aluminum, total	2/3	0.57	<0.050	-0.24	0.2	1[3]
Barium, total	3/3	0.042	0.021	0.030	2	0[2]
Calcium, total	3/3	120	59	93	d	[d]
Iron, total	3/3	1.2	0.12	0.77	0.3	2[3]
Magnesium, total	3/3	14	2.8	7.9	d	[d]
Manganese, total	3/3	0.086	0.0020	0.055	0.05	2[3]
Potassium, total	2/3	<2.0	1.6	-1.8	d	[d]
Silicon, total	3/3	5.8	3.4	4.6	d	[d]
Sodium, total	3/3	2.7	2.0	2.3	d	[d]
Vanadium, total	3/3	0.0024	0.0023	0.0024	d	[d]
Zinc, total	3/3	0.015	0.0053	0.010	5	0[3]
Others, unfiltered						
Alkalinity (mg/L)	3/3	370	150	280	d	[d]
Total organic carbon (mg/L)	3/3	1.7	0.50	1.2	d	[d]
Total suspended solids (mg/L)	2/3	8.0	<5.0	-6.7	d	[d]
Radionuclides, filtered (pCi/L)*						
Gross alpha	2/3	4.9*	0.89	2.8	15	0[2]
Gross beta	1/3	10*	2.2	5.0	50	0[2]
H-3	3/3	1,200*	570*	910*	20,000	0[2]
Radionuclides, unfiltered (pCi/L)*						
Gross alpha	1/3	2.7*	0.78	1.7*	15	0[2]
Gross beta	1/3	3.2*	0.84	1.7	50	0[2]
H-3	3/3	1,400*	730*	1,100*	20,000	0[2]

\*Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>c</sup>If a reference limit exists, the source is coded as:

- 1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.
- 2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.
- 3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.
- 4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

<sup>d</sup>Not applicable.

\*Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.



Table 7.63. Constituents in Waste Area Grouping (WAG) 5 groundwater at ORNL, April 5-30, 1993

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Downgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	14/20	27	0.10	-6.6	250	0[3]
Sulfate, as SO <sub>4</sub>	11/20	280	<10	-45	250	1[3]
Base neutral/acid extractable organics, unfiltered (µg/L)						
Bis(2-ethylhexyl) phthalate	5/20	YB3,100	U10	-170	d	{d}
Field measurements, unfiltered						
Conductivity (mS/cm)	20/20	1.3	0.46	0.86	d	{d}
Dissolved oxygen (mg/L)	20/20	15	8.6	11	d	{d}
Redox (mV)	20/20	670	320	470	d	{d}
Temperature (°C)	20/20	15	12	14	30.5	0[1]
Turbidity (JTU)	20/20	490	1.0	56	1	19[2]
pH (SU)	20/20	9.0	6.2	7.2	(6.5, 8.5)	2[3]
Metals, filtered (mg/L)						
Aluminum	13/20	0.49	U0.019	-0.064	0.2	17[3]
Antimony	1/20	U0.019	U0.0050	-0.017	d	{d}
Arsenic	1/20	U0.0035	U0.0015	-0.0025	0.05	0[1]
Barium	20/20	0.89	B0.019	0.27	2	0[2]
Beryllium	4/20	U0.0020	U0.00030	-0.00056	d	{d}
Boron	20/20	1.5	B0.031	0.19	d	{d}
Calcium	20/20	180	B2.4	96	d	{d}
Copper	6/20	U0.010	U0.0027	-0.0043	1.3	0[2]
Iron	19/20	1.2	B0.0089	-0.30	0.3	6[3]
Lead	16/20	0.0051	U0.0012	-0.0026	0.015	0[2]
Magnesium	20/20	37	B0.95	18	d	{d}
Manganese	20/20	1.3	B0.0010	0.21	0.05	12[3]
Mercury	1/20	U0.00020	U0.00010	-0.00012	0.002	0[1]
Nickel	5/20	B0.028	U0.0042	-0.0078	d	{d}
Potassium	20/20	8.2	B0.91	2.2	d	{d}
Silicon	20/20	14	1.8	8.4	d	{d}
Sodium	20/20	130	B4.1	22	d	{d}
Vanadium	1/20	U0.010	U0.0021	-0.0033	d	{d}
Zinc	5/20	B0.018	U0.0048	-0.0065	5	0[3]
Metals, unfiltered (mg/L)						
Aluminum, total	19/20	1.9	U0.019	-0.33	0.2	15[3]
Arsenic, total	2/20	U0.0075	U0.0020	-0.0029	0.05	0[1]
Barium, total	20/20	0.98	B0.019	0.28	2	0[2]

Table 7.63 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
<b>Metals, unfiltered (mg/L)</b>						
Beryllium, total	1/20	U0.0020	U0.00030	-0.00056	d	[d]
Boron, total	20/20	1.5	B0.030	0.19	d	[d]
Calcium, total	20/20	180	B2.8	97	d	[d]
Chromium, total	1/20	0.015	U0.0033	-0.0049	0.05	0[1]
Copper, total	8/20	U0.010	U0.0027	-0.0050	1.3	0[2]
Iron, total	20/20	2.0	B0.031	0.59	0.3	9[3]
Lead, total	14/20	0.0049	U0.0012	-0.0024	0.015	0[2]
Magnesium, total	20/20	36	B1.1	18	d	[d]
Manganese, total	20/20	1.3	B0.0035	0.24	0.05	12[3]
Mercury, total	5/20	0.00042	U0.00010	-0.00014	0.002	0[1]
Nickel, total	7/20	B0.022	U0.0042	-0.0081	d	[d]
Potassium, total	20/20	8.1	B0.92	2.3	d	[d]
Selenium, total	1/20	U0.018	U0.0020	-0.0058	0.01	4[1]
Silicon, total	20/20	14	1.9	8.7	d	[d]
Sodium, total	20/20	130	B4.2	22	d	[d]
Thallium, total	1/20	B0.013	U0.0012	-0.0034	d	[d]
Vanadium, total	2/20	U0.010	U0.0021	-0.0033	d	[d]
Zinc, total	6/20	0.050	U0.0048	-0.0085	5	0[3]
<b>Others, filtered</b>						
Alkalinity (mg/L)	20/20	550	150	320	d	[d]
Total dissolved solids (mg/L)	20/20	750	220	420	500	6[1]
<b>Others, unfiltered</b>						
Alkalinity (mg/L)	20/20	560	150	320	d	[d]
Cyanide, total (µg/L)	1/20	0.000049	U0.0000020	-0.000011	d	[d]
Nitrogen, total Kjeldahl (mg/L)	16/20	0.68	U0.010	-0.26	d	[d]
Phenolics, total recoverable (mg/L)	2/20	0.014	<0.0010	-0.0017	d	[d]
Total organic carbon (mg/L)	19/20	4.6	<0.50	-1.3	d	[d]
Total organic halides (µg/L)	5/20	1,200	<5.0	-77	d	[d]
Total suspended solids (mg/L)	9/20	440	2.0	-48	d	[d]
<b>Radionuclides, filtered (pCi/L)*</b>						
Am-241	7/20	0.51*	-0.19	0.071*	1.2	0[4]
C-14	9/20	2,700*	-220	490*	101	0[4]
Cm-244	7/20	16*	-0.15	1.6	2.4	2[4]
Co-60	3/20	24*	-4.1	2.4	200	0[4]
CS-137	2/20	8.4*	-1.6	1.4*	120	0[4]
Gross alpha	9/20	27*	-1.8	3.5*	15	2[2]
Gross beta	14/20	510*	-0.16	71*	50	3[2]
H-3	16/20	270,000,000*	-3,500	20,000,000	20,000	13[2]

Table 7.63 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
<b>Radionuclides, filtered (pCi/L)*</b>						
Pu-238	3/20	0.54	-0.068	0.091*	1.6	0(4)
Pu-239	2/20	0.13*	-0.20	-0.047	1.2	0(4)
Total rad Sr	8/20	510*	-1.1	41	8	5(2)
U-234	19/20	0.68*	0.035	0.42*	20	0(4)
U-235	8/20	0.30*	-0.10	0.089*	24	0(4)
U-238	11/20	0.27*	-0.027	0.12*	24	0(4)
<b>Radionuclides, unfiltered (pCi/L)*</b>						
Am-241	5/20	1.6*	-0.22	0.12	1.2	1(4)
C-14	8/16	2,500*	-270	520*	101	0(4)
Cm-244	9/20	18*	-0.22	1.6	2.4	2(4)
Co-60	4/20	32*	-2.4	3.4*	200	0(4)
Cs-137	1/20	5.1	-4.1	0.88*	120	0(4)
Gross alpha	7/20	25*	-0.76	3.0*	15	2(2)
Gross beta	14/20	970*	0.46	100*	50	4(2)
H-3	16/20	270,000,000*	-3,800	19,000,000	20,000	13(2)
Pu-238	3/20	0.57*	-0.16	0.055	1.6	0(4)
Total rad Sr	10/20	540*	-0.59	42	8	5(2)
U-234	19/20	1.4*	0.024	0.58*	20	0(4)
U-235	8/20	0.32*	-0.030	0.10*	24	0(4)
U-238	13/20	0.41*	-0.012	0.13*	24	0(4)
<b>Volatile organics, unfiltered (µg/L)</b>						
1,1,1-Trichloroethane	1/20	U5.0	J1.0	-4.8	200	0(1)
1,1-Dichloroethane	4/20	U5.0	J1.0	-4.5	d	(d)
1,1-Dichloroethene	1/20	5.0	U5.0	-5.0	7	0(1)
1,2-Dichloroethene	5/20	Y3,300	J2.0	~180	70	1(2)
Acetone	1/20	12	U10	~10	d	(d)
Benzene	1/20	25	U5.0	~6.0	5	1(1)
Methylene chloride	2/20	JB5.0	U5.0	-5.0	d	(d)
Tetrachloroethene	1/20	U5.0	J1.7	-4.8	5	0(2)
Trichloroethene	5/20	38	J2.0	-7.6	5	3(1)
Vinyl chloride	4/20	Y2,700	J4.7	~150	2	20(1)
Xylene, total	1/20	U5.0	J2.0	-4.9	10,000	0(2)
<b>Upgradient Wells</b>						
<b>Anions, unfiltered (mg/L)</b>						
Chloride	1/2	<2.0	0.20	-1.1	250	0(3)
Phosphate	1/2	<3.0	1.2	-2.1	d	(d)
Sulfate, as SO <sub>4</sub>	2/2	15	15	15	250	0(3)

Table 7.63 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
<b>Field measurements, unfiltered</b>						
Conductivity (mS/cm)	2/2	0.59	0.49	0.54	d	[d]
Dissolved oxygen (mg/L)	2/2	9.4	8.3	8.9	d	[d]
Redox (mV)	2/2	570	530	550	d	[d]
Temperature (°C)	2/2	14	12	13	30.5	0[1]
Turbidity (JTU)	2/2	11	10	11	1	2[2]
pH (SU)	2/2	7.4	6.8	7.1	(6.5, 8.5)	0[3]
<b>Metals, filtered (mg/L)</b>						
Aluminum	1/2	B0.11	U0.019	~0.066	0.2	1[3]
Barium	2/2	B0.14	B0.14	0.14	2	0[2]
Boron	2/2	B0.029	B0.022	0.025	d	[d]
Calcium	2/2	74	70	72	d	[d]
Iron	1/2	B0.076	U0.0084	~0.042	0.3	0[3]
Lead	2/2	B0.0026	B0.0014	0.0020	0.015	0[2]
Magnesium	2/2	12	B2.8	7.3	d	[d]
Manganese	2/2	0.027	B0.0030	0.015	0.05	0[3]
Potassium	2/2	B1.1	B0.52	0.83	d	[d]
Silicon	2/2	12	7.5	9.8	d	[d]
Sodium	2/2	7.4	5.9	6.6	d	[d]
<b>Metals, unfiltered (mg/L)</b>						
Aluminum, total	2/2	0.41	B0.052	0.23	0.2	1[3]
Barium, total	2/2	B0.15	B0.14	0.14	2	0[2]
Boron, total	2/2	B0.046	B0.025	0.035	d	[d]
Calcium, total	2/2	73	72	73	d	[d]
Iron, total	2/2	0.57	B0.018	0.29	0.3	1[3]
Lead, total	2/2	0.0044	B0.0026	0.0035	0.015	0[2]
Magnesium, total	2/2	12	B3.0	7.2	d	[d]
Manganese, total	2/2	0.077	B0.0048	0.041	0.05	1[3]
Nickel, total	1/2	B0.0045	U0.0042	~0.0044	d	[d]
Potassium, total	2/2	B1.2	B0.48	0.86	d	[d]
Silicon, total	2/2	13	7.7	10	d	[d]
Sodium, total	2/2	7.3	6.1	6.7	d	[d]
<b>Others, filtered</b>						
Alkalinity (mg/L)	2/2	230	210	220	d	[d]
Total dissolved solids (mg/L)	2/2	270	240	260	500	0[1]
<b>Others, unfiltered</b>						
Alkalinity (mg/L)	2/2	230	210	220	d	[d]
Nitrogen, total Kjeldahl (mg/L)	2/2	0.38	0.21	0.30	d	[d]

Table 7.63 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
<b>Others, unfiltered</b>						
Total organic carbon (mg/L)	2/2	0.73	0.73	0.73	d	(d)
Total organic halides (µg/L)	1/2	<5.3	<5.0	-5.1	d	(d)
Total suspended solids (mg/L)	1/2	55	<5.0	-30	d	(d)
<b>Radionuclides, filtered (pCi/L)*</b>						
Am-241	1/2	0.070*	0.046	0.058	1.2	0(4)
Co-60	1/2	5.7*	-2.4	1.6	200	0(4)
Gross beta	1/2	4.6*	-0.054	2.3	50	0(2)
H-3	2/2	1,400*	1,200*	1,300*	20,000	0(2)
Total rad Sr	1/2	1.2*	-0.32	0.46	8	0(2)
U-234	2/2	0.70*	0.59*	0.65*	20	0(4)
U-238	1/2	0.14*	0.070	0.11	24	0(4)
<b>Radionuclides, unfiltered (pCi/L)*</b>						
Gross alpha	1/2	1.4*	0.89	1.1	15	0(2)
H-3	2/2	1,100*	950*	1,000*	20,000	0(2)
Total rad Sr	1/2	1.1*	0.27	0.68	8	0(2)
U-234	2/2	0.51*	0.38*	0.45*	20	0(4)
U-235	1/2	0.15*	0.057	0.11	24	0(4)
U-238	1/2	0.15*	0.051	0.099	24	0(4)

\*Prefix "<" indicates the value for a parameter (excluding metals and organics) was not quantifiable at the analytical detection limit; "J" indicates the value was estimated at or below the analytical detection limit by the laboratory; "B" indicates the compound was found in the laboratory blank; "JB" indicates the value was estimated at or below the analytical detection limit and was found in the laboratory blank; "Y" indicates the value exceeded the calibration range and the sample was diluted and reanalyzed; and "U" indicates the value for a parameter was undetected at the analytical detection limit.

<sup>a</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>b</sup>If a reference limit exists, the source is coded as:

1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.

2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.

3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.

4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

<sup>c</sup>Not applicable.

\*Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

**Table 7.64. Constituents in Waste Area Grouping (WAG) 6 groundwater at ORNL,  
February 18–March 29, May 6–14, August 9–September 24, and  
November 16–23, 1993**

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference	Number of values
					value	exceeding reference [ref] <sup>c</sup>
Downgradient Wells						
Field measurements, unfiltered						
Conductivity (mS/cm)	50/50	1.3	0.020	0.59	d	[d]
Dissolved oxygen (mg/L)	50/50	18	2.1	11	d	[d]
Redox (mV)	42/42	780	300	480	d	[d]
Temperature (°C)	50/50	19	11	15	30.5	0[1]
Turbidity (NTU)	50/50	550	0	37	1	38[2]
pH (SU)	50/50	7.6	5.1	6.8	(6.5, 8.5)	8[3]
Others, unfiltered						
Alkalinity (mg/L)	41/42	500	<1.0	-240	d	[d]
Radionuclides, filtered (pCi/L) <sup>*</sup>						
Co-60	14/50	410*	-7.8	26*	200	3[4]
Cs-137	10/50	8.9*	-5.4	2.2*	120	0[4]
Gross alpha	14/50	10*	-0.46	1.6*	15	[2]
Gross beta	16/25	260*	-0.16	23*	50	[1]
H-3	47/50	2,300,000*	350	280,000*	80,000	21[4]
Total rad Sr	13/50	4.9*	-2.2	1.1*	40	0[4]
Volatile organics, unfiltered (µg/L)						
1,1,1-Trichloroethane	1/50	U5.0	J2.0	-4.9	200	0[1]
1,1-Dichloroethane	1/50	U5.0	J2.2	-4.9	d	[d]
1,2-Dichloroethane	4/50	11	U5.0	-5.2	5	3[1]
1,2-Dichloroethene	7/50	7.9	J3.0	-5.0	70	0[2]
Acetone	1/50	35	U10	-11	d	[d]
Carbon disulfide	2/50	14	J3.0	-5.1	d	[d]
Carbon tetrachloride	4/50	34	U5.0	-7.1	5	4[1]
Chloroform	8/50	39	J1.0	-7.0	100	0[2]
Methylene chloride	1/50	U5.0	JB3.1	-5.0	d	[d]
Tetrachloroethene	1/50	U5.0	J2.1	-4.9	5	0[2]
Trichloroethene	7/50	Y160	J3.0	-17	5	4[1]
Upgradient Wells						
Field measurements, unfiltered						
Conductivity (mS/cm)	14/14	1.1	0.010	0.50	d	[d]
Dissolved oxygen (mg/L)	14/14	15	8.0	11	d	[d]
Redox (mV)	14/14	660	380	560	d	[d]
Temperature (°C)	14/14	16	12	14	30.5	0[1]
Turbidity (NTU)	14/14	190	2.0	49	1	14[2]
pH (SU)	14/14	8.3	5.0	7.2	(6.5, 8.5)	2[3]
Others, unfiltered						
Alkalinity (mg/L)	14/14	430	7.5	200	d	[d]
Radionuclides, filtered (pCi/L) <sup>*</sup>						
Co-60	1/14	6.5*	-2.2	1.4*	200	0[4]
Cs-137	3/14	13*	-1.1	2.2*	120	0[4]
Gross alpha	6/14	3.5*	-0.73	1.1*	d	[d]
Gross beta	4/7	9.2*	1.1	3.7*	d	[d]
H-3	11/14	3,200*	270	1,600*	80,000	0[4]
Total rad Sr	3/14	3.8*	-1.0	0.71*	40	0[4]

Table 7.64 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Volatile organics, unfiltered (µg/L)						
Carbon disulfide	2/14	J5.0	J1.3	-4.7	d	[d]
Methylene chloride	1/14	U5.0	2.3	-4.8	d	[d]

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; "J" indicates the value was estimated at or below the analytical detection limit by the laboratory; "JB" indicates the value was estimated at or below the analytical detection limit and was found in the laboratory blank; "Y" indicates the value exceeded the calibration range and the sample was diluted and reanalyzed; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>c</sup>If a reference limit exists, the source is coded as:

1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.

2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.

3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.

4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

<sup>d</sup>Not applicable.

\*Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

Table 7.65. Constituents in Waste Area Grouping (WAG) 7 groundwater at ORNL,  
July 14–August 13, 1993

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Downgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	9/13	80	<2.0	~14	250	0[3]
Fluoride	3/13	3.8	<0.10	-0.49	4	0[2]
Nitrate	4/13	96	<1.0	-13	10	2[2]
Sulfate, as SO <sub>4</sub>	13/13	780	10	-170	250	2[3]
Base neutral/acid extractable organics, unfiltered (µg/L)						
Benzyl butyl phthalate	5/13	B6.0	JB1.0	-4.2	d	[d]
Diethyl phthalate	3/13	U5.0	JB2.0	-4.3	d	[d]
Field measurements, unfiltered						
Conductivity (mS/cm)	13/13	3.7	0.42	1.1	d	[d]
Dissolved oxygen (mg/L)	13/13	14	9.6	12	d	[d]
Redox (mV)	13/13	590	130	380	d	[d]
Temperature (°C)	13/13	19	14	15	30.5	0[1]
Turbidity (NTU)	13/13	320	5.0	100	1	13[2]
pH (SU)	13/13	8.7	6.9	7.6	(6.5, 8.5)	2[3]
Metals, unfiltered (mg/L)						
Aluminum, total	10/13	7.5	<0.050	-1.1	0.2	7[3]
Barium, total	13/13	0.21	0.027	0.11	2	0[2]
Boron, total	4/13	0.42	<0.080	~0.15	d	[d]
Calcium, total	13/13	340	3.3	85	d	[d]
Chromium, total	2/13	0.0090	<0.0040	-0.0047	0.05	0[1]
Cobalt, total	3/13	0.030	<0.0040	-0.0076	d	[d]
Copper, total	1/13	0.0081	<0.0070	-0.0071	1.3	0[2]
Iron, total	13/13	14	0.077	1.8	0.3	9[3]
Lead, total	1/13	0.025	<0.020	-0.020	0.015	13[2]
Magnesium, total	13/13	200	0.90	35	d	[d]
Manganese, total	13/13	1.3	0.0073	0.21	0.05	6[3]
Mercury, total	10/13	0.00014	<0.000050	-0.00010	0.002	0[1]
Nickel, total	5/13	0.36	<0.010	-0.048	d	[d]
Potassium, total	13/13	8.0	1.0	3.0	d	[d]
Silicon, total	13/13	17	4.8	8.2	d	[d]
Sodium, total	13/13	620	3.6	120	d	[d]
Vanadium, total	3/13	0.010	<0.0020	-0.0029	d	[d]
Zinc, total	8/13	0.028	<0.0050	-0.0087	5	0[3]
Others, unfiltered						
Alkalinity (mg/L)	13/13	660	70	300	d	[d]
Total organic carbon (mg/L)	8/13	2.5	<0.50	-0.92	d	[d]
Total organic halides (µg/L)	8/13	64	<5.0	-16	d	[d]
Total suspended solids (mg/L)	9/13	360	<5.0	-51	d	[d]
Radionuclides, filtered (pCi/L)*						
Am-241	1/1	0.22*	0.22*	0.22	1.2	0[4]
Co-60	5/13	510*	-1.6	44	200	1[4]
Cs-137	4/13	17*	-2.4	3.7*	120	0[4]
Gross alpha	7/13	160*	-0.73	16	15	1[2]
Gross beta	11/13	4,900*	1.1*	480	50	5[2]
H-3	10/13	1,300,000*	-380	170,000	20,000	4[2]
Pu-239	1/1	0.16*	0.16*	0.16	1.2	0[4]
Th-228	1/1	0.18*	0.18*	0.18	16	0[4]
Th-230	1/1	0.25*	0.25*	0.25	12	0[4]
Total rad Sr	4/13	7.0*	-0.11	1.4*	8	0[2]
U-234	1/1	51*	51*	51	20	1[4]
U-235	1/1	0.73*	0.73*	0.73	24	0[4]
U-238	1/1	5.9*	5.9*	5.9	24	0[4]
Radionuclides, unfiltered (pCi/L)*						
Co-60	5/13	490*	-110	33	200	1[4]
Cs-137	6/13	32	-2.4	6.3*	120	0[4]
Gross alpha	7/13	140*	-2.7	13	15	1[2]
Gross beta	11/13	5,900*	1.6	560	50	4[2]



Table 7.65 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
<b>Radionuclides, unfiltered (pCi/L)*</b>						
H-3	9/13	1,300,000*	-570	170,000	20,000	4[2]
Pu-238	1/1	2.7*	2.7*	2.7	1.6	1[4]
Th-228	1/1	0.17*	0.17*	0.17	16	0[4]
Th-230	1/1	0.14*	0.14*	0.14	12	0[4]
Total rad Sr	3/13	5.4*	-0.51	1.4*	8	0[2]
U-234	1/1	54*	54*	54	20	1[4]
U-235	1/1	1.6*	1.6*	1.6	24	0[4]
U-238	1/1	5.4*	5.4*	5.4	24	0[4]
<b>Volatile organics, unfiltered (µg/L)</b>						
Acetone	1/13	U10	J7.0	-9.8	d	[d]
Carbon disulfide	1/13	11	U5.0	-5.5	d	[d]
Tetrachloroethene	1/13	U5.0	J2.0	-4.8	5	0[2]
Trichloroethene	1/13	U5.0	J2.0	-4.8	5	0[1]
<b>Upgradient Wells</b>						
<b>Anions, unfiltered (mg/L)</b>						
Chloride	2/2	3.5	<H2.0	-2.8	250	0[3]
Fluoride	1/2	1.7	<0.10	-0.90	4	0[2]
Sulfate, as SO <sub>4</sub>	1/2	80	<10	-45	250	0[3]
<b>Field measurements, unfiltered</b>						
Conductivity (mS/cm)	2/2	0.52	0.010	0.27	d	[d]
Dissolved oxygen (mg/L)	2/2	13	11	12	d	[d]
Redox (mV)	2/2	440	390	420	d	[d]
Temperature (°C)	2/2	16	16	16	30.5	0[1]
Turbidity (NTU)	2/2	140	51	93	1	2[2]
pH (SU)	2/2	7.7	6.5	7.1	(6.5, 8.5)	1[3]
<b>Metals, unfiltered (mg/L)</b>						
Aluminum, total	2/2	2.1	0.064	1.1	0.2	1[3]
Barium, total	2/2	0.056	0.052	0.054	2	0[2]
Boron, total	1/2	0.098	<0.080	-0.089	d	[d]
Calcium, total	2/2	38	0.82	20	d	[d]
Chromium, total	1/2	0.0069	<0.0040	-0.0055	0.05	0[1]
Iron, total	2/2	2.8	0.17	1.5	0.3	1[3]
Magnesium, total	2/2	8.0	1.6	4.8	d	[d]
Manganese, total	2/2	0.49	0.035	0.26	0.05	1[3]
Mercury, total	2/2	H0.00010	H0.000091	-0.000096	0.002	0[1]
Potassium, total	2/2	4.5	1.6	3.0	d	[d]
Silicon, total	2/2	11	10	11	d	[d]
Sodium, total	2/2	65	3.4	34	d	[d]
Vanadium, total	1/2	0.0034	<0.0020	-0.0027	d	[d]
Zinc, total	1/2	0.0099	<0.0050	-0.0075	5	0[3]
<b>Others, unfiltered</b>						
Alkalinity (mg/L)	2/2	210	13	110	d	[d]
Total organic carbon (mg/L)	1/2	0.50	<0.50	-0.50	d	[d]
Total organic halides (µg/L)	2/2	33	22	27	d	[d]
Total suspended solids (mg/L)	1/2	73	<5.0	-39	d	[d]
<b>Radionuclides, filtered (pCi/L)*</b>						
Cs-137	2/2	9.5*	6.8*	8.1	120	0[4]
Gross alpha	2/2	3.2*	2.5*	2.9*	15	0[2]
Gross beta	2/2	7.6*	3.5*	5.5	50	0[2]
H-3	1/2	3,800*	890	2,300	20,000	0[2]
<b>Radionuclides, unfiltered (pCi/L)*</b>						
Cs-137	1/2	35*	1.4	18	120	0[4]
Gross alpha	2/2	4.1*	3.0*	3.5*	15	0[2]

Table 7.65 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Radionuclides, unfiltered (pCi/L) <sup>a</sup>						
Gross beta	2/2	13*	5.9*	9.3	50	0[2]
H-3	2/2	16,000*	320*	8,000	20,000	0[2]
Total rad Sr	1/2	1.5*	0.22	0.84	8	0[2]

\*Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; "<H" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit and that the holding time was exceeded by the laboratory; "J" indicates the value was estimated at or below the analytical detection limit by the laboratory; "B" indicates the compound was found in the laboratory blank; "JB" indicates the value was estimated at or below the analytical detection limit and was found in the laboratory blank; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>a</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>b</sup>If a reference limit exists, the source is coded as:

- 1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.
- 2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.
- 3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.
- 4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

<sup>c</sup>Not applicable.

\*Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

Table 7.66. Constituents in Waste Area Groupings (WAGs) 8&9 groundwater at ORNL, September 28–October 15, 1993

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Downgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	9/9	11	3.4	5.7	250	0[3]
Fluoride	6/9	1.9	<0.10	-0.47	4	0[2]
Nitrate	2/9	5.8	<1.0	-1.7	10	0[2]
Sulfate, as SO <sub>4</sub>	9/9	300	11	68	250	1[3]
Base neutral/acid extractable organics, unfiltered (µg/L)						
Benzyl butyl phthalate	3/9	B10	JB2.0	-5.1	d	[d]
Diethyl phthalate	1/9	U5.0	JB1.0	-4.6	d	[d]
Field measurements, unfiltered						
Conductivity (mS/cm)	9/9	0.92	0.26	0.53	d	[d]
Dissolved oxygen (mg/L)	9/9	12	9.0	10	d	[d]
Redox (mV)	8/8	540	260	400	d	[d]
Temperature (°C)	9/9	20	15	17	30.5	0[1]
Turbidity (NTU)	9/9	39	2.0	9.3	1	9[2]
pH (SU)	9/9	9.3	6.2	7.4	(6.5, 8.5)	2[3]
Metals, unfiltered (mg/L)						
Aluminum, total	3/9	2.0	<0.050	-0.31	0.2	2[3]
Arsenic, total	1/9	0.013	<0.010	-0.010	0.05	0[1]
Barium, total	9/9	0.18	0.023	0.096	2	0[2]
Boron, total	4/9	0.70	<0.080	-0.17	d	[d]
Calcium, total	9/9	100	1.3	46	d	[d]
Chromium, total	1/9	0.0054	<0.0040	-0.0042	0.05	0[1]
Cobalt, total	1/9	0.016	<0.0040	-0.0053	d	[d]
Iron, total	8/9	21	<0.050	-3.4	0.3	5[3]
Magnesium, total	9/9	18	0.13	11	d	[d]
Manganese, total	9/9	2.8	0.0024	0.61	0.05	6[3]
Potassium, total	9/9	4.6	1.6	2.7	d	[d]
Silicon, total	9/9	18	2.6	7.6	d	[d]
Sodium, total	9/9	180	4.6	41	d	[d]
Vanadium, total	3/9	0.0036	<0.0020	-0.0024	d	[d]
Zinc, total	2/9	0.015	<0.0050	-0.0063	5	0[3]
Others, unfiltered						
Alkalinity (mg/L)	9/9	350	85	230	d	[d]
Total organic carbon (mg/L)	4/9	1.6	<0.50	-0.67	d	[d]
Total organic halides (µg/L)	3/9	14	<5.0	-7.1	d	[d]
Total suspended solids (mg/L)	2/9	64	<5.0	-14	d	[d]
Radionuclides, filtered (pCi/L)*						
Co-60	2/9	4.9*	-1.6	2.0*	200	0[4]
Cs-137	1/9	4.6*	-0.81	0.86	120	0[4]
Gross alpha	5/9	11*	-0.35	3.4*	15	0[2]
Gross beta	8/9	3,500*	0.81	650	50	3[2]
H-3	7/9	65,000*	140	8,000	20,000	1[2]
Total rad Sr	5/9	1,900*	-0.84	340	8	3[2]
Radionuclides, unfiltered (pCi/L)*						
Co-60	2/9	5.4*	-0.54	2.1*	200	0[4]
Gross alpha	5/9	5.7*	0.24	2.5*	15	0[2]
Gross beta	8/9	3,800*	1.9	650	50	3[2]
H-3	8/9	65,000*	-27	8,000	20,000	1[2]
Total rad Sr	4/9	2,100*	-0.38	350	8	3[2]
Volatile organics, unfiltered (µg/L)						
1,2-Dichloroethene	1/9	11	U5.0	-5.7	70	0[2]
Trichloroethene	1/9	6.3	U5.0	-5.1	5	1[1]
Vinyl chloride	1/9	U10	J1.3	-9.0	2	8[1]

Table 7.66 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Upgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	2/2	4.6	2.8	3.7	250	0[3]
Fluoride	1/2	0.50	<0.10	~0.30	4	0[2]
Sulfate, as SO <sub>4</sub>	2/2	130	25	75	250	0[3]
Field measurements, unfiltered						
Conductivity (mS/cm)	2/2	0.54	0.39	0.46	d	[d]
Dissolved oxygen (mg/L)	2/2	11	11	11	d	[d]
Redox (mV)	2/2	450	310	380	d	[d]
Temperature (°C)	2/2	15	14	15	30.5	0[1]
Turbidity (NTU)	2/2	12	10	11	1	2[2]
pH (SU)	2/2	8.1	6.7	7.4	(6.5, 8.5)	0[3]
Metals, unfiltered (mg/L)						
Aluminum, total	1/2	2.1	<0.050	~1.1	0.2	1[3]
Barium, total	2/2	0.084	0.045	0.065	2	0[2]
Boron, total	1/2	0.31	<0.080	~0.20	d	[d]
Calcium, total	2/2	59	15	37	d	[d]
Chromium, total	1/2	0.0045	<0.0040	~0.0043	0.05	0[1]
Copper, total	1/2	0.012	<0.0070	~0.0095	1.3	0[2]
Iron, total	1/2	9.7	<0.050	~4.9	0.3	1[3]
Magnesium, total	2/2	19	3.3	11	d	[d]
Manganese, total	2/2	3.1	0.041	1.6	0.05	1[3]
Potassium, total	2/2	3.6	3.0	3.3	d	[d]
Silicon, total	2/2	17	5.6	11	d	[d]
Sodium, total	2/2	59	10	35	d	[d]
Vanadium, total	1/2	0.0045	<0.0020	~0.0033	d	[d]
Zinc, total	1/2	0.013	<0.0050	~0.0090	5	0[3]
Others, unfiltered						
Alkalinity (mg/L)	2/2	170	120	150	d	[d]
Total organic carbon (mg/L)	1/2	<0.50	<0.50	~0.50	d	[d]
Total suspended solids (mg/L)	1/2	69	<5.0	~37	d	[d]
Radionuclides, filtered (pCi/L)*						
Gross beta	1/2	5.4*	2.2	3.8	50	0[2]
H-3	2/2	1,200*	700*	930	20,000	0[2]
Radionuclides, unfiltered (pCi/L)*						
Gross beta	2/2	6.5*	4.3*	5.4	50	0[2]
H-3	2/2	1,100*	840*	950*	20,000	0[2]
Volatile organics, unfiltered (µg/L)						
Methylene chloride	1/2	U5.0	J3.6	~4.3	d	[d]

\*Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; "J" indicates the value was estimated at or below the analytical by the laboratory; "B" indicates the compound was found in the laboratory blank; "JB" indicates the value was estimated at or below the analytical detection limit and was found in the laboratory blank; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>c</sup>If a reference limit exists, the source is coded as:

- 1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.
- 2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.
- 3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.
- 4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

\*Not applicable.

\*Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

Table 7.67. Constituents in Waste Area Grouping (WAG) 11 groundwater at ORNL,  
December 18, 1992–January 18, 1993

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Downgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	3/5	2.5	<2.0	-2.1	250	0[3]
Fluoride	2/5	0.30	<0.10	-0.16	4	0[2]
Nitrate	2/5	1.8	<1.0	-1.2	10	0[2]
Phosphate	1/5	1.0	<1.0	-1.0	d	[d]
Sulfate, as SO <sub>4</sub>	2/5	12	<10	-11	250	0[3]
Base neutral/acid extractable organics, unfiltered (µg/L)						
Benzyl butyl phthalate	1/5	U10	81.0	-8.2	d	[d]
Field measurements, unfiltered						
Conductivity (mS/cm)	5/5	0.21	0.040	0.11	d	[d]
Dissolved oxygen (mg/L)	5/5	9.2	6.1	7.2	d	[d]
Redox (mV)	5/5	690	580	630	d	[d]
Temperature (°C)	5/5	14	13	13	30.5	0[1]
Turbidity (JTU)	5/5	350	8.4	160	1	5[2]
pH (SU)	5/5	9.1	6.9	7.7	(6.5, 8.5)	1[3]
Metals, filtered (mg/L)						
Antimony	3/5	0.0060	<0.0050	-0.0054	d	[d]
Barium	5/5	0.13	0.012	0.046	2	0[2]
Calcium	5/5	56	10	34	d	[d]
Magnesium	5/5	18	1.1	8.8	d	[d]
Manganese	2/5	0.0035	<0.0010	-0.0016	0.05	0[3]
Mercury	1/5	<0.000050	<0.000050	-0.000050	0.002	0[1]
Potassium	4/5	3.5	<0.40	-2.1	d	[d]
Silicon	5/5	11	3.4	6.0	d	[d]
Sodium	5/5	11	0.74	2.9	d	[d]
Zinc	1/5	0.0056	<0.0050	-0.0051	5	0[3]
Metals, unfiltered (mg/L)						
Aluminum, total	2/5	1.2	<0.050	-0.51	0.2	2[3]
Barium, total	5/5	0.24	0.020	0.087	2	0[2]
Calcium, total	5/5	48	9.7	30	d	[d]
Iron, total	2/5	2.8	<0.050	-0.88	0.3	2[3]
Magnesium, total	5/5	16	1.3	8.1	d	[d]
Manganese, total	4/5	0.28	<0.0010	-0.069	0.05	2[3]
Mercury, total	1/5	<0.000050	<0.000050	-0.000050	0.002	0[1]
Potassium, total	5/5	3.1	0.85	2.0	d	[d]
Silicon, total	5/5	10	4.5	6.0	d	[d]
Sodium, total	5/5	9.5	0.58	2.6	d	[d]
Vanadium, total	2/5	0.0024	<0.0020	-0.0021	d	[d]
Zinc, total	5/5	0.016	0.0063	0.012	5	0[3]
Others, filtered						
Alkalinity (mg/L)	5/5	200	33	110	d	[d]
Total dissolved solids (mg/L)	5/5	210	68	140	500	0[1]
Others, unfiltered						
Alkalinity (mg/L)	5/5	190	35	110	d	[d]
Total organic carbon (mg/L)	4/5	0.71	<0.50	-0.59	d	[d]
Total organic halides (µg/L)	2/5	29	<5.0	-12	d	[d]
Total suspended solids (mg/L)	2/5	39	<5.0	-13	d	[d]
Radionuclides, filtered (pCi/L)*						
Gross alpha	4/5	5.9*	-0.38	2.5*	15	0[2]
Gross beta	5/5	27*	8.4*	15*	50	0[2]
H-3	1/5	1,400*	-220	160	20,000	0[2]
Total rad Sr	2/5	3.8*	0	1.9*	8	0[2]

Table 7.67 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Radionuclides, unfiltered (pCi/L)*						
Co-60	3/5	12*	-8.4	2.4	200	0[4]
Cs-137	1/5	2.2*	-1.6	0.66	120	0[4]
Gross alpha	3/5	5.4*	0.27	2.6*	15	0[2]
Gross beta	5/5	35*	4.3*	18*	50	0[2]
Total rad Sr	2/5	3.5*	-2.0	1.3	8	0[2]
Volatile organics, unfiltered (µg/L)						
Trichloroethene	2/5	58	U5.0	-18	5	2[1]
Upgradient Wells						
Anions, unfiltered (mg/L)						
Fluoride	4/6	0.20	<0.10	-0.12	4	0[2]
Phosphate	1/6	2.0	<1.0	-1.2	d	[d]
Base neutral/acid extractable organics, unfiltered (µg/L)						
Diethyl phtalate	2/6	B10	B6.0	-9.3	d	[d]
Field measurements, unfiltered						
Conductivity (mS/cm)	6/6	0.27	0.12	0.19	d	[d]
Dissolved oxygen (mg/L)	6/6	9.5	8.0	8.8	d	[d]
Redox (mV)	6/6	660	400	540	d	[d]
Temperature (°C)	6/6	14	12	14	30.5	0[1]
Turbidity (JTU)	6/6	34	6.3	19	1	6[2]
pH (SU)	6/6	9.2	7.3	8.0	(6.5, 8.5)	1[3]
Metals, filtered (mg/L)						
Barium	6/6	0.21	0.035	0.099	2	0[2]
Calcium	6/6	82	27	63	d	[d]
Iron	2/6	0.27	<0.050	-0.10	0.3	0[3]
Magnesium	6/6	15	2.7	10	d	[d]
Manganese	2/6	0.38	<0.0010	-0.088	0.05	2[3]
Mercury	1/6	0.000050	<0.000050	-0.000050	0.002	0[1]
Potassium	6/6	4.3	2.0	2.9	d	[d]
Silicon	6/6	9.3	5.9	7.3	d	[d]
Sodium	6/6	5.4	1.2	2.7	d	[d]
Zinc	1/6	0.065	<0.0050	-0.015	5	0[3]
Metals, unfiltered (mg/L)						
Aluminum, total	3/6	0.40	<0.050	-0.11	0.2	1[3]
Barium, total	6/6	0.21	0.042	0.11	2	0[2]
Calcium, total	6/6	77	26	57	d	[d]
Iron, total	5/6	0.34	<0.050	-0.16	0.3	1[3]
Magnesium, total	6/6	15	2.5	10	d	[d]
Manganese, total	5/6	0.36	<0.0010	-0.087	0.05	2[3]
Potassium, total	6/6	4.1	1.8	2.6	d	[d]
Silicon, total	6/6	8.6	5.7	6.7	d	[d]
Sodium, total	6/6	4.9	1.0	2.4	d	[d]
Zinc, total	5/6	0.0080	<0.0050	-0.0060	5	0[3]
Others, filtered						
Alkalinity (mg/L)	6/6	260	130	190	d	[d]
Total dissolved solids (mg/L)	6/6	260	160	210	500	0[1]
Others, unfiltered						
Alkalinity (mg/L)	6/6	260	130	190	d	[d]
Total organic carbon (mg/L)	4/6	0.83	<0.50	-0.63	d	[d]
Total organic halides (µg/L)	1/6	<5.8	<5.0	-5.1	d	[d]
Total suspended solids (mg/L)	1/6	9.0	<5.0	-5.7	d	[d]
Radionuclides, filtered (pCi/L)*						
Co-60	1/6	4.1*	-6.8	-1.1	200	0[4]
Gross alpha	3/6	7.0*	0.59	2.4*	15	0[2]

Table 7.67 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Radionuclides, filtered (pCi/L)*						
Gross beta	5/6	14*	3.0	7.6*	50	0[2]
H-3	1/6	1,100*	-460	150	20,000	0[2]
Total rad Sr	2/6	7.0*	-2.5	1.5	8	0[2]
Radionuclides, unfiltered (pCi/L)*						
Gross alpha	5/6	9.7*	0.49	3.8*	15	0[2]
Gross beta	5/6	16*	1.4	8.1*	50	0[2]
H-3	1/6	2,500*	-220	590	20,000	0[2]
Total rad Sr	2/6	7.6*	-5.9	1.8	8	0[2]

\*Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; "<H" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit and that the holding time was exceeded by the laboratory; "B" indicates the compound was found in the laboratory blank; "<H" indicates the holding time was exceeded by the laboratory; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>a</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>b</sup>If a reference limit exists, the source is coded as:

1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.

2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.

3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.

4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

<sup>c</sup>Not applicable.

\*Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

Table 7.68. Constituents in Waste Area Grouping (WAG) 17 groundwater at ORNL,  
June 29–July 9, 1993

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Downgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	4/4	15	3.5	8.6	250	0[3]
Fluoride	1/4	0.30	<0.10	-0.15	4	0[2]
Nitrate	1/4	3.5	<1.0	-1.6	10	0[2]
Sulfate, as SO <sub>4</sub>	4/4	50	30	41	250	0[3]
Field measurements, unfiltered						
Conductivity (mS/cm)	4/4	0.81	0.39	0.64	d	[d]
Dissolved oxygen (mg/L)	4/4	13	10	11	d	[d]
Redox (mV)	4/4	310	250	270	d	[d]
Temperature (°C)	4/4	19	15	17	30.5	0[1]
Turbidity (JTU)	4/4	55	6.3	29	1	4[2]
pH (SU)	4/4	7.3	6.9	7.0	(6.5, 8.5)	0[3]
Metals, unfiltered (mg/L)						
Aluminum, total	1/4	0.98	<0.050	-0.28	0.2	1[3]
Barium, total	4/4	0.16	0.031	0.092	2	0[2]
Boron, total	1/4	0.13	<0.080	-0.093	d	[d]
Calcium, total	4/4	120	72	100	d	[d]
Iron, total	2/4	0.98	<0.050	-0.32	0.3	1[3]
Magnesium, total	4/4	36	7.6	25	d	[d]
Manganese, total	4/4	0.17	0.0086	0.058	0.05	1[3]
Mercury, total	4/4	0.00014	0.000052	0.000077	0.002	0[1]
Potassium, total	2/4	2.6	<1.0	-1.6	d	[d]
Silicon, total	4/4	6.5	4.3	5.1	d	[d]
Sodium, total	4/4	12	5.5	8.0	d	[d]
Vanadium, total	1/4	0.0029	<0.0020	-0.0022	d	[d]
Zinc, total	2/4	0.010	<0.0050	-0.0065	5	0[3]
Others, unfiltered						
Alkalinity (mg/L)	4/4	440	190	330	d	[d]
Total organic carbon (mg/L)	4/4	1.4	0.75	1.1	d	[d]
Total organic halides (µg/L)	3/4	11,000	<5.0	-2,700	d	[d]
Total suspended solids (mg/L)	1/4	26	<5.0	-10	d	[d]
Radionuclides, filtered (pCi/L)*						
Co-60	1/4	2.7*	1.1	1.9*	200	0[4]
Gross beta	4/4	5.4*	3.8*	4.5*	50	0[2]
H-3	4/4	5,900*	2,300*	4,600*	20,000	0[2]
Total rad Sr	1/4	3.8*	0.027	1.3	8	0[2]
Radionuclides, unfiltered (pCi/L)*						
Gross alpha	1/4	7.6*	-0.73	2.0	15	0[2]
Gross beta	3/4	8.4*	-0.27	4.7*	50	0[2]
H-3	4/4	5,900*	1,800*	4,300*	20,000	0[2]
Total rad Sr	2/4	4.1*	1.9	2.7*	8	0[2]
Volatile organics, unfiltered (µg/L)						
1,1,1-Trichloroethane	1/4	U5.0	J3.5	-4.6	200	0[1]
1,1-Dichloroethane	1/4	U5.0	J2.0	-4.3	d	[d]
1,1-Dichloroethene	1/4	20	U5.0	-8.8	7	1[1]
1,2-Dichloroethene	2/4	Y3,100	J3.0	-780	70	1[2]
Benzene	1/4	16	U5.0	-7.8	5	1[1]
Chloroform	1/4	U5.0	J3.1	-4.5	100	0[2]
Tetrachloroethene	1/4	18	U5.0	-8.3	5	1[2]
Trichloroethene	2/4	Y9,100	U5.0	-2,300	5	2[1]
Vinyl chloride	1/4	95	U10	-31	2	4[1]



Table 7.68 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Upgradient Wells						
Anions, unfiltered (mg/L)						
Chloride	3/4	11	<2.0	-4.9	250	0[3]
Fluoride	1/4	0.20	<0.10	-0.13	4	0[2]
Anions, unfiltered (mg/L)						
Nitrate	1/4	2.0	<1.0	-1.3	10	0[2]
Sulfate, as SO <sub>4</sub>	4/4	62	15	36	250	0[3]
Field measurements, unfiltered						
Conductivity (mS/cm)	4/4	0.74	0.46	0.63	d	[d]
Dissolved oxygen (mg/L)	4/4	12	12	12	d	[d]
Redox (mV)	4/4	340	260	290	d	[d]
Temperature (°C)	4/4	16	14	15	30.5	0[1]
Turbidity (JTU)	4/4	360	13	140	1	4[2]
pH (SU)	4/4	7.5	6.7	7.2	(6.5, 8.5)	0[3]
Metals, unfiltered (mg/L)						
Aluminum, total	1/4	0.50	<0.050	-0.16	0.2	1[3]
Barium, total	4/4	0.11	0.034	0.076	2	0[2]
Boron, total	2/4	0.16	<0.080	-0.099	d	[d]
Calcium, total	4/4	160	46	100	d	[d]
Iron, total	3/4	0.61	<0.050	-0.19	0.3	1[3]
Magnesium, total	4/4	39	5.6	23	d	[d]
Manganese, total	3/4	0.017	<0.0010	-0.0065	0.05	0[3]
Mercury, total	2/4	0.000067	<0.000050	-0.000059	0.002	0[1]
Potassium, total	3/4	3.3	<1.0	-2.2	d	[d]
Silicon, total	4/4	8.0	3.9	6.1	d	[d]
Sodium, total	4/4	7.3	4.6	6.2	d	[d]
Vanadium, total	1/4	0.0024	<0.0020	-0.0021	d	[d]
Zinc, total	1/4	0.0054	<0.0050	-0.0051	5	0[3]
Others, unfiltered						
Alkalinity (mg/L)	4/4	390	260	330	d	[d]
Total organic carbon (mg/L)	4/4	1.3	0.63	0.90	d	[d]
Total suspended solids (mg/L)	1/4	68	<5.0	-21	d	[d]
Radionuclides, filtered (pCi/L)*						
Co-60	1/4	5.4*	-1.6	1.0	200	0[4]
Cs-137	1/4	5.4*	-1.4	1.8	120	0[4]
Gross alpha	2/4	3.8*	0.32	1.8*	15	0[2]
Gross beta	2/4	7.6*	2.2	4.9*	50	0[2]
H-3	4/4	14,000*	3,200*	7,200*	20,000	0[2]
Radionuclides, unfiltered (pCi/L)*						
Co-60	1/4	4.9*	-5.7	-0.068	200	0[4]
Gross beta	3/4	16*	-0.57	9.4	50	0[2]
H-3	4/4	13,000*	3,200*	7,200*	20,000	0[2]
Total rad Sr	1/4	2.5*	-0.81	0.73	8	0[2]

Table 7.68 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Volatile organics, unfiltered (µg/L)						
Carbon disulfide	1/4	U5.0	J1.3	-4.1	d	[d]

<sup>a</sup>Prefix "<" indicates the value for a parameter (excluding organics) was not quantifiable at the analytical detection limit; "J" indicates the value was estimated at or below the analytical detection limit by the laboratory; "Y" indicates the value exceeded the calibration range and the sample was diluted and reanalyzed; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>c</sup>If a reference limit exists, the source is coded as:

- 1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.
- 2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.
- 3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.
- 4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

<sup>d</sup>Not applicable.

<sup>e</sup>Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

**Table 7.69. ORNL Plant Perimeter Monitoring summary statistics from  
1993 sampling events**

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
<b>Melton Valley Exit Pathway</b>						
<b>Field Measurements -- Unfiltered</b>						
Conductivity (mS/cm)	13/13	0.75	0.010	0.28	d	[d]
Dissolved oxygen (ppm)	13/13	12	6.9	10	d	[d]
Temperature (°C)	13/13	17	13	15	30.5	0[1]
pH (SU)	13/13	8.2	5.0	6.7	(6.5, 8.5)	4[3]
<b>Radionuclides (pCi/L) -- Filtered<sup>a</sup></b>						
Co-60	1/13	4.6*	-0.27	1.2*	200	0[4]
Cs-137	3/13	21*	-1.1	4.0*	120	0[4]
Gross alpha	4/13	5.9*	-0.73	1.4*	15	0[2]
Gross beta	4/9	1,500*	1.1	180	50	2[2]
H-3	11/13	190,000*	270	26,000	20,000	3[2]
Total rad Sr	6/13	840*	0.35	69	8	2[2]
<b>Radionuclides (pCi/L) -- Unfiltered<sup>a</sup></b>						
Co-60	2/5	5.4*	0.54	2.7*	200	0[4]
Cs-137	1/5	150*	-0.54	32	120	1[4]
Gross alpha	3/5	10*	-0.27	4.5*	15	0[2]
Gross beta	5/5	1,400*	4.9*	310	50	2[2]
H-3	5/5	190,000*	2,700*	54,000	20,000	2[2]
Total rad Sr	2/5	840*	-0.41	180	8	2[2]
<b>Volatile Organics (µg/L) -- Unfiltered</b>						
Methylene chloride	1/13	U 5.0	2.3	~ 4.8	d	[d]
<b>East Bethel Valley Exit Pathway</b>						
<b>Field Measurements -- Unfiltered</b>						
Conductivity (mS/cm)	5/5	0.74	0.27	0.56	d	[d]
Dissolved oxygen (ppm)	5/5	12	8.8	11	d	[d]
Temperature (°C)	5/5	16	14	15	30.5	0[1]
pH (SU)	5/5	8.0	6.7	7.4	(6.5, 8.5)	0[3]
<b>Radionuclides (pCi/L) -- Filtered<sup>a</sup></b>						
Co-60	1/5	5.4*	-1.6	0.86	200	0[4]
Cs-137	1/5	5.4*	-1.4	1.1	120	0[4]
Gross alpha	2/5	3.8*	-0.57	1.4	15	0[2]
Gross beta	3/5	7.6*	2.2	5.4*	50	0[2]
H-3	4/5	14,000*	-240	5,700*	20,000	0[2]
Total rad Sr	1/5	3.8*	-0.35	0.97	8	0[2]
<b>Radionuclides (pCi/L) -- Unfiltered<sup>a</sup></b>						
Co-60	1/5	4.9*	-5.7	-1.1	200	0[4]
Gross beta	4/5	16*	-0.57	8.4*	50	0[2]
H-3	4/5	13,000*	-110	5,700*	20,000	0[2]
Total rad Sr	1/5	2.5*	-1.1	0.37	8	0[2]
<b>Volatile Organics (µg/L) -- Unfiltered</b>						
Acetone	1/5	72	U 10	~ 22	d	[d]
Benzene	1/5	U 5.0	J 1.2	~ 4.2	5	0[1]
Carbon disulfide	2/5	U 5.0	J 1.3	~ 4.0	d	[d]
<b>West Bethel Valley Exit Pathway</b>						
<b>Field Measurements -- Unfiltered</b>						
Conductivity (mS/cm)	2/2	0.63	0.63	0.63	d	[d]
Dissolved oxygen (ppm)	2/2	14	6.0	9.9	d	[d]
Temperature (°C)	2/2	14	9.7	12	30.5	0[1]
pH (SU)	2/2	7.6	7.4	7.5	(6.5, 8.5)	0[3]

Table 7.69 (continued)

Parameter	N det/ N total	Max <sup>a</sup>	Min <sup>a</sup>	Av <sup>b</sup>	Reference value	Number of values exceeding reference [ref] <sup>c</sup>
Radionuclides (pCi/L) -- Filtered <sup>d</sup>						
Co-60	1/2	3.8*	-0.27	1.8	200	0[4]
Cs-137	1/2	3.8*	0.81	2.3	120	0[4]
Gross beta	2/2	260*	3.2*	130	50	1[2]
H-3	2/2	1,000*	920*	970*	20,000	0[2]
Total rad Sr	1/2	120*	5.1	61	8	1[2]
Radionuclides (pCi/L) -- Unfiltered <sup>d</sup>						
Gross alpha	1/2	1.6*	1.5	1.6*	15	0[2]
Gross beta	2/2	260*	11*	140	50	1[2]
H-3	2/2	1,400*	810*	1,100	20,000	0[2]
Total rad Sr	1/2	130*	4.6	66	8	1[2]
White Wing Scrapyard Exit Pathway						
Field Measurements -- Unfiltered						
Conductivity (mS/cm)	4/4	0.45	0.040	0.21	d	[d]
Dissolved oxygen (ppm)	4/4	12	6.1	9.1	d	[d]
Temperature (°C)	4/4	13	10	12	30.5	0[1]
pH (SU)	4/4	8.2	6.9	7.6	(6.5, 8.5)	0[3]
Radionuclides (pCi/L) -- Filtered <sup>d</sup>						
Gross alpha	3/4	15*	-0.38	4.6	15	1[2]
Gross beta	4/4	21*	8.4*	14*	50	0[2]
H-3	2/4	1,400*	-220	520	20,000	0[2]
Total rad Sr	4/4	7.0*	2.7*	4.6*	8	0[2]
Radionuclides (pCi/L) -- Unfiltered <sup>d</sup>						
Co-60	1/4	3.2	0.27	2.2*	200	0[4]
Cs-137	1/4	2.2*	-3.2	0.49	120	0[4]
Gross alpha	2/4	17*	0.27	5.1	15	1[2]
Gross beta	4/4	27*	4.3*	16*	50	0[2]
Total rad Sr	2/4	7.0*	0.054	2.5	8	0[2]
Volatile Organics (µg/L) -- Unfiltered						
Trichloroethene	1/4	17	U 5.0	- 8.0	5	1[1]

<sup>a</sup>Prefix "J" indicates the value was estimated at or below the analytical detection limit by the laboratory; and "U" indicates the value for an organic parameter was undetected at the analytical detection limit.

<sup>b</sup>A tilde (~) indicates that estimated and/or undetected values were used in the calculation.

<sup>c</sup>If a reference limit exists, the source is coded as:

1 Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, Domestic Water Supply, as amended.

2 40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.

3 40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.

4 DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water.

<sup>d</sup>Not applicable.

<sup>e</sup>Individual and average radionuclide concentrations significantly greater than zero are identified by an \*.

Table 7.70. Constituents in the groundwater wells located at the K-1407 Operable Unit at the K-25 Site, 1993

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
<i>Field measurements</i>						
Conductivity (µmho/cm)	n / 32	128	876.53	1875	-	-
Conductivity - initial (µmho/cm)	n / 32	66	829.87	1834	-	-
Dissolved oxygen (ppm)	n / 32	1.1	4.9	8.2	-	-
Dissolved oxygen - initial (ppm)	n / 32	0.4	2.4906	9.1	-	-
Redox (mv)	n / 32	-95	74.281	250	-	-
Redox - initial (mv)	n / 32	-120	64.688	229	-	-
Temperature (degrees C)	n / 32	10.4	15.728	24.6	-	-
Temperature - initial (degrees C)	n / 32	8.9	16.097	22	-	-
pH (std units)	n / 32	6	6.7406	7.6	6.5 - 8.5 <sup>S</sup>	8
pH - initial (std units)	n / 32	5.3	6.5562	7.4	6.5 - 8.5 <sup>S</sup>	9
<i>Dissolved<sup>1</sup> metals by ICP (mg/L)</i>						
Aluminum	19 / 26	0.02	0.0463	0.33	0.2 <sup>S</sup>	1
Antimony	0 / 26				-	-
Barium	26 / 26	0.018	0.1328	0.49	2 <sup>P</sup>	0
Beryllium	0 / 27				-	-
Cadmium	2 / 28	0.0042	0.0046	0.0051	0.005 <sup>P</sup>	1
Calcium	26 / 26	19	114	220	-	-
Chromium	4 / 26	0.015	0.0333	0.045	0.1 <sup>P</sup>	0
Cobalt	9 / 26	0.0056	0.0268	0.052	-	-
Copper	6 / 26	0.0045	0.0066	0.0097	1 <sup>S</sup>	0
Iron	24 / 26	0.008	4.5051	16	0.3 <sup>S</sup>	15
Lithium	1 / 26	0.0056	0.0056	0.0056	-	-
Magnesium	26 / 26	3.3	17.023	51	-	-
Manganese	26 / 26	0.001	8.2789	36	0.05 <sup>S</sup>	22
Molybdenum	0 / 26				-	-
Nickel	1 / 26	0.01	0.01	0.01	-	-
Niobium	2 / 26	0.0079	0.008	0.008	-	-
Potassium	26 / 26	1.2	2.6038	5.2	-	-
Silver	1 / 26	0.0068	0.0068	0.0068	0.1 <sup>S</sup>	0
Sodium	26 / 26	1.5	43.135	120	-	-
Strontium	26 / 26	0.032	0.2358	0.51	-	-
Thorium	0 / 26				-	-
Titanium	1 / 26	0.0046	0.0046	0.0046	-	-
Vanadium	0 / 26				-	-
Zinc	17 / 26	c 0.0026	0.0092	c 0.02	5 <sup>S</sup>	0
Zirconium	0 / 26				-	-
<i>Total<sup>1</sup> metals by ICP (mg/L)</i>						
Aluminum	26 / 26	0.03	2.952	19	0.2 <sup>S</sup>	18
Antimony	0 / 26				-	-
Barium	26 / 26	0.017	0.1485	0.5	2 <sup>P</sup>	0
Beryllium	8 / 27	0.0004	0.0007	0.0016	-	-
Cadmium	7 / 28	0.0035	0.0048	0.007	0.005 <sup>P</sup>	2

Table 7.70 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
Calcium	26 / 26	17	114.81	230	-	-
Chromium	8 / 26	0.013	0.0259	0.048	0.1 <sup>P</sup>	0
Cobalt	12 / 26	0.0065	0.0262	0.065	-	-
Copper	18 / 26	0.0046	0.0111	0.043	1 <sup>S</sup>	0
Iron	26 / 26	0.033	11.668	38	0.3 <sup>S</sup>	24
Lithium	8 / 26	0.0042	0.0078	0.022	-	-
Magnesium	26 / 26	3.1	17.296	52	-	-
Manganese	26 / 26	0.0054	8.3527	38	0.05 <sup>S</sup>	24
Molybdenum	0 / 26				-	-
Nickel	4 / 26	0.012	0.018	0.028	-	-
Niobium	0 / 26				-	-
Potassium	26 / 26	1.2	3.3885	8.9	-	-
Silver	0 / 26				0.1 <sup>S</sup>	x
Sodium	26 / 26	1.5	42.638	120	-	-
Strontium	26 / 26	0.03	0.2355	0.52	-	-
Thorium	0 / 26				-	-
Titanium	18 / 26	0.0034	0.0725	0.31	-	-
Vanadium	8 / 26	0.008	0.0172	0.048	-	-
Zinc	19 / 26	c 0.0064	0.0241	0.14	5 <sup>S</sup>	0
Zirconium	4 / 26	0.0053	0.0081	0.014	-	-
<i>Dissolved<sup>1</sup> radiochemistry (pCi/L)</i>						
Alpha activity	n / 26	-3.51 ± 6.2	1.5386 ± 0.4615	33.7 ± 7.3	15 <sup>P</sup>	2
Beta activity	n / 26	-6.24 ± 10	10.042 ± 0.7246	309 ± 11	50 <sup>P</sup>	2
Cesium-137	n / 1	32.2 ± 30	32.2 ± 30	32.2 ± 30	120 <sup>D</sup>	0
Protactinium-234m	n / 1	7910 ± 4600	7910 ± 4600	7910 ± 4600	2800 <sup>D</sup>	1
Strontium	n / 1	-3.07 ± 16	-3.07 ± 16	-3.07 ± 16	8 <sup>P</sup>	0
Technetium-99	n / 26	-881 ± 1300	50.83 ± 16.712	967 ± 1400	4000 <sup>D</sup>	0
Thorium-234	n / 1	E 3.84 ± 520	3.84 ± 520	E 3.84 ± 520	400 <sup>D</sup>	0
Uranium-234	n / 1	0 ± 0.87	0 ± 0.87	0 ± 0.87	20 <sup>D</sup>	0
Uranium-235	n / 1	E 17.1 ± 71	17.1 ± 71	E 17.1 ± 71	24 <sup>D</sup>	0
Uranium-238	n / 1	0 ± 0.75	0 ± 0.75	0 ± 0.75	24 <sup>D</sup>	0
<i>Total<sup>1</sup> radiochemistry (pCi/L)</i>						
Alpha activity	n / 26	-1.78 ± 6.6	2.1318 ± 0.489	37.3 ± 6.9	15 <sup>P</sup>	2
Beta activity	n / 26	-7.58 ± 10	10.959 ± 0.736	353 ± 12	50 <sup>P</sup>	2
Cesium-137	n / 1	E 30.5 ± 45	30.5 ± 45	E 30.5 ± 45	120 <sup>D</sup>	0
Protactinium-234m	n / 1	E 2710 ± 8000	2710 ± 8000	E 2710 ± 8000	2800 <sup>D</sup>	0
Strontium	n / 1	+ 5.07 ± 17	5.07 ± 17	+ 5.07 ± 17	8 <sup>P</sup>	0
Technetium-99	n / 26	-958 ± 1300	53.496 ± 16.711	+ 707 ± 1400	4000 <sup>D</sup>	0
Thorium-234	n / 1	i 989 ± 340	989 ± 340	i 989 ± 340	400 <sup>D</sup>	1
Uranium-234	n / 1	+ 0.898 ± 1.3	0.898 ± 1.3	+ 0.898 ± 1.3	20 <sup>D</sup>	0
Uranium-235	n / 1	E 52.4 ± 91	52.4 ± 91	E 52.4 ± 91	24 <sup>D</sup>	1
Uranium-238	n / 1	+ 0.225 ± 0.45	0.225 ± 0.45	+ 0.225 ± 0.45	24 <sup>D</sup>	0

Table 7.70 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
<i>Semivolatile organics (µg/L)</i>						
1,2,4-Trichlorobenzene	0 / 26				-	-
1,2-Dichlorobenzene	0 / 26				600 <sup>P</sup>	x
1,2-Diphenylhydrazine	0 / 26				-	-
1,3-Dichlorobenzene	0 / 26				-	-
1,4-Dichlorobenzene	0 / 26				5 <sup>S</sup>	x
2,3,4,6-Tetrachlorophenol	0 / 26				-	-
2,4,5-Trichlorophenol	0 / 26				-	-
2,4,6-Trichlorophenol	0 / 26				-	-
2,4-Dichlorophenol	0 / 26				-	-
2,4-Dimethylphenol	0 / 26				-	-
2,4-Dinitrophenol	0 / 26				-	-
2,4-Dinitrotoluene	0 / 26				-	-
2,6-Dinitrotoluene	0 / 26				-	-
2-Chloronaphthalene	0 / 26				-	-
2-Chlorophenol	0 / 26				-	-
2-Methylnaphthalene	0 / 26				-	-
2-Methylphenol	0 / 26				-	-
2-Nitroaniline	0 / 26				-	-
2-Nitrophenol	0 / 26				-	-
3,3'-Dichlorobenzidine	0 / 26				-	-
3-Nitroaniline	0 / 26				-	-
4,6-Dinitro-2-methylphenol	0 / 26				-	-
4-Bromophenyl-phenylether	0 / 26				-	-
4-Chloro-3-methylphenol	0 / 26				-	-
4-Chloroaniline	0 / 26				-	-
4-Chlorophenyl-phenylether	0 / 26				-	-
4-Methylphenol	0 / 26				-	-
4-Nitroaniline	0 / 26				-	-
4-Nitrophenol	0 / 26				-	-
Acenaphthene	0 / 26				-	-
Acenaphthylene	0 / 26				-	-
Aniline	0 / 26				-	-
Anthracene	0 / 26				-	-
Benzidine	0 / 26				-	-
Benzo(a)anthracene	0 / 26				-	-
Benzo(a)pyrene	0 / 26				-	-
Benzo(b)fluoranthene	0 / 26				-	-
Benzo(g,h,i)perylene	0 / 26				-	-
Benzo(k)fluoranthene	0 / 26				-	-
Benzoic acid	0 / 26				-	-
Benzyl alcohol	0 / 26				-	-
Butylbenzylphthalate	0 / 26				-	-
Chrysene	0 / 26				-	-
Di-n-butylphthalate	8 / 26	J 0.2	1.475	JB 3	-	-
Di-n-octylphthalate	0 / 26				-	-
Dibenz(a,h)anthracene	0 / 26				-	-
Dibenzofuran	0 / 26				-	-

Table 7.70 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results					Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>				
Diethylphthalate	7 / 26	JB	0.5	0.9857	JB	2	-	-
Dimethylphthalate	0 / 26						-	-
Fluoranthene	0 / 26						-	-
Fluorene	0 / 26						-	-
Hexachlorobenzene	0 / 26						-	-
Hexachlorobutadiene	0 / 26						-	-
Hexachlorocyclopentadiene	0 / 26						-	-
Hexachloroethane	0 / 26						-	-
Indeno(1,2,3-cd)pyrene	0 / 26						-	-
Isophorone	0 / 26						-	-
N-Nitroso-di-n-propylamine	0 / 26						-	-
N-Nitrosodimethylamine	0 / 26						-	-
N-Nitrosodiphenylamine	0 / 26						-	-
Naphthalene	0 / 26						-	-
Nitrobenzene	0 / 26						-	-
Pentachlorophenol	1 / 26	J	1	1	J	1	1 <sup>P</sup>	0
Phenanthrene	0 / 26						-	-
Phenol	0 / 26						-	-
Pyrene	0 / 26						-	-
Pyridine	0 / 26						-	-
bis(2-Chloroethoxy)methane	0 / 26						-	-
bis(2-Chloroethyl)ether	0 / 26						-	-
bis(2-Chloroisopropyl)ether	0 / 26						-	-
bis(2-Ethylhexyl)phthalate	6 / 26	JB	0.9	1.4833	JB	2	-	-
<i>Semivolatile organics, tentatively identified compounds (µg/L)</i>								
1,4-Dioxane	3 / 3	J	8	22.667	J	50	-	-
1-Propanol,2-(1-methylethox	1 / 1	J	27	27	J	27	-	-
2-Pentanol,4-methyl-	1 / 1	J	21	21	J	21	-	-
2-Pentanone, 4-hydroxy-4-methy	12 / 12	JAB	14	122.92	JAB	680	-	-
3-Penten-2-one, 4-methyl-	1 / 1	AJ	28	28	AJ	28	-	-
4-Octanol,4-methyl-	1 / 1	J	28	28	J	28	-	-
Cyclohexene	7 / 7	JB	17	23.857	JB	33	-	-
Sulfur (S8)	2 / 2	J	15	20.5	J	26	-	-
Tetrachloroethene	2 / 2	J	63	131.5	J	200	-	-
Toluene	1 / 1	J	9	9	J	9	-	-
Tributyl phosphate	1 / 1	J	10	10	J	10	-	-
Trichloroethene	3 / 3	J	8	186	J	470	-	-
Unknown	39 / 39	J	9	28.205	J	100	-	-
Unknown alcohol	8 / 8	J	10	25.625	J	51	-	-
Unknown alcohol/alkoxy compound	9 / 9	J	8	29.333	J	51	-	-
<i>Dissolved<sup>1</sup> metals by spectrochemistry (mg/L)</i>								
Arsenic	5 / 26		0.005	0.0068		0.0084	0.05 <sup>P</sup>	0
Lead	0 / 27						0.015 <sup>P</sup>	x
Mercury	1 / 26		0.0002	0.0002		0.0002	0.002 <sup>P</sup>	0
Selenium	0 / 26						0.05 <sup>P</sup>	x
Thallium	0 / 26						-	-



Table 7.70 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
<i>Total<sup>1</sup> metals by spectrochemistry (mg/L)</i>						
Arsenic	10 / 26	0.0062	0.0101	0.016	0.05 <sup>P</sup>	0
Lead	8 / 27	0.0048	0.0191	0.081	0.015 <sup>P</sup>	1
Mercury	0 / 26				0.002 <sup>P</sup>	x
Selenium	0 / 26				0.05 <sup>P</sup>	x
Thallium	0 / 26				-	-
<i>Volatile organics (µg/L)</i>						
1,1,1-Trichloroethane	5 / 26	12	37.8	66	200 <sup>P</sup>	0
1,1,2,2-Tetrachloroethane	0 / 26				-	-
1,1,2-Trichloroethane	3 / 26	J 3	7	15	-	-
1,1-Dichloroethane	10 / 26	JD 4	298.5	D 1200	-	-
1,1-Dichloroethene	11 / 26	J 1	137.18	D 590	7 <sup>P</sup>	8
1,2-Dichloroethane	2 / 26	J 2	7.5	13	5 <sup>P</sup>	1
1,2-Dichloroethene (total)	19 / 26	J 3	704.89	D 2300	70 <sup>P</sup>	10
1,2-Dichloropropane	0 / 26				5 <sup>P</sup>	x
2-Butanone	3 / 26	J 7	8.3333	J 9	-	-
2-Hexanone	0 / 26				-	-
4-Methyl-2-pentanone	0 / 26				-	-
Acetone	3 / 26	JB 5	91.667	B 140	-	-
Benzene	6 / 26	JB 1	1	JB 1	5 <sup>P</sup>	0
Bromodichloromethane	0 / 26				100 <sup>P</sup>	x
Bromoform	0 / 26				100 <sup>P</sup>	x
Bromomethane	0 / 26				-	-
Carbon disulfide	0 / 26				-	-
Carbon tetrachloride	0 / 26				5 <sup>P</sup>	x
Chlorobenzene	0 / 26				100 <sup>P</sup>	x
Chloroethane	0 / 26				200 <sup>P</sup>	x
Chloroform	1 / 26	J 2	2	J 2	100 <sup>P</sup>	0
Chloromethane	0 / 26				-	-
Dibromochloromethane	0 / 26				100 <sup>P</sup>	x
Ethylbenzene	0 / 26				700 <sup>P</sup>	x
Methylene chloride	1 / 26	J 1	1	J 1	-	-
Styrene	0 / 26				100 <sup>P</sup>	x
Tetrachloroethene	8 / 26	J 1	266.12	D 1000	5 <sup>P</sup>	4
Toluene	2 / 26	5	5	5	1000 <sup>P</sup>	0
Trichloroethene	15 / 26	J 1	1908.4	D 13,000	5 <sup>P</sup>	14
Vinyl acetate	0 / 26				-	-
Vinyl chloride	10 / 26	J 6	157.4	D 310	2 <sup>P</sup>	10
Xylene (total)	0 / 26				10,000 <sup>P</sup>	x
cis-1,3-Dichloropropene	0 / 26				-	-
trans-1,3-Dichloropropene	0 / 26				-	-
<i>Volatile organics, tentatively identified compounds (µg/L)</i>						
Chlorotrifluoroethene	1 / 1	J 36	36	J 36	-	-
Freon 113	6 / 6	J 33	643.83	JD 1200	-	-
Freon 123	4 / 4	J 11	49.5	JD 140	-	-
Hexane	16 / 16	BJ 9	202	BJ 2500	-	-

Table 7.70 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
Unknown	2 / 2 J 5		97.5 J	190	-	-
<i>Dissolved<sup>1</sup> wet chemistry (mg/L)</i>						
Uranium fluorometric	7 / 26	0.001	0.0014	0.003	0.02 <sup>P7</sup>	0
<i>Total<sup>1</sup> wet chemistry</i>						
Chloride (mg/L)	26 / 26	2	132.74	478	250 <sup>S</sup>	9
Conductivity ( $\mu$ mho/cm)	n / 104	147	953.95	2050	-	-
Dissolved solids (mg/L)	26 / 26	70	591.85	1224	500 <sup>S</sup>	17
Fluoride (mg/L)	6 / 26	0.1	0.1333	0.2	2 <sup>S</sup>	0
Nitrate brucine (mg/L)	14 / 26	0.11	0.3471	1.5	10 <sup>P</sup>	0
Phenols (mg/L)	0 / 26				-	-
Sulfate (mg/L)	26 / 26	3	76.038	390	250 <sup>S</sup>	2
Suspended solids (mg/L)	26 / 26	2	60.423	680	-	-
Total organic carbon (mg/L)	31 / 103	1.7	6.6839	23	-	-
Total organic halides ( $\mu$ g/L)	67 / 111	11	2252.8	9484	-	-
Turbidity (NTU)	26 / 26	1	46.112	240	1 <sup>P</sup>	25
Uranium fluorometric (mg/L)	9 / 26	0.001	0.0014	0.003	0.02 <sup>P</sup>	0
pH (std units)	n / 108	6	6.8926	7.6	6.5 - 8.5 <sup>S</sup>	11

- 1 *Total* = unfiltered sample (soluble + suspended) and *Dissolved* = filtered sample (soluble only). ICP = inductively coupled plasma
- 2 Both the number of detected results and the total number of results include all duplicate and replicate measurements. No blanks, matrix spikes, equipment rinse or other QA/QC data are reported in this table. *n* denotes not applicable.
- 3 The minimum and maximum detected results are listed with their laboratory analytical qualifiers.
  - A denotes aldol condensation product
  - B denotes parameter found in blank as well as sample
  - c denotes possible contamination
  - D denotes the compound identified at a secondary dilution factor
  - E denotes for radiochemistry parameters the result is less than the minimum detectable activity (MDA), confidence level is less than 95%. Also denotes for organics the measurement exceeded the instrument calibration range
  - i denotes a tentatively identified isotope from the radiochemistry laboratory
  - J denotes an estimated value (usually below the detection limit)
  - + denotes the duplicate control limits do not apply, duplicate and sample near the MDA
- 4 The average radiochemistry results and their associated limits of error were calculated from all of the results using optimally weighted mean and variance estimates assuming independent measurements with unequal errors, as documented in *Radiation Detection and Measurement* by Glenn F. Knoll, New York: John Wiley and Sons (1979), pp. 137-139. For the non-radiochemistry analytes the average listed is the unweighted arithmetic mean of all detected results. No analytical qualifiers are listed for the average.
- 5 If a reference value exists it originates from the following sources:
  - P 40 CFR Part 141 National Primary Drinking Water Regulations, Subparts B and G, as amended
  - S 40 CFR Part 143 National Secondary Drinking Water Regulations, as amended
  - D DOE Order 5400.5, Chapter III, Derived Concentration Guides (DCG) for Air and Water. Four percent of the DOE DCG represents the DOE criterion of 4 mrem effective dose equivalent from ingestion of drinking water.
  - denotes no reference value exists for this analyte
- 6 The number of detected results exceeding the reference value is given.
  - denotes that since no reference value exists for this analyte, the number exceeding is not applicable.
  - x denotes that no detected measurements were reported for this analyte so that no comparisons were made to the reference value.
- 7 Proposed drinking water standard.

Table 7.71. Constituents in the Exit Pathway Wells at the K-25 Site, 1993

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
<i>Field measurements</i>						
Conductivity ( $\mu\text{mho/cm}$ )	n / 8	176	411.87	656	-	-
Conductivity - initial ( $\mu\text{mho/cm}$ )	n / 8	195	422.62	708	-	-
Dissolved oxygen (ppm)	n / 8	0.4	2.25	4	-	-
Dissolved oxygen - initial (ppm)	n / 8	0.4	1.3875	2.6	-	-
Redox (mv)	n / 8	-153	16.75	212	-	-
Redox - initial (mv)	n / 8	-116	126.75	229	-	-
Temperature (degrees C)	n / 8	10.3	13.275	16.2	-	-
Temperature - initial (degrees C)	n / 8	11.7	13.425	15.4	-	-
pH (std units)	n / 8	6.3	7.625	9.2	6.5 - 8.5 <sup>5</sup>	3
pH - initial (std units)	n / 8	6.3	7.8875	9.7	6.5 - 8.5 <sup>5</sup>	4
<i>Dissolved<sup>1</sup> radiochemistry (pCi/L)</i>						
Alpha activity	n / 8	-0.952 $\pm$ 1.7	0.8106 $\pm$ 0.5255	4.01 $\pm$ 2	15 <sup>P</sup>	0
Beta activity	n / 8	1.79 $\pm$ 2.9	5.9852 $\pm$ 0.8637	13.9 $\pm$ 3.4	50 <sup>P</sup>	0
Technetium-99	n / 8	-1050 $\pm$ 1300	-310.1 $\pm$ 467.74	1050 $\pm$ 1400	4000 <sup>D</sup>	0
<i>Total<sup>1</sup> radiochemistry (pCi/L)</i>						
Alpha activity	n / 8	-0.576 $\pm$ 1.8	0.7077 $\pm$ 0.5301	4.29 $\pm$ 2.4	15 <sup>P</sup>	0
Beta activity	n / 8	0.0854 $\pm$ 2.8	5.4102 $\pm$ 0.8639	+ 10.7 $\pm$ 3.2	50 <sup>P</sup>	0
Technetium-99	n / 8	+ -1170 $\pm$ 1300	-377.1 $\pm$ 467.74	536 $\pm$ 1400	4000 <sup>D</sup>	0
<i>Volatile organics (ng/L)</i>						
1,1,1-Trichloroethane	0 / 8				200 <sup>P</sup>	x
1,1,2,2-Tetrachloroethane	0 / 8				-	-
1,1,2-Trichloroethane	0 / 8				-	-
1,1-Dichloroethane	0 / 8				-	-
1,1-Dichloroethene	0 / 8				7 <sup>P</sup>	x
1,2-Dichloroethane	0 / 8				5 <sup>P</sup>	x
1,2-Dichloroethene (total)	1 / 8	J 2	2	J 2	70 <sup>P</sup>	0
1,2-Dichloropropane	0 / 8				5 <sup>P</sup>	x
2-Butanone	0 / 8				-	-
2-Hexanone	0 / 8				-	-
4-Methyl-2-pentanone	0 / 8				-	-
Acetone	0 / 8				-	-
Benzene	2 / 8	J 1	1.5	J 2	5 <sup>P</sup>	0
Bromodichloromethane	0 / 8				100 <sup>P</sup>	x
Bromoform	0 / 8				100 <sup>P</sup>	x
Bromomethane	0 / 8				-	-
Carbon disulfide	0 / 8				-	-
Carbon tetrachloride	0 / 8				5 <sup>P</sup>	x
Chlorobenzene	0 / 8				100 <sup>P</sup>	x
Chloroethane	0 / 8				200 <sup>P</sup>	x
Chloroform	0 / 8				100 <sup>P</sup>	x

Table 7.71 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
Chloromethane	0 / 8				-	-
Dibromochloromethane	0 / 8				100 <sup>P</sup>	x
Ethylbenzene	0 / 8				700 <sup>P</sup>	x
Methylene chloride	0 / 8				-	-
Styrene	0 / 8				100 <sup>P</sup>	x
Tetrachloroethene	0 / 8				5 <sup>P</sup>	x
Toluene	0 / 8				1000 <sup>P</sup>	x
Trichloroethene	2 / 8	J 0.5	0.6	J 0.7	5 <sup>P</sup>	0
Vinyl acetate	0 / 8				-	-
Vinyl chloride	0 / 8				2 <sup>P</sup>	x
Xylene (total)	0 / 8				10,000 <sup>P</sup>	x
cis-1,3-Dichloropropene	0 / 8				-	-
trans-1,3-Dichloropropene	0 / 8				-	-
<i>Dissolved<sup>1</sup> wet chemistry (mg/L)</i>						
Uranium fluorometric	2 / 8	0.002	0.003	0.004	0.02 <sup>P</sup>	0
<i>Total<sup>1</sup> wet chemistry</i>						
Conductivity ( $\mu$ mho/cm)	n / 32	207	513.62	839	-	-
Fluoride (mg/L)	8 / 8	0.1	0.7125	1.8	2 <sup>S</sup>	0
Uranium fluorometric (mg/L)	2 / 8	0.001	0.0025	0.004	0.02 <sup>P</sup>	0
pH (std units)	n / 32	6.7	8.0812	9.5	6.5 - 8.5 <sup>S</sup>	12

<sup>1</sup> Total = unfiltered sample (soluble + suspended) and Dissolved = filtered sample (soluble only).

<sup>2</sup> Both the number of detected results and the total number of results include all duplicate and replicate measurements. No blanks, matrix spikes, equipment rinsate or other QA/QC data are reported in this table. n denotes not applicable.

<sup>3</sup> The minimum and maximum detected results are listed with their laboratory analytical qualifiers.

J denotes an estimated value (usually below the detection limit)

+ denotes the duplicate control limits do not apply; duplicate and sample near the minimum detectable activity (MDA).

<sup>4</sup> The average radiochemistry results and their associated limits of error were calculated from all of the results using optimally weighted mean and variance estimates assuming independent measurements with unequal errors, as documented in *Radiation Detection and Measurement* by Glenn F. Knoll, New York: John Wiley and Sons (1979), pp. 137-139. For the non-radiochemistry analytes the average listed is the unweighted arithmetic mean of all detected results. No analytical qualifiers are listed for the average.

<sup>5</sup> If a reference value exists it originates from the following sources:

P 40 CFR Part 141 National Primary Drinking Water Regulations, Subparts B and G, as amended

S 40 CFR Part 143 National Secondary Drinking Water Regulations, as amended

D DOE Order 5400.5, Chapter III, Derived Concentration Guides (DCG) for Air and Water. Four percent of the DOE DCG represents the DOE criterion of 4 mrem effective dose equivalent from ingestion of drinking water.

- denotes no reference value exists for this analyte

<sup>6</sup> The number of detected results exceeding the reference value is given.

- denotes that since no reference value exists for this analyte, the number exceeding is not applicable.

x denotes that no detected measurements were reported for this analyte so that no comparisons were made to the reference value.

Table 7.72. Constituents in the groundwater wells located at the K-770 Operable Unit at the K-25 Site, 1993

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
<i>Field measurements</i>						
Conductivity (µmho/cm)	n / 34	41	473.79	2230	-	-
Conductivity - initial (µmho/cm)	n / 34	53	528.79	2210	-	-
Dissolved oxygen (ppm)	n / 34	0.9	5.1206	8.5	-	-
Dissolved oxygen - initial (ppm)	n / 34	0.5	3.7853	8	-	-
Redox (mv)	n / 34	-58	195.26	430	-	-
Redox - initial (mv)	n / 34	-52	174.79	438	-	-
Temperature (degrees C)	n / 34	13.6	16.191	20.2	-	-
Temperature - initial (degrees C)	n / 34	13.8	16.374	21	-	-
pH (std units)	n / 34	4.9	6.7824	11.5	6.5 - 8.5 <sup>S</sup>	19
pH - initial (std units)	n / 34	4.8	6.85	11.5	6.5 - 8.5 <sup>S</sup>	16
<i>Dissolved<sup>1</sup> metals by ICP (mg/L)</i>						
Aluminum	7 / 16	0.028	0.5494	3.3	0.2 <sup>S</sup>	2
Antimony	0 / 16				-	-
Barium	16 / 16	0.0065	0.0554	0.11	2 <sup>P</sup>	0
Beryllium	0 / 16				-	-
Cadmium	3 / 16	0.0037	0.005	0.0067	0.005 <sup>P</sup>	1
Calcium	16 / 16	3.6	48.163	73	-	-
Chromium	2 / 16	0.011	0.0135	0.016	0.1 <sup>P</sup>	0
Cobalt	0 / 16				-	-
Copper	2 / 16	0.0055	0.0063	0.007	1 <sup>S</sup>	0
Iron	11 / 16	0.0059	0.9554	9	0.3 <sup>S</sup>	4
Lead	0 / 8				0.015 <sup>P</sup>	x
Lithium	0 / 8				-	-
Magnesium	16 / 16	0.034	12.433	31	-	-
Manganese	15 / 16	0.0016	0.2408	1.5	0.05 <sup>S</sup>	7
Molybdenum	0 / 16				-	-
Nickel	3 / 16	0.011	0.0137	0.016	-	-
Phosphorus	0 / 8				-	-
Potassium	13 / 16	0.72	3.7262	15	-	-
Silver	0 / 16				0.1 <sup>S</sup>	x
Sodium	16 / 16	0.79	4.6619	8.8	-	-
Strontium	8 / 8	0.03	0.0897	0.14	-	-
Vanadium	1 / 16	0.0067	0.0067	0.0067	-	-
Zinc	12 / 16	0.0031	0.0081	0.015	5 <sup>S</sup>	0
<i>Total<sup>1</sup> metals by ICP (mg/L)</i>						
Aluminum	15 / 16	0.04	24.267	150	0.2 <sup>S</sup>	12
Antimony	0 / 16				-	-
Barium	16 / 16	0.04	0.1478	0.64	2 <sup>P</sup>	0
Beryllium	6 / 16	0.0004	0.0057	0.015	-	-
Cadmium	6 / 16	0.0048	0.0261	0.053	0.005 <sup>P</sup>	5
Calcium	16 / 16	4.1	65.444	230	-	-
Chromium	10 / 16	0.011	0.1918	1.5	0.1 <sup>P</sup>	3

Table 7.72 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
Cobalt	6 / 16	0.0074	0.0481	0.12	-	-
Copper	15 / 16	0.0056	0.0735	0.63	1 <sup>S</sup>	0
Iron	16 / 16	0.075	33.933	180	0.3 <sup>S</sup>	14
Lead	0 / 8				0.015 <sup>P</sup>	x
Lithium	2 / 8	0.0089	0.0109	0.013	-	-
Magnesium	16 / 16	2	25.256	170	-	-
Manganese	16 / 16	0.024	1.5449	9.4	0.05 <sup>S</sup>	14
Molybdenum	2 / 16	0.012	0.0455	0.079	-	-
Nickel	15 / 16	0.01	0.1009	0.8	-	-
Phosphorus	3 / 8	0.37	0.7367	1.4	-	-
Potassium	15 / 16	1	9.08	43	-	-
Silver	0 / 16				0.1 <sup>S</sup>	x
Sodium	16 / 16	0.73	4.7831	8.7	-	-
Strontium	8 / 8	0.04	0.0945	0.14	-	-
Vanadium	6 / 16	0.0096	0.1119	0.32	-	-
Zinc	16 / 16	0.0064	0.0917	0.47	5 <sup>S</sup>	0
<i>Polychlorinated biphenyls (PCBs) (µg/L)</i>						
Aroclor-1016	0 / 8				-	-
Aroclor-1221	0 / 8				-	-
Aroclor-1232	0 / 8				-	-
Aroclor-1242	0 / 8				-	-
Aroclor-1248	0 / 8				-	-
Aroclor-1254	0 / 8				-	-
Aroclor-1260	0 / 8				-	-
<i>Pesticides (µg/L)</i>						
4,4'-DDD	0 / 8				-	-
4,4'-DDE	0 / 8				-	-
4,4'-DDT	0 / 8				-	-
Aldrin	0 / 8				-	-
Dieldrin	3 / 8	JN 0.02	0.0233	JN 0.03	-	-
Endosulfan I	0 / 8				-	-
Endosulfan II	0 / 8				-	-
Endosulfan sulfate	0 / 8				-	-
Endrin	0 / 8				-	-
Endrin ketone	0 / 8				-	-
Heptachlor	3 / 8	J 0.01	0.0133	JN 0.02	0.4 <sup>P</sup>	0
Heptachlor epoxide	0 / 8				0.2 <sup>P</sup>	x
Methoxychlor	0 / 8				40 <sup>P</sup>	x
Toxaphene	0 / 8				3 <sup>P</sup>	x
alpha-BHC	0 / 8				-	-
alpha-Chlordane	0 / 8				-	-
beta-BHC	0 / 8				-	-
delta-BHC	0 / 8				-	-
gamma-BHC (lindane)	1 / 8	JN 0.03	0.03	JN 0.03	0.2 <sup>P</sup>	0
gamma-Chlordane	0 / 8				-	-

Table 7.72 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
<i>Dissolved<sup>1</sup> radiochemistry (pCi/L)</i>						
Alpha activity	n / 16	-1.89 ± 2.3	2.1001 ± 0.5125	37.6 ± 5.4	15 <sup>P</sup>	1
Beta activity	n / 16	-2.33 ± 3	11.774 ± 0.8623	167 ± 7.9	50 <sup>P</sup>	4
Neptunium-237	n / 8	-5.51 ± 12	-0.141 ± 0.92	s 0 ± 1.7	1.2 <sup>D</sup>	0
Plutonium-238	n / 8	-13.7 ± 17	0.1291 ± 1.3053	0.738 ± 2.6	1.6 <sup>D</sup>	0
Plutonium-239	n / 8	-6.87 ± 15	-0.08 ± 1.1695	0.738 ± 1.5	1.2 <sup>D</sup>	0
Technetium-99	n / 16	-337 ± 1300	41.254 ± 20.094	1680 ± 1400	4000 <sup>D</sup>	0
Thorium-228	n / 8	-7.4 ± 11	-0.526 ± 2.2256	71 ± 27	16 <sup>D</sup>	2
Thorium-230	n / 8	0 ± 9.2	0.5697 ± 1.5509	C 4.9 ± 14	12 <sup>D</sup>	0
Thorium-232	n / 8	-4.9 ± 11	-0.311 ± 1.5992	2.65 ± 12	2 <sup>D</sup>	1
Uranium-234	n / 8	-0.982 ± 2.2	0.1043 ± 0.9172	10.8 ± 11	20 <sup>D</sup>	0
Uranium-238	n / 8	-2.7 ± 11	0.0765 ± 0.8067	1.45 ± 2	24 <sup>D</sup>	0
<i>Total<sup>1</sup> radiochemistry (pCi/L)</i>						
Alpha activity	n / 16	-2.28 ± 2.3	0.155 ± 0.3385	38 ± 5.5	15 <sup>P</sup>	3
Beta activity	n / 16	-1.82 ± 3.1	28.402 ± 0.7868	336 ± 5.3	50 <sup>P</sup>	4
Neptunium-237	n / 8	+ -5.93 ± 13	0.102 ± 0.9835	2.74 ± 12	1.2 <sup>D</sup>	1
Plutonium-238	n / 8	+ -18.5 ± 21	0.312 ± 1.38	+ 2.05 ± 3	1.6 <sup>D</sup>	1
Plutonium-239	n / 8	-6.87 ± 15	-0.1 ± 1.1638	0.682 ± 1.4	1.2 <sup>D</sup>	0
Technetium-99	n / 16	-55 ± 52	46.44 ± 20.145	1840 ± 1400	4000 <sup>D</sup>	0
Thorium-228	n / 8	-7.4 ± 11	-0.514 ± 2.1897	81.4 ± 29	16 <sup>D</sup>	2
Thorium-230	n / 8	C -7.4 ± 12	2.2853 ± 1.7217	37.1 ± 20	12 <sup>D</sup>	2
Thorium-232	n / 8	-4.93 ± 11	0.6917 ± 1.3037	+ 10.6 ± 11	2 <sup>D</sup>	1
Uranium-234	n / 8	-1.03 ± 2.3	0.7422 ± 1.1792	72.4 ± 140	20 <sup>D</sup>	2
Uranium-238	n / 8	0 ± 200	1.3372 ± 1.0835	37.5 ± 11	24 <sup>D</sup>	1
<i>Semivolatile organics (µg/L)</i>						
1,2,4-Trichlorobenzene	0 / 8				-	-
1,2-Dichlorobenzene	0 / 8				600 <sup>P</sup>	x
1,2-Diphenylhydrazine	0 / 8				-	-
1,3-Dichlorobenzene	0 / 8				-	-
1,4-Dichlorobenzene	0 / 8				5 <sup>S</sup>	x
2,3,4,6-Tetrachlorophenol	0 / 8				-	-
2,4,5-Trichlorophenol	0 / 8				-	-
2,4,6-Trichlorophenol	0 / 8				-	-
2,4-Dichlorophenol	0 / 8				-	-
2,4-Dimethylphenol	0 / 8				-	-
2,4-Dinitrophenol	0 / 8				-	-
2,4-Dinitrotoluene	0 / 8				-	-
2,6-Dinitrotoluene	0 / 8				-	-
2-Chloronaphthalene	0 / 8				-	-
2-Chlorophenol	0 / 8				-	-
2-Methylnaphthalene	0 / 8				-	-
2-Methylphenol	0 / 8				-	-
2-Nitroaniline	0 / 8				-	-
2-Nitrophenol	0 / 8				-	-

Table 7.72 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		
3,3'-Dichlorobenzidine	0 / 8				-	.
3-Nitroaniline	0 / 8				-	.
4,6-Dinitro-2-methylphenol	0 / 8				-	.
4-Bromophenyl-phenylether	0 / 8				-	.
4-Chloro-3-methylphenol	0 / 8				-	.
4-Chloroaniline	0 / 8				-	.
4-Chlorophenyl-phenylether	0 / 8				-	.
4-Methylphenol	0 / 8				-	.
4-Nitroaniline	0 / 8				-	.
4-Nitrophenol	0 / 8				-	.
Acenaphthene	0 / 8				-	.
Acenaphthylene	0 / 8				-	.
Aniline	0 / 8				-	.
Anthracene	0 / 8				-	.
Benzidine	0 / 8				-	.
Benzo(a)anthracene	0 / 8				-	.
Benzo(a)pyrene	0 / 8				-	.
Benzo(b)fluoranthene	0 / 8				-	.
Benzo(g,h,i)perylene	0 / 8				-	.
Benzo(k)fluoranthene	0 / 8				-	.
Benzoic acid	0 / 8				-	.
Benzyl alcohol	0 / 8				-	.
Butylbenzylphthalate	0 / 8				-	.
Chrysene	0 / 8				-	.
Di-n-butylphthalate	7 / 8	JB 2	4.2857	JB 8	-	.
Di-n-octylphthalate	0 / 8				-	.
Dibenz(a,h)anthracene	0 / 8				-	.
Dibenzofuran	0 / 8				-	.
Diethylphthalate	3 / 8	JB 0.6	1.2	JB 2	-	.
Dimethylphthalate	0 / 8				-	.
Fluoranthene	0 / 8				-	.
Fluorene	0 / 8				-	.
Hexachlorobenzene	0 / 8				-	.
Hexachlorobutadiene	0 / 8				-	.
Hexachlorocyclopentadiene	0 / 8				-	.
Hexachloroethane	0 / 8				-	.
Indeno(1,2,3-cd)pyrene	0 / 8				-	.
Isophorone	0 / 8				-	.
N-Nitroso-di-n-propylamine	0 / 8				-	.
N-Nitrosodimethylamine	0 / 8				-	.
N-Nitrosodiphenylamine	0 / 8				-	.
Naphthalene	0 / 8				-	.
Nitrobenzene	0 / 8				-	.
Pentachlorophenol	0 / 8				1 <sup>P</sup>	x
Phenanthrene	0 / 8				-	.
Phenol	0 / 8				-	.
Pyrene	0 / 8				-	.
Pyridine	0 / 8				-	.
bis(2-Chloroethoxy)methane	0 / 8				-	.



Table 7.72 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>		
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>				
bis(2-Chloroethyl)ether	0 / 8				-	-		
bis(2-Chloroisopropyl)ether	0 / 8				-	-		
bis(2-Ethylhexyl)phthalate	8 / 8	J	0.7	6.3375	37	-		
<i>Semivolatile organics, tentatively identified compounds (µg/L)</i>								
1,2-Benzenedicarboxylic acid	1 / 1	J	8	8	J	8	-	-
1,2-Xylene	1 / 1	J	35	35	J	35	-	-
2-Pentanone, 4-hydroxy-4-methyl	7 / 7	JAB	84	153.86	JAB	230	-	-
Dimethyl benzene	5 / 5	JY	49	99.8	JY	170	-	-
Ethylbenzene	2 / 2	J	28	69	J	110	-	-
Toluene	1 / 1	J	18	18	J	18	-	-
Unknown	15 / 15	J	8	32.933	J	110	-	-
<i>Dissolved<sup>1</sup> metals by spectrochemistry (mg/L)</i>								
Arsenic	0 / 16					0.05 <sup>P</sup>		x
Lead	0 / 16					0.015 <sup>P</sup>		x
Mercury	0 / 16					0.002 <sup>P</sup>		x
Selenium	1 / 16		0.0059	0.0059	0.0059	0.05 <sup>P</sup>		0
Thallium	0 / 16					-		-
<i>Total<sup>1</sup> metals by spectrochemistry (mg/L)</i>								
Arsenic	4 / 16		0.0061	0.0205	0.039	0.05 <sup>P</sup>		0
Lead	9 / 16		0.0049	0.0505	0.2	0.015 <sup>P</sup>		4
Mercury	2 / 16		0.0002	0.0003	0.0004	0.002 <sup>P</sup>		0
Selenium	1 / 16		0.0067	0.0067	0.0067	0.05 <sup>P</sup>		0
Thallium	0 / 16					-		-
<i>Volatile organics (µg/L)</i>								
1,1,1-Trichloroethane	0 / 16					200 <sup>P</sup>		x
1,1,2,2-Tetrachloroethane	0 / 16					-		-
1,1,2-Trichloroethane	0 / 16					-		-
1,1-Dichloroethane	0 / 16					-		-
1,1-Dichloroethene	0 / 16					7 <sup>P</sup>		x
1,2-Dichloroethane	0 / 16					5 <sup>P</sup>		x
1,2-Dichloroethene (total)	0 / 16					70 <sup>P</sup>		x
1,2-Dichloropropane	0 / 16					5 <sup>P</sup>		x
2-Butanone	0 / 16					-		-
2-Hexanone	0 / 16					-		-
4-Methyl-2-pentanone	0 / 16					-		-
Acetone	1 / 16	J	19	19	J	19		-
Benzene	0 / 16					5 <sup>P</sup>		x
Bromodichloromethane	0 / 16					100 <sup>P</sup>		x
Bromoform	0 / 16					100 <sup>P</sup>		x
Bromomethane	0 / 16					-		-
Carbon disulfide	0 / 16					-		-

Table 7.72 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results				Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>			
Carbon tetrachloride	0 / 16					5 <sup>P</sup>	x
Chlorobenzene	0 / 16					100 <sup>P</sup>	x
Chloroethane	0 / 16					200 <sup>P</sup>	x
Chloroform	0 / 16					100 <sup>P</sup>	x
Chloromethane	0 / 16					-	-
Dibromochloromethane	0 / 16					100 <sup>P</sup>	x
Ethylbenzene	0 / 16					700 <sup>P</sup>	x
Methylene chloride	0 / 16					-	-
Styrene	0 / 16					100 <sup>P</sup>	x
Tetrachloroethene	1 / 16	J 1	1	J 1		5 <sup>P</sup>	0
Toluene	1 / 16	J 0.9	0.9	J 0.9		1000 <sup>P</sup>	0
Trichloroethene	0 / 16					5 <sup>P</sup>	x
Vinyl acetate	0 / 16					-	-
Vinyl chloride	0 / 16					2 <sup>P</sup>	x
Xylene (total)	0 / 16					10,000 <sup>P</sup>	x
cis-1,3-Dichloropropene	0 / 16					-	-
trans-1,3-Dichloropropene	0 / 16					-	-
<i>Volatile organics, tentatively identified compounds (µg/L)</i>							
Hexane	8 / 8	JB 17	20.875	JB 24		-	-
Unknown	1 / 1	J 6	6	J 6		-	-
Unknown hydrocarbon	1 / 1	J 23	23	J 23		-	-
<i>Dissolved<sup>1</sup> wet chemistry (mg/L)</i>							
Uranium fluorometric (mg/L)	4 / 8	0.001	0.0175	0.065		0.02 <sup>P</sup>	1
<i>Total<sup>1</sup> wet chemistry</i>							
Alkalinity (mg/L)	8 / 8	14	145	245		-	-
Chloride (mg/L)	8 / 8	1	5.25	12		250 <sup>S</sup>	0
Conductivity (µmho/cm)	n / 64	67	384.87	952		-	-
Cyanide colorimetric (mg/L)	0 / 8					-	-
Dissolved solids (mg/L)	8 / 8	68	219	344		500 <sup>S</sup>	0
Fluoride (mg/L)	7 / 8	0.1	0.2714	0.8		2 <sup>S</sup>	0
Fluoride SIE (mg/L)	1 / 8	0.3	0.3	0.3		2 <sup>S</sup>	0
Nitrate brucine (mg/L)	6 / 8	0.28	1.5133	2.2		10 <sup>P</sup>	0
Sulfate (mg/L)	7 / 8	2	15.429	42		250 <sup>S</sup>	0
Suspended solids (mg/L)	8 / 8	6	8533.4	48,920		-	-
Turbidity (NTU)	8 / 8	6	5620	40,000		1 <sup>P</sup>	8
Uranium fluorometric (mg/L)	4 / 8	0.001	0.0152	0.056		0.02 <sup>P</sup>	1
pH (std units)	n / 64	5.4	7.0047	11.6		6.5 - 8.5 <sup>S</sup>	13

<sup>1</sup> Total = unfiltered sample (soluble + suspended) and Dissolved = filtered sample (soluble only). ICP = inductively coupled plasma

<sup>2</sup> Both the number of detected results and the total number of results include all duplicate and replicate measurements. No blanks, matrix spikes, equipment rinseate or other QA/QC data are reported in this table. n denotes not applicable.

Table 7.72 (continued)

Analyte	Number detected/ number of results <sup>2</sup>	Detected results			Reference Value <sup>5</sup>	Number exceeding reference value <sup>6</sup>
		Minimum <sup>3</sup>	Average <sup>4</sup>	Maximum <sup>3</sup>		

- 3 The minimum and maximum detected results are listed with their laboratory analytical qualifiers.
- A denotes aldol condensation product
  - B denotes parameter found in blank as well as sample
  - C denotes control analysis outside of control limits
  - J denotes an estimated value (usually below the detection limit)
  - N denotes confirmed by second column; quantitative results differed by more than 50% between columns.
  - s denotes the spike recovery is not within limits
  - Y denotes indistinguishable isomer in tentatively identified compound (TIC)
  - + denotes the duplicate control limits do not apply, duplicate and sample near the minimum detectable activity (MDA).
- 4 The average radiochemistry results and their associated limits of error were calculated from all of the results using optimally weighted mean and variance estimates assuming independent measurements with unequal errors, as documented in *Radiation Detection and Measurement* by Glenn F. Knoll, New York: John Wiley and Sons (1979), pp. 137-139. For the non-radiochemistry analytes the average listed is the unweighted arithmetic mean of all detected results. No analytical qualifiers are listed for the average.
- 5 If a reference value exists it originates from the following sources:
- P 40 CFR Part 141 National Primary Drinking Water Regulations, Subparts B and G, as amended
  - S 40 CFR Part 143 National Secondary Drinking Water Regulations, as amended
  - D DOE Order 5400.5, Chapter III, Derived Concentration Guides (DCG) for Air and Water. Four percent of the DOE DCG represents the DOE criterion of 4 mrem effective dose equivalent from ingestion of drinking water.
  - denotes no reference value exists for this analyte
- 6 The number of detected results exceeding the reference value is given.
- denotes that since no reference value exists for this analyte, the number exceeding is not applicable.
  - x denotes that no detected measurements were reported for this analyte so that no comparisons were made to the reference value.

**Table 8.1. Number of measurements from external control programs,  
Y-12 Analytical Services Organization, CY 1993**

Program	Total measurements	Measurements in limits
Proficiency Analytical Testing (PAT)	120	120
Proficiency Environmental Testing (PET)	2368	2341
EPA Discharge Monitoring Report (DMR)	29	29
EPA Drinking Water Certification	70	65
EPA Environmental Monitoring System Laboratory (EMSL)	46	27
DOE Environmental Measurements Laboratory (DOE-EML)	36	30
EPA Contract Laboratory Program (CLP)	<i>a</i>	<i>a</i>
Mixed Analyte Performance Evaluation Program (MAPEP)	25	25
<b>Total</b>	<b>2694</b>	<b>2637</b>

<sup>a</sup>This program scores on additional criteria other than an "acceptable/unacceptable" evaluation of the measurement result. Y-12 Plant Analytical Services Organization score average for 1993; 77.12%.

**Table 8.2. ORNL Site Analytical Services Organization external performance evaluation programs, CY 1993**

Program	Total measurements	Measurements in limits	Percentage acceptable	Program numbers
CLP	<i>a</i>	<i>a</i>	<i>a</i>	OAL and IA 2Q93-1Q94
DMR	24	22	91.67	DMR #13
PAT	48	45	93.75	Rounds 112-115
PET	1778	1763	99.16	OAL and IA Jan.-Dec. 93
WP <sup>b</sup>	271	253	93.36	WP030 and WP031
WS <sup>b</sup>	57	55	96.49	WS032
EML	69	67	97.10	EML 551 and 556
EMSL <sup>c</sup>	22	16	72.22	CY 1993

<sup>a</sup>This program scores on additional criteria other than an "acceptable/unacceptable" evaluation of the measurement result. ORNL ASD average score for 1993: 81.8%.

<sup>b</sup>WP: water pollution; WS: water supply.

<sup>c</sup>In recalculating the total number of measurements and number of measurements in limits from the percentage acceptable,  $16/22 = 72.7\%$  was the closest value achievable.

Table 8.3. Number of measurements from external control programs,  
K-25 Site Analytical Services Organization, CY 1993

Program	Total measurements	Number unacceptable	Measurements in limits	Percentage acceptable
CLP <sup>a</sup>	127	14	113	88.98
DMR	28	2	26	92.86
ELPAT	48	2	46	95.83
EML-QAP <sup>b</sup>	41	6	35	85.37
EMSL-LV	31	11	20	64.52
MAPEP <sup>c</sup>	27	0	27	100.00
PAT	112	0	112	100.00
PET	278	3	275	98.92
WP	180	13	167	92.78
WS <sup>d</sup>	70	14	56	80.00
Total	942	65	877	93.1

<sup>a</sup>Sources received for this program are based on weighted averages instead of "acceptable/unacceptable" ratios.

<sup>b</sup>Environmental Measurements Laboratory—Quality Assessment Program.

<sup>c</sup>This is a pilot program for which no acceptance limits have been established.

<sup>d</sup>Awaiting results for last evaluation study for 1993.

**Table A.1. Reference standards for water**

Parameter	All parameters				Tennessee water quality criteria— fish & aquatic life <sup>e</sup>	Tennessee water quality criteria— recreation <sup>f</sup>	Radionuclides only	
	National primary drinking water <sup>d</sup>	National secondary drinking water <sup>b</sup>	Tennessee water quality criteria— domestic water supply <sup>c</sup>	Antions (mg/L)			4% of DOE DCG <sup>d</sup>	DOE DCG
Chloride		250						
Fluoride	4.0	2.0						
Nitrate	10							
Nitrite	1.0							
Sulfate, as SO <sub>4</sub>		250						
<i>Base/neutral/acid extractable organics (µg/L)</i>								
1,2-Dichlorobenzene	600				17,000			
1,3-Dichlorobenzene					2,600			
1,4-Dichlorobenzene	75	5.0		75	2,600			
2,4-Dinitrophenol					1,400			
2,4-Dinitrotoluene					42			
2,4,6-Trichlorophenol					6.5			
2-Methyl-4,6-Dinitrophenol					765			
3,4-Benzofluoranthene					0.3			
Benzo(k)fluoranthene					0.3			
Acenaphthylene					0.3			
Anthracene					0.03			
Benzo(a)anthracene					0.3			
Benzo(a)pyrene					0.3			
bis-(2-chloroethyl)ether					14			
bis-(2-ethylhexyl)phthalate					59			
Di-n-butyl phthalate					12,000			
Diethyl phthalate					120,000			
Dimethyl phthalate					2,900,000			
Fluoranthene					54			
Fluorene					0.03			
Hexachlorobenzene					0.007			
Hexachloroethane					89			

Table A.1 (continued)

Parameter	All parameters				Radionuclides only		
	National primary drinking water <sup>a</sup>	National secondary drinking water <sup>b</sup>	Tennessee water quality criteria—domestic water supply <sup>c</sup>	Tennessee water quality criteria—fish & aquatic life <sup>c</sup>	Tennessee water quality criteria—recreation <sup>c</sup>	4% of DOE DCG <sup>d</sup>	DOE DCG
Nitrobenzene					1,900		
Pentachlorophenol	1.0			20			
Phenathrene					0.03		
Pyrene					0.03		
Dissolved oxygen, mg/L				5.0			
Temperature, °C			30.5		30.5		
Turbidity, JTU <sup>e</sup>	1.0						
pH, standard units		(6.5, 8.5)	(6.0, 9.0)	(6.5, 8.5)	(6.0, 9.0)		
			<i>Metals (mg/L)</i>				
Aluminum		0.2					
Antimony					4.31		
Arsenic	0.05		0.05	0.36			
Barium	2.0						
Beryllium						0.0013	
Cadmium	0.005		0.01	0.004			
Chromium	0.1		0.05	0.016	670		
Copper	1.3 <sup>f</sup>	1.0		0.018			
Cyanide				0.022			
Iron		0.3					
Lead	0.015 <sup>g</sup>		0.05	0.082			
Manganese		0.05					
Mercury	0.002		0.002	0.0024		0.00015	
Nickel				1.4		4.6	
Selenium	0.05		0.01	0.02			
Silver		0.1	0.05	0.004			
Zinc		5.0		0.117			
Asbestos (fibers/L)		7,000,000					
			<i>Others</i>				

**Table A.1 (continued)**

Parameter	All parameters				Radionuclides only		
	National primary drinking water <sup>a</sup>	National secondary drinking water <sup>b</sup>	Tennessee water quality criteria—domestic water supply <sup>c</sup>	Tennessee water quality criteria—fish & aquatic life <sup>c</sup>	Tennessee water quality criteria—recreation <sup>d</sup>	4% of DOE DCG <sup>e</sup>	DOE DCG
Coliform Bacteria (ml)	0.01						
Color (color units)		15		0.022			
Cyanide (mg/L)							
Odor (T.O.N.)		3					
Total dissolved solids, mg/L		500	500				
			<i>Pesticides/herbicides/PCBs (µg/L)</i>				
2,3,7,8-TCDD (Dioxin)						0.000001	
2,4-D	70						
2,4,5-TP (Silvex)	50			1.1		0.006	
4,4'-DDT						0.006	
4,4'-DDE						0.008	
4,4'-DDD							
Alachlor	2						
Aldicarb sulfoxide	4						
Aldrin				3		0.014	
Atrazine	3						
Carbofuran	40						
Chlordane	2			2.4		0.006	
Dalapon	200						
a-Endosulfan				0.22		2	
b-Endosulfan				0.22		2	
Endrin				0.18			
Ethylene dibromide	0.05						
Heptachlor	0.4			0.52		0.002	
Heptachlor epoxide	0.2			0.52		0.001	
g-BHC (Lindane)	0.2			2.0		0.63	
Methoxychlor	40						
PCB-1242						0.0005	
PCB-1254						0.0005	



**Table A.1 (continued)**

All parameters

Parameter	National primary drinking water <sup>a</sup>	National secondary drinking water <sup>b</sup>	Tennessee water quality criteria—domestic water supply <sup>c</sup>	Tennessee water quality criteria—fish & aquatic life <sup>c</sup>	Tennessee water quality criteria—recreation <sup>f</sup>	Radionuclides only	
						4% of DOE DCG <sup>d</sup>	DOE DCG
PCB-1221					0.0005		
PCB-1232					0.0005		
PCB-1248					0.0005		
PCB-1260					0.0005		
PCB-1016					0.0005		
PCB, total	0.5				0.001		
Toxaphene	3.0			0.73	0.008		
<i>Radionuclides (pCi/L)<sup>g</sup></i>							
Am-241						1.2	30
Bi-214						24,000	600,000
C-14						101	2,800
Cd-109						400	10,000
Ce-143						1,200	30,000
Co-60						200	5,000
Cr-51						4,000	100,000
Cs-137						120	3,000
Eu-155						4,000	100,000
Gross alpha	15						
Gross beta	50 <sup>h</sup>						
H-3	20,000						
I-131						80,000	2,000,000
K-40						120	3,000
Np-237						280	7,000
Pa-234m						1.2	30
Pu-238						2,800	70,000
Pu-239/240						1.6	40
Ra-226	5.0					1.2	30
Ra-228	5.0					4	100
Ru-106						4	100
						240	6,000

**Table A.1 (continued)**

All parameters

Parameter	National primary drinking water <sup>a</sup>	National secondary drinking water <sup>b</sup>	Tennessee water quality criteria—domestic water supply <sup>c</sup>	Tennessee water quality criteria—fish & aquatic life <sup>c</sup>	Tennessee water quality criteria—recreation <sup>c</sup>	Radionuclides only	
						4% of DOE DCG <sup>d</sup>	DOE DCG
Tc-99						4,000	100,000
Th-228						16	400
Th-230						12	300
Th-232						2	50
Th-234						400	10,000
Thorium, natural						2	50
Total rad Sr	8.0					40	1,000
U-234						20	500
U-235						24	600
U-238						24	600
Uranium, natural						24	600
Uranium, total <sup>e</sup>						20	500
<i>Volatile organics (µg/L)</i>							
1,1,1-Trichloroethane	200		200		170,000		
1,1-Dichloroethene	7.0		7.0		32		
1,1,2-Trichloroethane					420		
1,1,2,2-Tetrachloroethane					110		
1,2-Dichloroethane	5.0		5.0		990		
1,2-Dichloroethene	70						
cis-1,2-Dichloroethene	70						
trans-1,2-Dichloroethene	100						
1,2-Dichloropropane	5.0						
cis-1,3-Dichloropropane					1,700		
trans-1,2-Dichloropropane					1,700		
Acrolein					780		
Acrylonitrile					6.7		
Benzene	5.0		5.0		710		
Bromodichloromethane	100 <sup>f</sup>						
Bromoform	100 <sup>f</sup>				4,700		

Table A.1 (continued)

Parameter	All parameters				Radionuclides only		
	National primary drinking water <sup>a</sup>	National secondary drinking water <sup>b</sup>	Tennessee water quality criteria—domestic water supply <sup>c</sup>	Tennessee water quality criteria—fish & aquatic life <sup>c</sup>	Tennessee water quality criteria—recreation <sup>f</sup>	4% of DOE DCG <sup>g</sup>	DOE DCG
Carbon tetrachloride	5.0		5.0		44		
Chlorobenzene	100						
Chloroethane	200						
Chloroform	100 <sup>h</sup>				4,700		
Dibromochloromethane	100 <sup>h</sup>				4,700		
Ethylbenzene	700				29,000		
Methylene chloride					16,000		
Styrene	100						
Tetrachloroethene	5.0				88		
Toluene	1,000				300,000		
Total Trihalomethanes	100				100		
Trichloroethene	5.0		5.0		807		
Vinyl chloride	2.0		2.0		5,250		
Xylene, total	10,000						

<sup>a</sup>40 CFR Part 141--National Primary Drinking Water Regulations, Subparts B and G, as amended.

<sup>b</sup>40 CFR Part 143--National Secondary Drinking Water Regulations, as amended.

<sup>c</sup>Rules of Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, as amended.

<sup>d</sup>DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water. Four percent of the DOE DCG to represent the DOE criterion of 4 mrem effective dose equivalent from ingestion of drinking water.

<sup>e</sup>JTU an NTU are roughly equivalent in the range of 25 to 1000 JTU.

<sup>f</sup>Action level, which is applicable to community water systems and non-transient, non-community water systems.

<sup>g</sup>Only the radionuclides that were sought at the Oak Ridge Reservation are listed.

<sup>h</sup>Regulatory guide for assessing compliance without further analysis.

<sup>i</sup>Minimum of uranium isotopes.

<sup>j</sup>Limit for total trihalomethanes (bromodichloromethane + bromoform + chloroform + dibromochloromethane).

Table A.2. Air permits at the Y-12 Plant

Y-12 Plant source number	Emission source reference number	Permit number	Source description
<i>Part I. Operating permits at the Y-12 Plant</i>			
Fugitive emission source	01-1020-89	034295P	Fugitive air emission at Y-12 Plant
Y-12-Plant-A(00)	01-0020-08	035025P	Plantwide permit for fluorescent light crusher
Y-9201-1-A(01)	01-0020-15	730303P	Welding booths
Y-9201-1-A(02)	01-0020-15	730303P	Welding shop
Y-9201-1-A(04)	01-0020-15	730303P	Metal fabrication shop
Y-9201-1-A(05)	01-0020-15	730303P	Welding shop
Y-9201-1-A(15)	01-0020-15	730303P	Metal fabrication shop
Y-9201-1-B(16)	01-0020-59	730310P	Tool grinding machines
Y-9201-1-B(18)	01-0020-59	730310P	Sand blaster exhaust
Y-9201-1-C(278)	01-0020-17	730304P	Graphitic carbon machining
Y-9201-1-C(279)	01-0020-17	730304P	Graphitic carbon machining
Y-9201-1-D(09)	01-0020-59	730310P	Fabrication shop
Y-9201-1-D(10)	01-0020-59	730310P	Fabrication shop
Y-9201-1-D(11)	01-0020-59	730310P	Fabrication shop
Y-9201-1-D(13)	01-0020-59	730310P	Metal grinders and milling machines
Y-9201-1-E(00)	01-1020-92	031880P	Lead machining operations
Y-9201-2-B(02)	01-0020-43	012887P	Acid wash station
Y-9201-3-A(01)	01-0020-55	013002F	Diesel generator
Y-9201-4-A(264)	01-1020-96	032956P	Mercury flasking hood
Y-9201-5-B(071)	01-0020-21	730305P	Machining operations L5N hood exhaust
Y-9201-5-B(072)	01-0020-21	730305P	Vacuum inlets L5E machining shop
Y-9201-5-B(03)	01-0020-21	730305P	Rubber-gel potting hood exhaust
Y-9201-5-B(073)	01-0020-21	730305P	Palarite shop, machine exhaust
Y-9201-5-B(267)	01-0020-21	730305P	Tool-grinding machines hood exhaust
Y-9201-5-B(277)	01-0020-21	730305P	Cleaning hood, equipment service
Y-9201-5-B(273)	01-0020-21	730305P	Electrochemical machine, stainless steel
Y-9201-5-D(01)	01-1020-44	025902P	Hood
Y-9201-5-D(02)	01-1020-44	025902P	Film dryer exhaust fume hood
Y-9201-5-E(01)	01-1020-70	025983P	BeO hot press
Y-9201-5-E(02)	01-1020-70	025983P	A53 hot press house vacuum
Y-9201-5-E(08)	01-1020-70	025983P	Room exhaust
Y-9201-5-G(01)	01-0020-44	730308P	Arc melt
Y-9201-5-G(02)	01-0020-44	730308P	DeVilbiss hood
Y-9201-5-G(03)	01-0020-44	730308P	Nitric acid dip tanks
Y-9201-5-G(04)	01-0020-44	730308P	Acid pickling tanks
Y-9201-5-G(05)	01-0020-44	730308P	Abrasive saws
Y-9201-5-G(06)	01-0020-44	730308P	Scrap metal recycle
Y-9201-5-G(07)	01-0020-44	730308P	Vapor degreaser
Y-9201-5-H(01)	01-0020-16	026019P	Mixing process material
Y-9201-5-H(02)	01-0020-16	026019P	Setup and sample area
Y-9201-5-H(03)	01-0020-16	026019P	Vapor blaster
Y-9201-5-H(04)	01-0020-16	026019P	Nickel-plating tank exhaust
Y-9201-5-H(05)	01-0020-16	026019P	Material handling

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9201-5-H(06)	01-0020-16	026019P	Material handling
Y-9201-5-H(07)	01-0020-16	026019P	Glove box and blending station
Y-9201-5-H(08)	01-0020-16	026019P	Inspection house vacuum
Y-9201-5N-A(67)	01-1020-18	730314P	Machine shop exhaust
Y-9201-5N-B(239)	01-0020-30	030484P	Plating tanks and hoods
Y-9201-5N-B(240)	01-0020-30	030484P	Plating tanks and hoods
Y-9201-5N-B(241)	01-0020-30	030484P	Plating tanks and hoods
Y-9201-5N-B(242)	01-0020-30	030484P	Incinerator
Y-9201-5N-B(243)	01-0020-30	030484P	Grit blaster
Y-9201-5N-B(244)	01-0020-30	030484P	Grit blaster and area exhaust
Y-9202-A-(20)	01-0020-06	031696P	Laboratory beryllium
Y-9202-A-(21)	01-0020-06	031696P	Laboratory
Y-9204-2-A(01)	01-0020-46	026107P	Storage tank
Y-9204-2-A(02)	01-0020-46	026107P	Storage tank
Y-9204-2-A(03)	01-0020-46	026107P	Storage tank
Y-9204-2-A(04)	01-0020-46	026107P	Storage tank
Y-9204-2-A(05)	01-0020-46	026107P	Storage tank
Y-9204-2-A(06)	01-0020-46	026107P	Storage tank
Y-9204-2-A(07)	01-0020-46	026107P	Storage tank
Y-9204-2-A(08)	01-0020-46	026107P	Storage tank
Y-9204-2-A(09)	01-0020-46	026107P	Storage tank
Y-9204-2-A(10)	01-0020-46	026107P	Storage tank
Y-9204-2-A(11)	01-0020-46	026107P	Storage tank
Y-9204-2-A(12)	01-0020-46	026107P	Storage tank
Y-9204-2-A(13)	01-0020-46	026107P	Storage tank
Y-9204-2-B	01-0020-45	012889P	Storage tank
Y-9204-2-B(14)	01-0020-71	025954P	Reduction cell
Y-9204-2-B(15)	01-0020-71	025954P	Reduction cell
Y-9204-2-B(16)	01-0020-71	025954P	Reduction cell
Y-9204-2-B(17)	01-0020-71	025954P	Reduction cell
Y-9204-2-B(18)	01-0020-71	025954P	Caustic scrubber exhaust
Y-9204-2-B(19)	01-0020-71	025954P	Caustic scrubber exhaust
Y-9204-2-B(20)	01-0020-71	025954P	Storage area
Y-9204-2-B(21)	01-0020-71	025954P	Reduction cell
Y-9204-2-B(22)	01-0020-71	025954P	Reduction cell
Y-9204-2-B(23)	01-0020-71	025954P	Caustic scrubber exhaust
Y-9204-2-B(24)	01-0020-71	025954P	Caustic scrubber exhaust
Y-9204-2-B(25)	01-0020-71	025954P	Lithium metal wash station
Y-9204-2-B(26)	01-0020-71	025954P	Cleaning station
Y-9204-2-B(27)	01-0020-71	025954P	Lithium remelt oven
Y-9204-2-B(28)	01-0020-71	025954P	Reduction cell
Y-9204-2-C(29)	01-1020-19	025900P	Classified
Y-9204-2-C(30)	01-1020-19	025900P	Classified
Y-9204-2-C(31)	01-1020-19	025900P	Classified
Y-9204-2-C(32)	01-1020-19	025900P	Classified

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9204-2-C(33)	01-1020-19	025900P	Classified
Y-9204-2-C(34)	01-1020-19	025900P	Classified
Y-9204-2-C(35)	01-1020-19	025900P	Classified
Y-9204-2-C(36)	01-1020-19	025900P	Classified
Y-9204-2-C(37)	01-1020-19	025900P	Classified
Y-9204-2-C(38)	01-1020-19	025900P	Classified
Y-9204-2-C(39)	01-1020-19	025900P	Classified
Y-9204-2-C(40)	01-1020-19	025900P	Classified
Y-9204-2-C(41)	01-1020-19	025900P	Classified
Y-9204-2-C(42)	01-1020-19	025900P	Classified
Y-9204-2-C(43)	01-1020-19	025900P	Classified
Y-9204-2-C(44)	01-1020-19	025900P	Classified
Y-9204-2-C(45)	01-1020-19	025900P	Classified
Y-9204-2-C(46)	01-1020-19	025900P	Classified
Y-9204-2-C(47)	01-1020-19	025900P	Classified
Y-9204-2-C(48)	01-1020-19	025900P	Classified
Y-9204-2-C(49)	01-1020-19	025900P	Classified
Y-9204-2-C(50)	01-1020-19	025900P	Classified
Y-9204-2-C(51)	01-1020-19	025900P	Classified
Y-9204-2-D(52)	01-1020-57	025967P	Storage tanks
Y-9204-2-D(53)	01-1020-57	025967P	Station
Y-9204-2-D(54)	01-1020-57	025967P	Salvage vats
Y-9204-2-D(55)	01-1020-57	025967P	Storage tank
Y-9204-2-D(56)	01-1020-57	025967P	Lithium chloride crystallizer
Y-9204-2-D(57)	01-1020-57	025967P	Lithium chloride crystallizer
Y-9204-2-D(58)	01-1020-57	025967P	Neutralizer
Y-9204-2-D(59)	01-1020-57	025967P	Three lab hoods
Y-9204-2-D(60)	01-1020-57	025967P	Process tank
Y-9204-2-D(61)	01-1020-57	025967P	Lithium chloride crystallizer
Y-9204-2-D(62)	01-1020-57	025967P	Lithium hydroxide neutralizer
Y-9204-2-D(63)	01-1020-57	025967P	HCl head tanks
Y-9204-2-D(64)	01-1020-57	025967P	Process tanks
Y-9204-2-D(65)	01-1020-57	025967P	Process tank
Y-9204-2-D(66)	01-1020-57	025967P	Neutralizer
Y-9204-2-D(67)	01-1020-57	025967P	Neutralizer
Y-9204-2-E(68)	01-1020-55	730328P	Oven
Y-9204-2-E(69)	01-1020-55	730328P	Oven
Y-9204-2-E(70)	01-1020-55	730328P	Tungsten screener
Y-9204-2-E(71)	01-1020-55	730328P	Dry box vent
Y-9204-2-E(72)	01-1020-55	730328P	Glove boxes
Y-9204-2-E(73)	01-1020-55	730328P	Material handling
Y-9204-2-E(74)	01-1020-55	730328P	Glove boxes
Y-9204-2-E(75)	01-1020-55	730328P	Outgassing/annealing ovens
Y-9204-2-E(76)	01-1020-55	730328P	Material handling
Y-9204-2-E(77)	01-1020-55	730328P	Glove boxes

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9204-2-E(78)	01-1020-55	730328P	Reactor unloading station
Y-9204-2-E(79)	01-1020-55	730328P	Reactor unloading station
Y-9204-2-E(80)	01-1020-55	730328P	Glove boxes
Y-9204-2-E(81)	01-1020-55	730328P	Vacuum pump
Y-9204-2-F	01-0020-32	012874P	Storage tank
Y-9204-2-F(082)	01-0020-51	025897P	Classified
Y-9204-2-F(083)	01-0020-51	025897P	Classified
Y-9204-2-F(084)	01-0020-51	025897P	Classified
Y-9204-2-F(085)	01-0020-51	025897P	Classified
Y-9204-2-F(086)	01-0020-51	025897P	Classified
Y-9204-2-F(087)	01-0020-51	025897P	Classified
Y-9204-2-G(088)	S01-1020-79	028350P	Inspection operation
Y-9204-2-G(089)	S01-1020-79	028350P	Metalworking machine shop hood, B-2
Y-9204-2-G(090)	S01-1020-79	028350P	Metalworking machine shop hood, B-2
Y-9204-2-H(492)	S01-1020-42	025952P	Etching vats
Y-9204-2-H(493)	S01-1020-42	025952P	Glue mixing
Y-9204-2E-A(202)	01-1020-91	730938P	Positive Ion Accelerator
Y-9204-2E-A(436)	01-0020-68	730312P	Oven
Y-9204-2E-A(439)	01-0020-68	730312P	Hood exhaust
Y-9204-2E-A(441)	01-0020-68	730312P	Hood
Y-9204-2E-A(442)	01-0020-68	730312P	Hood
Y-9204-2E-A(443)	01-0020-68	730312P	Degreaser
Y-9204-2E-A(444)	01-0020-68	730312P	Electropolishers
Y-9204-2E-A(445)	01-0020-68	730312P	Surface coating
Y-9204-2E-A(448)	01-0020-68	730312P	Glove box
Y-9204-2E-B(12)	01-1020-41	025953P	X-ray testing
Y-9204-2E-B(14)	01-1020-41	025953P	Hoods
Y-9204-2E-B(15)	01-1020-41	025953P	Hoods
Y-9204-2E-C(12)	01-1020-55	730328P	Machine shop hood exhaust, B2E
Y-9204-2E-C(13)	01-1020-55	730328P	Machine shop hood exhaust, specimen shop
Y-9204-3-AJ-106	01-0020-89	018208P	Roof exhaust stack
Y-9204-4-A(02)	01-1020-56	032416P	Wash tank
Y-9204-4-A(03)	01-1020-56	032416P	Quench tanks
Y-9204-4-A(04)	01-1020-56	032416P	1,000-ton press
Y-9204-4-A(05)	01-1020-56	032416P	7,500-ton press
Y-9204-4-A(06)	01-1020-56	032416P	Exhaust from press pit area
Y-9204-4-A(07)	01-1020-56	032416P	Plasma torch cutting machine
Y-9204-4-A(08)	01-1020-56	032416P	Vacuum quench furnace
Y-9204-4-A(09)	01-1020-56	032416P	Ingot cooler
Y-9204-4-A(10)	01-1020-56	032416P	Exhaust from lathe
Y-9204-4-A(11)	01-1020-56	032416P	Grinding facility
Y-9204-4-A(12)	01-1020-56	032416P	Dye penetrant
Y-9204-4-A(13)	01-1020-56	032416P	Salt baths
Y-9204-4-A(14)	01-1020-56	032416P	Quench tanks
Y-9204-4-A(15)	01-1020-56	032416P	Preheat furnace exhaust

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9204-4-A(17)	01-1020-56	032416P	Oven exhaust
Y-9204-4-A(18)	01-1020-56	032416P	Vacuum furnace quench chamber
Y-9204-4-A(19)	01-1020-56	032416P	7,500-ton press and 1,500-ton press
Y-9204-4-A(88)	01-1020-56	032416P	Grit blast system
Y-9204-4-B(481)	01-0020-72	730313P	Exhaust from machining operation
Y-9204-4-B(482)	01-0020-72	730313P	Exhaust from hood, reclamation area
Y-9204-4-B(484)	01-0020-72	730313P	Rolling mill, first floor assembly
Y-9204-4-B(485)	01-0020-72	730313P	Exhaust from paint hood
Y-9204-4-B(486)	01-0020-72	730313P	Filtering exhaust from paint booths
Y-9204-4-B(488)	01-0020-72	730313P	Laboratory hoods, first floor
Y-9204-4-B(489)	01-0020-72	730313P	Laboratory hoods, reclamation area
Y-9204-4-B(490)	01-0020-72	730313P	Assembly process, first floor
Y-9204-4-B(491)	01-0020-72	730313P	Assembly process, first floor
Y-9204-4-D(1)	01-1020-35	032584P	Product certification cleaning
Y-9204-4-E(258)	01-0020-33	030819P	Plating equipment
Y-9204-4-E(259)	S01-0020-33	025002P	Plating equipment
Y-9204-4-E(260)	S01-0020-33	025002P	Plating equipment
Y-92044-E(261)	S01-0020-33	025002P	Plating equipment
Y-9206-A(01)	01-0020-48	012892P	8,500-gal storage tank, tank farm
Y-9206-A(02)	01-0020-48	012892P	12,800-gal storage tank, tank farm
Y-9206-A(03)	01-0020-48	012892P	10,000-gal storage tank, tank farm
Y-9206-B(013)	01-0020-03	731689P	South stack, incinerator
Y-9206-B(015)	01-0020-03	731689P	West stack
Y-9206-B(016)	01-0020-03	731689P	Dissolving hood
Y-9206-B(017)	01-0020-03	731689P	Steam cleaning hoods
Y-9206-B(115)	01-0020-03	731689P	Reduction fluid bed
Y-9206-B(135)	01-0020-03	731689P	Air emission control scrubber stack
Y-9206-B(136)	01-0020-03	731689P	Air emission control consolidated stack
Y-9206-B(208)	01-0020-03	731689P	Conversion fluid bed
Y-9206-B(209)	01-0020-03	731689P	HF purge vent
Y-9206-B(210)	01-0020-03	731689P	Chemical makeup area
Y-9206-B(211)	01-0020-03	731689P	Hoods 29 and 30
Y-9206-B(212)	01-0020-03	731689P	Dry vacuum system
Y-9206-C(01)	01-1020-24	730316P	Classified
Y-9206-C(02)	01-1020-24	730316P	Classified
Y-9206-E (NEW)	01-1020-24	730316P	Classified
Y-9212-A(019)	01-1020-72	033581P	Filter exhaust, denitrator, fluid bed, etc.
Y-9212-A(021)	01-1020-72	033581P	Centrifuges, liquid pour-up station, etc.
Y-9212-A(022)	01-1020-72	033581P	Reduction salvage, crusher and hopper
Y-9212-A(024)	01-1020-72	033581P	Calcliner and dry vacuum system enclosure
Y-9212-A(025)	01-1020-72	033581P	Denitrator area and fluid bed room enclosure
Y-9212-A(027)	01-1020-72	033581P	D-wing, Rm 1010 hoods, Rms 26 and 29
Y-9212-A(028)	01-1020-72	033581P	Reduction, shear, and Rm 1010, enriched uranium conversion facility
Y-9212-A(033)	01-1020-72	033581P	Head house equipment and incinerator



Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9212-A(036)	01-1020-72	033581P	East scrubber (C-1 wing) exhaust
Y-9212-A(040)	01-1020-72	033581P	B-1 sampling lab hoods
Y-9212-A(042)	01-1020-72	033581P	Chloride removal system/C-1 wing process exhaust
Y-9212-A(050)	01-1020-72	033581P	C-1 chip burner, enclosures, load hoods
Y-9212-A(111)	01-1020-72	033581P	Reduction fluid beds
Y-9212-A(112)	01-1020-72	033581P	Conversion fluid beds
Y-9212-A(132)	01-1020-72	033581P	Decontamination facility
Y-9212-A(430)	01-1020-72	033581P	HF dock cylinder/vaporizer purge vent
Y-9212-A(431)	01-1020-72	033581P	N <sub>2</sub> O <sub>4</sub> cylinder purge vent
Y-9212-A(432)	01-1020-72	033581P	Muffle furnaces (2) vent, Rm 29
Y-9212-A(500)	01-1020-72	033581P	Primary extraction vent
Y-9212-A(501)	01-1020-72	033581P	Secondary extraction vent
Y-9212-B(01)	01-0020-02	730301P	U metal drying and briquetting process
Y-9212-B(02)	01-0020-02	730301P	Exhaust from chip washing and drying
Y-9212-B(03)	01-0020-02	730301P	E-wing machine shop
Y-9212-B(04)	01-0020-02	730301P	U metal and U metal alloy casting
Y-9212-C(01)	01-0020-05	025984P	Drum receiving/sampling hood and glove box
Y-9212-C(02)	01-0020-05	025984P	Tube furnace/gas purge vents
Y-9212-C(03)	01-0020-05	025984P	Sampling hoods and safe bottles/Rm 1022
Y-9212-C(04)	01-0020-05	025984P	Dry hoods/Rm 1021
Y-9212-C(05)	01-0020-05	025984P	Dissolver tray hoods/Rm 1021
Y-9212-C(06)	01-0020-05	025984P	Dissolver hood
Y-9212-C(07)	01-0020-05	025984P	Dissolver trays/scrubber
Y-9212-C(08)	01-0020-05	025984P	Shear and saw hood/Rm 1021
Y-9212-C(09)	01-0020-05	025984P	Precipitation process
Y-9212-F(01)	01-1020-49	730321P	Two deburr benches, hood exhaust, A-wing
Y-9212-F(02)	01-1020-49	730321P	Two deburr benches, hood exhaust, A-wing
Y-9212-F(03)	01-1020-49	730321P	Machining, hood exhaust, A-wing
Y-9212-F(04)	01-1020-49	730321P	Machining, hood exhaust, A-wing
Y-9212-F(05)	01-1020-49	730321P	Machining, hood exhaust, A-wing
Y-9212-G(01)	01-1020-47	028435P	Seal-peel pot
Y-9215-A(01)	01-0020-37	731839P	Machine shop hood exhaust, M-wing
Y-9215-B(02)	01-0020-38	012880P	Turco pretreat spray hood
Y-9215-B(1)	01-1020-51	732125P	O-wing metalworking operations
Y-9215-B(2)	01-1020-51	732125P	O-wing metalworking operations
Y-9215-B(4)	01-1020-51	732125P	O-wing metalworking operations
Y-9215-B(6)	01-1020-51	732125P	O-wing metalworking operations
Y-9215-C(02)	01-1020-52	025948P	Hydroform exhaust
Y-9215-C(03)	01-1020-52	730323P	Vapor blaster/metal cleaner
Y-9215-C(10)	01-1020-52	730323P	Nickel plating, metal working exhaust
Y-9215-C(11)	01-1020-52	730323P	Exhaust
Y-9215-C(17)	01-1020-52	730323P	Rolling mill
Y-9215-C(19)	01-1020-52	730323P	Electric annealing oven
Y-9215-D(12)	01-1020-53	025966P	Rolling mill exhaust
Y-9215-D(13)	01-1020-53	025966P	Hood exhaust

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9215-D(14)	01-1020-53	025966P	Exhaust from rolling mill
Y-9215-D(1S)	01-1020-53	025966P	Turret lathe and shear exhaust
Y-9215-E(6)	01-1020-54	025972P	Lab hood
Y-9215-E(7)	01-1020-54	025972P	Lab hoods
Y-9215-E(8)	01-1020-54	025972P	Lab hoods
Y-9401-2-A(205)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(220)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(221)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(222)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(223)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(224)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(225)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(226)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(227)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(228)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(229)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(230)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(231)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(232)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(233)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(234)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(235)	01-0020-88	730286P	Plating equipment
Y-9401-3-A	01-1020-31	029322F	Coal-fired boiler
Y-9401-3-B(170)	01-1020-31	029322F	Coal-fired boiler
Y-9401-3-C	01-1020-31	029322F	Coal-fired boiler
Y-9401-3-D(171)	01-1020-31	029322F	Coal-fired boiler
Y-9401-3-H(01) [9616-10]	01-1020-62	029280P	20,000-gal sulfuric acid storage tank
Y-9401-5-A(01)	01-0020-92	026108P	Uranium chip oxidizer
Y-9404-11-A(1)	01-1020-81	028426P	Purification plant
Y-9404-11-A(2)	01-1020-81	028426P	Purification plant
Y-9404-11-A(3)	01-1020-81	028426P	Purification plant
Y-9404-11-A(4)	01-1020-81	028426P	Purification plant
Y-9404-5-B(02)	01-0020-25	012866P	Spray room exhaust
Y-9404-5-B(03)	01-0020-25	012866P	Spray booth
Y-9404-7-FUG-A(00)	01-1020-89	034295P	PCB drum storage facility
Y-9404-9-C(03)	01-0020-40	012882P	PVC curing ovens
Y-9404-9-D(04)	01-0020-40	012882P	PVC curing ovens
Y-9404-9-E(05)	01-0020-40	012882P	PVC curing ovens
Y-9616-7-A(459)	01-1020-74	033498P	West end treatment storage tank
Y-9616-7-A(460)	01-1020-74	033498P	West end treatment storage tank
Y-9616-7-A(461)	01-1020-74	033498P	West end treatment storage tank
Y-9616-7-A(462)	01-1020-74	033498P	West end treatment storage tank
Y-9616-7-A(463)	01-1020-74	033498P	West end treatment vent, reactor vessel
Y-9616-7-A(464)	01-1020-74	033498P	West end treatment storage tank
Y-9616-7-A(465)	01-1020-74	033498P	West end treatment vent, degasifier unit

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9616-7-A(466)	01-1020-74	033498P	West end treatment storage tank
Y-9616-7-A(467)	01-1020-74	033498P	West end treatment storage tank
Y-9616-7-A(468)	01-1020-74	033498P	West end treatment storage tank
Y-9616-7-A(469)	01-1020-74	033498P	West end treatment vent, lime silo
Y-9616-7-A(470)	01-1020-74	033498P	West end treatment storage tank
Y-9616-7-A(1)	01-1020-80	031254P	Vent from air stripper
Y-9616-7-B(650)	01-1020-74	033498P	Biological treatment tanks
Y-9616-7-B(651)	01-1020-74	033498P	Biological treatment tanks
Y-9616-7-B(653)	01-1020-74	033498P	Biological treatment tanks
Y-9616-7-B(654)	01-1020-74	033498P	Biological treatment tanks
Y-9616-7-B(655)	01-1020-74	033498P	Biological treatment tanks
Y-9616-7-B(655)	01-1020-74	033498P	Biological treatment tanks
Y-9616-7-B(656)	01-1020-74	033498P	Solids storage tanks
Y-9616-7-B(657)	01-1020-74	033498P	Solids storage tanks
Y-9616-7-B(658)	01-1020-74	033498P	Solids storage tanks
Y-9616-7-B(659)	01-1020-74	033498P	Solids storage tanks
Y-9616-7-B(660)	01-1020-74	033498P	Solids storage tanks
Y-9616-7-B(661)	01-1020-74	033498P	Solids storage tanks
Y-9616-7-B(662)	01-1020-74	033498P	Solids storage tanks
Y-9620-2A	01-0020-50	012894P	Storage tank
Y-9623-A(01)	01-1020-25	025970P	Vent from reactor vessel
Y-9623-A(02)	01-1020-25	025970P	Vent from eight tanks
Y-9623-A(03)	01-1020-25	025970P	Lab hood
Y-9623-A(04)	01-1020-25	025970P	Lime silo
Y-9623-A(05)	01-1020-25	025970P	Storage tank
Y-9623-A(06)	01-1020-25	025970P	Storage tank
Y-9720-12-FUG-A(00)	01-1020-89	034295P	Nonspecial nuclear material warehouse
Y-9720-19-A(01)	01-0020-41	012885P	Curing oven
Y-9720-19-C(01)	01-0020-23	012864P	Teflon sintering oven
Y-9720-19-D(03)	01-0020-27	012869P	Plastics spray booth
Y-9720-20-A(01)	01-1020-39	025971P	Small maintenance shop, fabric filter
Y-9720-25-FUG-A(00)	01-1020-89	034295P	Classified waste storage facility
Y-9720-28-FUG-A(00)	01-1020-89	034295P	Drum storage warehouse
Y-9720-31-FUG-A-(00)	01-1020-89	034295P	RCRA and mixed waste storage and staging facility
Y-9720-32-A(201)	01-0020-42	032547P	Classified waste shredder
Y-9720-44-FUG-A(00)	01-1020-89	034295P	Low-level waste storage pad
Y-9720-5-A(130)	01-1020-75	031958P	Hood at 9720-5 east end
Y-9720-58-FUG-A(00)	01-1020-89	034295P	PCB and RCRA staging and storage facility
Y-9720-6-A(1)	01-0020-26	012867P	Paint spray booth
Y-9720-6-A(2)	01-0020-26	012867P	Paint spray booth
Y-9720-6-B(01)	01-0020-75	015154P	Wood working operation
Y-9720-6-B(03)	01-0020-26	012867P	Drying oven
Y-9720-6-E(01)	01-0020-83	016548P	Clean room laboratory
Y-9720-60-FUG-A(00)	01-1020-89	034295P	DARA solids storage unit
Y-9720-9-FUG-A(00)	01-1020-89	034295P	PCB and RCRA hazardous waste drum storage facility

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9737-A(01)	01-0020-22	012863P	Oven
Y-9738-A(576)	01-0020-14	025975P	Sandblaster
Y-9738-A(577)	01-0020-14	025975P	Hood with fan
Y-9738-A(578)	01-0020-14	025975P	Sand blaster
Y-9738-A(579)	01-0020-14	025975P	Hood with fan
Y-9738-A(580)	01-0020-14	025975P	Hood with fan
Y-9739-A(01)	01-1020-78	028105P	Print fold diazo blueprint copier/Rm 160
Y-9739-B(02)	01-1020-78	028105P	Print fold diazo blueprint copier/Rm 174
Y-9767-4-A(01)	01-0020-35	012877P	Chilled water circulating system
Y-9808-A	01-0020-77	015156P	Carpenter shop
Y-9808-A(01)	01-1020-22	026109P	Spray booth
Y-9809-A(01)	01-0020-93	025899P	Oxide storage vaults
Y-9811-1-FUG-B(00)	01-1020-89	034295P	Waste oil/solvent drum storage facility (OD-8)
Y-9811-1-A(1)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(2)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(3)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(4)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(5)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(6)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(7)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-6-A(1)	01-1020-82	029415P	Dry ash handling system
Y-9811-8-A(01)	01-1020-63	032988P	Waste oil/solvent storage facility (OD-9)
Y-9811-8-A(02)	01-1020-63	032988P	Waste oil/solvent storage facility (OD-9)
Y-9811-8-A(03)	01-1020-63	032988P	Waste oil/solvent storage facility (OD-9)
Y-9811-8-A(04)	01-1020-63	032988P	Waste oil/solvent storage facility (OD-9)
Y-9811-8-A(05)	01-1020-63	032988P	Waste oil/solvent storage facility (OD-9)
Y-9811-B(02)	01-1020-45	025903P	Incinerator
Y-9812-A-(287)	01-1020-29	033051P	12,115-gal storage tank
Y-9812-A-(288)	01-1020-29	033051P	12,133-gal storage tank
Y-9812-A-(289)	01-1020-29	033051P	4,876-gal storage tank
Y-9815-A(03)	01-0020-11	025895P	Vent from reactors
Y-9815-A(04)	01-0020-11	025895P	12,000-gal storage tank
Y-9815-A(05)	01-0020-11	025895P	4,500-gal storage tank
Y-9815-A(06)	01-0020-11	025895P	4,400-gal storage tank
Y-9815-A(07)	01-0020-11	025895P	1,800-gal storage tank
Y-9815-A(08)	01-0020-11	025895P	Two 2,200-gal storage tanks
Y-9818-A(01)	01-0020-12	025965P	Hot well seal tank
Y-9818-A(02)	01-0020-12	025965P	11 storage tanks, nitric acid recovery
Y-9818-A(03)	01-0020-12	025965P	Two bioreactor tanks/ozonation tanks
Y-9818-A(04)	01-0020-12	025965P	Basement exhaust
Y-9818-A(05)	01-0020-12	025965P	Nitric acid supply line vent
Y-9818-A(06)	01-0020-12	025965P	Ozone generator/area exhaust
Y-9818-A(07)	01-0020-12	025965P	10,000-gal storage tank
Y-9818-A(08)	01-0020-12	025965P	10,000-gal denitrification feed tank
Y-9818-A(09)	01-0020-12	025965P	4,000-gal nitrate receiving tank

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9818-A(10)	01-0020-12	025965P	10,000-gal nitric acid waste tank
Y-9818-A(11)	01-0020-12	025965P	10,000-gal nitric acid waste tank
Y-9818-A(12)	01-0020-12	025965P	10,000-gal nitric acid waste tank
Y-9828-6-FUG-A(00)	01-1020-89	034295P	Trash monitoring station
Y-9929-F(01)	M01-0020-39	012881P	Open yard coal storage
Y-9983-74-FUG-A(00)	01-1020-89	034295P	Old salvage yard
Y-9998-A(01)	01-0020-13	025957P	Swaging machines
Y-9998-A(02)	01-0020-13	025957P	Swaging machines
Y-9998-A(03)	01-0020-13	025957P	Furnaces
Y-9998-A(04)	01-0020-13	025957P	Nitric acid pickling tanks
Y-9998-A(05)	01-0020-13	025957P	Hood
Y-9998-A(06)	01-0020-13	025957P	Foundry operations
Y-9998-B(1)	01-1020-40	026110P	Machine shop
Y-BCB-FUG-A(00)	01-1020-89	034295P	Bear Creek Burial Grounds
Y-BCBG-NAK	01-00020-00	010002000	Open burn for NaK
Y-CSL-II-FUG-A(00)	01-1020-89	034295P	Y-12 Centralized Sanitary Landfill II
Y-CWSF-FUG-A(00)	01-1020-89	034295P	Containerized Waste Storage Facility
Y-IDY-FUG-A(00)	01-1020-89	034295P	Interim Drum Yard
Y-IWF-FUG-A(00)	01-1020-89	034295P	Industrial Waste Landfill IV
<i>Part II. Construction permits at the Y-12 Plant</i>			
Y-9201-1-A(01)	01-0020-15	730303P	Welding booths
Y-9201-1-A(02)	01-0020-15	730303P	Welding shop
Y-9201-1-A(04)	01-0020-15	730303P	Metal fabrication shop
Y-9201-1-A(05)	01-0020-15	730303P	Welding shop
Y-9201-1-A(15)	01-0020-15	730303P	Metal fabrication shop
Y-9201-1-B(16)	01-0020-59	730310P	Tool grinding machines
Y-9201-1-B(18)	01-0020-59	730310P	Sandblaster exhaust
Y-9201-1-C(278)	01-0020-17	730304P	Graphitic carbon machining
Y-9201-1-C(279)	01-0020-17	730304P	Graphitic carbon machining
Y-9201-1-D(09)	01-0020-59	730310P	Fabrication shop
Y-9201-1-D(10)	01-0020-59	730310P	Fabrication shop
Y-9201-1-D(11)	01-0020-59	730310P	Fabrication shop
Y-9201-1-D(13)	01-0020-59	730310P	Metal grinders and milling machines
Y-9201-5-B(071)	01-0020-21	730305P	Machining operations L5N hood exhaust
Y-9201-5-B(072)	01-0020-21	730305P	Vacuum inlets L5E machining shop
Y-9201-5-B(03)	01-0020-21	730305P	Rubber-gel potting hood exhaust
Y-9201-5-B(073)	01-0020-21	730305P	Palarite shop, machine exhaust
Y-9201-5-B(267)	01-0020-21	730305P	Tool grinding machines hood exhaust
Y-9201-5-B(277)	01-0020-21	730305P	Cleaning hood, equipment service
Y-9201-5-B(273)	01-0020-21	730305P	Electrochemical machine, stainless steel
Y-9201-5-G(01)	01-0020-44	921689P	Arc melt
Y-9201-5-G(02)	01-0020-44	921689P	DeVilbiss hood
Y-9201-5-G(03)	01-0020-44	921689P	Nitric acid dip tanks
Y-9201-5-G(04)	01-0020-44	921689P	Acid pickling tanks
Y-9201-5-G(05)	01-0020-44	921689P	Abrasive saws

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9201-5-G(06)	01-0020-44	921689P	Scrap metal recycle
Y-9201-5-G(07)	01-0020-44	921689P	Vapor degreaser
Y-9201-SN-A(67)	01-1020-18	730314P	Machine shop exhaust
Y-9202-A(162)	01-1020-94	931742P	Electrolytic deposition of uranium
Y-9203-B(108)	01-1020-93	931697P	Microanalytical lab
Y-9203-B(131)	01-1020-93	931697P	Microanalytical lab
Y-9203-B(137)	01-1020-93	931697P	Microanalytical lab
Y-9204-2-E(68)	01-1020-55	730328P	Oven
Y-9204-2-E(69)	01-1020-55	730328P	Oven
Y-9204-2-E(70)	01-1020-55	730328P	Tungsten screener
Y-9204-2-E(71)	01-1020-55	730328P	Dry box vent
Y-9204-2-E(72)	01-1020-55	730328P	Glove boxes
Y-9204-2-E(73)	01-1020-55	730328P	Material handling
Y-9204-2-E(74)	01-1020-55	730328P	Glove boxes
Y-9204-2-E(75)	01-1020-55	730328P	Outgassing/annealing ovens
Y-9204-2-E(76)	01-1020-55	730328P	Material handling
Y-9204-2-E(77)	01-1020-55	730328P	Glove boxes
Y-9204-2-E(78)	01-1020-55	730328P	Reactor unloading station
Y-9204-2-E(79)	01-1020-55	730328P	Reactor unloading station
Y-9204-2-E(80)	01-1020-55	730328P	Glove boxes
Y-9204-2-E(81)	01-1020-55	730328P	Vacuum pump
Y-9204-2E-A(202)	01-1020-91	730938P	Positive ion accelerator
Y-9204-2E-A(436)	01-0020-68	730312P	Oven
Y-9204-2E-A(439)	01-0020-68	730312P	Hood exhaust
Y-9204-2E-A(441)	01-0020-68	730312P	Hood
Y-9204-2E-A(442)	01-0020-68	730312P	Hood
Y-9204-2E-A(443)	01-0020-68	730312P	Degreaser
Y-9204-2E-A(444)	01-0020-68	730312P	Electropolishers
Y-9204-2E-A(445)	01-0020-68	730312P	Surface coating
Y-9204-2E-A(448)	01-0020-68	730312P	Glove box
Y-9204-2E-C(12)	01-1020-55	730328P	Machine shop hood exhaust, B2E
Y-9204-2E-C(13)	01-1020-55	730328P	Machine shop hood exhaust, specimen shop
Y-9204-4-A(02)	01-1020-56	931629P	Wash tank
Y-9204-4-A(03)	01-1020-56	931629P	Quench tanks
Y-9204-4-A(04)	01-1020-56	931629P	1,000-ton press
Y-9204-4-A(05)	01-1020-56	931629P	7,500-ton press
Y-9204-4-A(06)	01-1020-56	931629P	Exhaust from press pit area
Y-9204-4-A(07)	01-1020-56	931629P	Plasma torch cutting machine
Y-9204-4-A(08)	01-1020-56	931629P	Vacuum quench furnace
Y-9204-4-A(09)	01-1020-56	931629P	Ingot cooler
Y-9204-4-A(10)	01-1020-56	931629P	Exhaust from lathe
Y-9204-4-A(11)	01-1020-56	931629P	Grinding facility
Y-9204-4-A(12)	01-1020-56	931629P	Dye penetrant
Y-9204-4-A(13)	01-1020-56	931629P	Salt baths
Y-9204-4-A(14)	01-1020-56	931629P	Quench tanks

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9204-4-A(15)	01-1020-56	931629P	Preheat furnace exhaust
Y-9204-4-A(17)	01-1020-56	931629P	Oven exhaust
Y-9204-4-A(18)	01-1020-56	931629P	Vacuum furnace quench chamber
Y-9204-4-A(19)	01-1020-56	931629P	7,500-ton press and 1,500-ton press
Y-9204-4-A(88)	01-1020-56	931629P	Grit blast system
Y-9204-4-B(481)	01-0020-72	730313P	Exhaust from machining operation
Y-9204-4-B(482)	01-0020-72	730313P	Exhaust from hood, reclamation area
Y-9204-4-B(484)	01-0020-72	730313P	Rolling mill, first-floor assembly
Y-9204-4-B(485)	01-0020-72	730313P	Exhaust from paint hood
Y-9204-4-B(486)	01-0020-72	730313P	Filtering exhaust from paint booths
Y-9204-4-B(488)	01-0020-72	730313P	Laboratory hoods, first floor
Y-9204-4-B(489)	01-0020-72	730313P	Laboratory hoods, reclamation area
Y-9204-4-B(490)	01-0020-72	730313P	Assembly process, first floor
Y-9204-4-B(491)	01-0020-72	730313P	Assembly process, first floor
Y-9204-4-D(01)	—	730317P	Exhaust hood
Y-9206-B(013)	01-0020-03	731689P	South stack, incinerator
Y-9206-B(015)	01-0020-03	731689P	West stack
Y-9206-B(016)	01-0020-03	731689P	Dissolving hood
Y-9206-B(017)	01-0020-03	731689P	Steam cleaning hoods
Y-9206-B(115)	01-0020-03	731689P	Reduction fluid bed
Y-9206-B(135)	01-0020-03	731689P	Air emission control scrubber stack
Y-9206-B(136)	01-0020-03	731689P	Air emission control consolidated stack
Y-9206-B(208)	01-0020-03	731689P	Conversion fluid bed
Y-9206-B(209)	01-0020-03	731689P	HF purge vent
Y-9206-B(210)	01-0020-03	731689P	Chemical makeup area
Y-9206-B(211)	01-0020-03	731689P	Hoods 29 and 30
Y-9206-B(212)	01-0020-03	731689P	Dry vacuum system
Y-9206-C(01)	01-1020-24	730316P	Classified
Y-9206-C(02)	01-1020-24	730316P	Classified
Y-9206-E (NEW)	01-1020-24	730316P	Classified
Y-9212-B(01)	01-0020-02	730301P	U metal drying and briquetting process
Y-9212-B(02)	01-0020-02	730301P	Exhaust from chip washing and drying
Y-9212-B(03)	01-0020-02	730301P	E-wing machine shop
Y-9212-B(04)	01-0020-02	730301P	U metal and U metal alloy casting
Y-9212-F(01)	01-1020-49	730321P	Two deburr benches, hood exhaust, A-wing
Y-9212-F(02)	01-1020-49	730321P	Two deburr benches, hood exhaust, A-wing
Y-9212-F(03)	01-1020-49	730321P	Machining, hood exhaust, A-wing
Y-9212-F(04)	01-1020-49	730321P	Machining, hood exhaust, A-wing
Y-9212-F(05)	01-1020-49	730321P	Machining, hood exhaust, A-wing
Y-9215-A(01)	01-0020-37	731839P	Machine shop hood exhaust, M-wing
Y-9215-B(1)	01-1020-51	732125P	O-wing metal working operations
Y-9215-B(2)	01-1020-51	732125P	O-wing metal working operations
Y-9215-B(4)	01-1020-51	732125P	O-wing metal working operations
Y-9215-B(6)	01-1020-51	732125P	O-wing metal working operations
Y-9215-C(03)	01-1020-52	730323P	Vapor blaster/metal cleaner

Table A.2 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source description
Y-9215-C(10)	01-1020-52	730323P	Nickel plating, metal working exhaust
Y-9215-C(11)	01-1020-52	730323P	Exhaust
Y-9215-C(17)	01-1020-52	730323P	Rolling mill
Y-9215-C(19)	01-1020-52	730323P	Electric annealing oven
Y-9401-2-A(205)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(220)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(221)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(222)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(223)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(224)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(225)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(226)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(227)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(228)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(229)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(230)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(231)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(232)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(233)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(234)	01-0020-88	730286P	Plating equipment
Y-9401-2-A(235)	01-0020-88	730286P	Plating equipment
Y-9720-32-A(435)	01-1020-99	9332821	Classified paper incinerator
Y-9811-1-A(1)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(2)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(3)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(4)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(5)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(6)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)
Y-9811-1-A(7)	01-1020-95	731997P	Waste oil/storage bulk storage facility (OD-7)



Table A.3. ORNL air permits

ORNL source number	Emission source reference number	Permit number	Source description	Permit type
X-2519-1/5	73-0112-03,33,34	030284P	Five boilers and ash system	Operation
X-2522-T1A	73-0112-10		No. 2 fuel oil storage tank	Application
X-2522-T1A	73-0112-10	024114P	No. 2 fuel oil storage tank	Operation
X-2525-01	73-0112-14	030835P	Degreaser (perchloroethylene)	Operation
X-2525-6	73-0112-95	027257P	Machine shop	Operation
X-2525-SV11	73-0112-49		Electroplating shop	Application
X-2525-SV11	73-0112-49	024151P	Electroplating shop	Operation
X-2525-SV4	73-0112-38	031062P	Six wet and three dry grinders	Operation
X-2525-SV8	73-0112-62		Spray booth and oven	Application
X-2525-SV8	73-0112-62	024949P	Spray booth and oven	Operation
X-2547-01	73-0112-27	028439P	Spray booth	Operation
X-3039			Off-gas and hot cell ventilation	Application
X-3039	73-0112-93	035494P	Off-gas and hot cell ventilation	Operation
X-3500-SV12	73-0112-73	036689P	Electric belt furnace	Operation
X-3502-01	73-0112-05,06,07	030881P	Spray booths #1, #2, and #3	Operation
X-3502-09	73-0112-94	027194P	Hood-gluing	Operation
X-3502-1	73-0112-05,06,07		Manipulator boot shop	Application
X-3502-SV1	73-0112-39	023808P	Oven, curing	Operation
X-3502-SV2	73-0112-40	023807P	Oven, tempering	Operation
X-3502-SV4	73-0112-30	036053P	Cyclone and carpenter shop	Operation
X-3544-SV1	73-0112-70	730468P	Process Waste Treatment Plant	Operation
X-3587-SV1	73-0112-56	029830P	Printed circuit-board facility	Operation
X-3608-01	73-0112-37	730489P	NRWTP air stripper column	Operation
X-4508-SV8	73-0112-61	732645P	Acid etching process	Operation
X-4508-SV9			Sand blaster	Application
X-4508-SV9	73-0112-55	024306P	Sand blaster	Operation
X-6010-00	73-0112-85	025282P	Oak Ridge Electron Linear Accelerator	Operation
X-7002-05	73-0112-08		Paint spray booth	Application
X-7002-05	73-0112-08	030980P	Spray booth	Operation
X-7005-00	73-0112-45	037516P	Lead shop—machining operations	Operation
X-7005-3/7			Five lead-melting furnaces	Application
X-7007-1/2	73-0112-09	030824P	Spray booth and cleaning booth	Operation
X-7007-1/2/3	73-0112-09		Spray booth and cleaning booth	Application
X-7021-00			Sandblaster	Application
X-7021-00	73-0112-58	024307P	Grinding shop	Operation
X-7057-SV1	73-0112-76	030101P	Sand blaster	Operation
X-7069-T1	73-0112-60 NSPS	730836P	Gasoline storage tank	Operation
X-7600-01	73-0112-20	017930P	Nuclear fuel reprocessing	Operation
X-7602-01	73-0112-24	027090P	Boiler, hot water	Operation
X-7603-01			Boiler	Application
X-7603-01	73-0112-25	035134F	Steam boiler	Operation
X-7667-0	73-0112-0067-5	73-0112-0067-5	Chemical detonation facility	Open burning
X-7830-SV1	73-0112-71	731010P	Liquid Waste Solidification Project	Operation

Table A.3 (continued)

ORNL source number	Emission source reference number	Permit number	Source description	Permit type
X-7911-00	73-0112-82	034381P	HFIR, REDC 7920 and 7930	Operation
X-7934-SV2	73-0112-53		Silver-recovery system	Application
X-7934-SV2	73-0112-53	024912P	Silver-recovery system	Operation
X-7935-SV1	73-0112-78	027393P	Equipment cleaning facility	Operation
X-FE	73-0112-97	029660P	Fugitive emission source	Operation
X-FLC	73-0112-99	034960P	Fluorescent lamp disposers	Operation

Table A.4. K-25 Site air permits

K-25 source number	Emission source reference number	Permit number	Source description	Permit type
K1004L	73-0106-35	012503P	Main Vent of Development Facility	Operating
K1004TWESTNOVEN	73-0106-96	024301P	Fiber and Polymer Matrix Composites Curing Oven	Operating
K1004TSOUTHNOVEN	73-1106-01	024304P	Fiber and Polymer Matrix Composites Curing Oven	Operating
K1004THOOD	73-1106-04	024498P	Hood Evacuates Fumes from Mixing Epoxy Resin and Hardener	Operating
K1004TWIND3	73-1106-28	029901P	Fiber Winding Spools With Epoxy Dip	Operating
K1004TWIND2	73-1106-28	029901P	Fiber Winding Spools With Epoxy Dip	Operating
K1004TWIND4	73-1106-28	029901P	Fiber Winding Spools With Epoxy Dip	Operating
K1004TWIND1	73-1106-28	029901P	Fiber Winding Spools With Epoxy Dip	Operating
K1024FT1	73-0106-18	025655P	Filter Test Facility	Operating
K1037AVLISLCDEV	73-0106-69	029897P	Expansion Lab C Spray Coating W Exhaust Filters	Operating
K1037AVLISOOVEN	73-0106-73	029900P	Electric Oxidation Oven	Operating
K1037AVLISEXLAB	73-0106-68	031404P	Materials Test Unit (MTU)	Operating
K1037AVLISEXLAB	73-0106-68	031404P	Vacuum System Vents	Operating
K1037AVLISEXLAB	73-0106-68	031404P	Materials Handling Development Module (MHDm)	Operating
K1037AVLISEXLAB	73-0106-68	031404P	Electron Beam One (EB-1)	Operating
K1037AVLISLGB	73-0106-77	032345P	Grit Blast Facility with Baghouse	Operating
K1037AVLISQOVEN	73-0106-79	034645P	Quincy Oven	Operating
K1037AVLISGOVEN	73-0106-80	034646P	Grieve Oven TB-500 Electric	Operating
K1037AVLISFURN	73-0106-81	034647P	Huppert Furnace	Operating
K1037MLBH	73-0106-84	035867P	Mechanical Lab—Shaping Graphite and Metal Parts	Operating
K1037AVLISSSB	73-0106-85	035868P	Small Sand Blaster	Operating
K1037AVLISLAB	73-1106-35	932953P	AVLIS Lab - metallothermic reduction unit, chlorinator, and oxide cell	Permit to construct
K1037AVLISPRODCON	73-1106-36	933170P	Products Conversion Demonstration	Permit to construct
K1095PS1234	73-0106-14	734461P	Paint Spray Operation, one Oven, two Spray Booths, and one Silk Screen Degreaser	Operating
K1098FSB1	73-0106-13	034231P	Sand Blast Facility with Baghouse and Grit Recycle	Operating
K1200SITF	73-0106-61	017338P	System Interface Test Facility seven Vacuum Pumps	Operating
K1200CVTF	73-0106-62	017339P	Centrifuge Verification Test Facility ten Vacuum Pumps	Operating
K1200A123	73-0106-56	019608P	Purge Evacuation, Feed, and Withdrawal 13 Vacuum Pumps	Operating
K1200NBAYOVEN	73-0106-92	024272P	North Bay Oven Cures Fiber and Polymeric Matrix Composites	Operating
K1200FAE1	73-0106-86	029192P	Isotope Separating Process	Operating
K1200CENTERBAY	73-0106-87	732346P	Two Hoods Vent Mixing Epoxy Resins, Coating Fibers, Winding Fibers	Operating
K1202ST1	73-1106-20	033203P	Tank Stores Waste Oils and Solvents for Incinerator	Operating
K1202ST2	73-1106-41	034392P	Tank Stores Waste Oils and Solvents for Incinerator	Operating
K1401275029PL	73-0106-38	012506P	Plastic Shop Curing Oven	Operating
K1401121659	73-0106-09	016306P	1,1,1-Trichloroethane Degreaser	Operating
K1401MSMC1	73-0106-32	017337P	Motor Curing Oven	Operating
K1401OOOVENNE2	73-0106-89	028424P	Electric Oven to Bake out Residual Organics from Metal Parts	Operating

Table A.4 (continued)

K-25 source number	Emission source reference number	Permit number	Source description	Permit type
K1401JIGANDFIXT	73-0106-71	029898P	Vacuum Exhaust for Parts Fabrication in the Jig and Fixture Shop	Operating
K1401PLS1,4,6	73-0106-72	029899P	Ovens 1, 4, and 6 Used for Curing Plastic Parts in the Plastic Shop	Operating
K1401CARPENTERSHOP	73-1106-40	032930P	Miscellaneous wood and acrylic plastic working operations with cyclone control	Operating
K1401HCLE	73-0106-28	035840P	Hydrochloric Acid Tank	Operating
K25BULBCRUSHER	73-1106-43	934193P	Flourescent Lamp Disposers with Fabric/Carbon Filters	Operating
K1414RG	73-0106-28	016312P	Gasoline Storage Tank	Operating
K1414UNLGAS	73-1106-39	035063P	20,000 Gal Unleaded Gasoline Underground Storage Tank	Operating
K1414UG	73-0106-28	037113P	Methanol, unleaded gasoline storage tank	Operating
K1200CPL1	73-0106-58	017051P	Vent for aqueous spray chamber, ultrasonic cleaner, solvent	Operating
K1200CPL	73-0106-54	017055P	Aqueous spray, ultrasonic cleaner, solvent degreaser	Operating
K1420PHILLIPSPA	73-0106-70	023798P	Phillips Vapor Degreaser Perchloroethylene	Operating
K1420DISASSEMBL	73-0106-74	032344P	Disassembly Stand for Dismantling Parts	Operating
K1420A1	73-0106-82	034619P	Flammable Materials Storage Tank	Operating
K1425WOSC	73-0106-11	029895P	Waste Oil and Solvent Storage Tanks	Operating
K1425WOSA	73-0106-11	029895P	Waste Oil and Solvent Storage Tanks	Operating
K1425WOSD	73-0106-11	029895P	Waste Oil and Solvent Storage Tanks	Operating
K1425WOSB	73-0106-11	029895P	Waste Oil and Solvent Storage Tanks	Operating
K1435TSCAINCIN	73-0106-78	032449I	TSCA Incinerator	Operating
K1435CTANKFARM	73-0106-75	024105P	Tank Farm for Hazardous Liquid Wastes	Operating
K15012720FO	73-0106-28	016312P	K-1501 613,000-gal fuel oil tank	Operating
K15012810FO	73-0106-28	016312P	K-1501 15,228-gal fuel oil tank	Operating
K1501BOILER4	73-0106-04	029902F	Natural Gas Boiler	Operating
K1501BOILER7	73-0106-07	029902F	Gas/Oil Boiler	Operating
K1501SULFACID	73-0106-28	035840P	Sulfuric Acid Storage Tank	Operating
K1501BOILER8	73-0106-12	937114F	Gas/Oil Boiler	Permit to construct
K1501BOILER9	73-0106-12	937114F	Gas/Oil Boiler	Permit to construct
K1600TTFL	73-0106-59	017053P	Development Lab with two Hoods and one Small Oven	Operating
K1652FECS	73-1106-42	733774P	Fire extinguisher charging station	Operating
K-25-B-1	73-0106-19	016309P	Heat Exchange Medium Freon for Plant	Operating
K291	73-0106-63	015097P	Wet Air Evacuation System	Operating
K4029PC	73-0106-42	012660P	Gaseous Diffusion Purge Cascade	Operating
K602WAP	73-0106-93	024297P	Evacuation Wet Air Pumps or Air Jets	Operating
K60212543LO	73-0106-23	016310P	Lube Oil Tank	Operating
K60222540LO	73-0106-23	016310P	Lube Oil Tank	Operating
K60232542LO	73-0106-23	016310P	Lube Oil Tank	Operating
K60242541LO	73-0106-23	016310P	Lube Oil Tank	Operating
K60252545LO	73-0106-23	016310P	Lube Oil Tank	Operating
K60262544LO	73-0106-23	016310P	Lube Oil Tank	Operating
K704316MO	73-0106-24	034218P	Mineral Oil Tank	Operating

Table A.4 (continued)

K-25 source number	Emission source reference number	Permit number	Source description	Permit type
K7322140MO	73-0106-24	034218P	Mineral Oil Tank	Operating
K-7322135MO	73-0106-24	034218P	Mineral Oil Tank	Operating
K7622427MO	73-0106-24	034218P	Mineral Oil Tank	Operating
K7622428MO	73-0106-24	034218P	Mineral Oil Tank	Operating
K7922423MO	73-0106-24	034218P	Mineral Oil Tank	Operating
K7922431MO	73-0106-24	034218P	Mineral Oil Tank	Operating
K892LIMESILO	73-1106-08	025120P	Lime Silo	Operating
K894SULFACID	73-0106-28	035840P	Sulfuric Acid Storage Tank	Operating
K902JET	73-0106-93	024298P	Exhaust Jet	Operating
K902WAP	73-0106-93	024298P	Evacuation Wet Air Pumps	Operating
K90212310LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90212318LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90222321LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90222319LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90222320LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90222311LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90232312LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90232322LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90232323LO	73-0106-23	016310P	Lube Oil Tank	Operating
K9023324470FREON	73-0106-28	035840P	Freon R-114 Storage Tank	Operating
K9023324383	73-0106-28	035840P	Freon Storage Tank	Operating
K9023324469FREON	73-0106-28	035840P	Freon R-114 Storage Tank	Operating
K90242325LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90242324LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90242313LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90252314LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90252378LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90252379LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90262381LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90262380LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90262315LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90272383LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90272316LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90272382LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90282384LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90282317LO	73-0106-23	016310P	Lube Oil Tank	Operating
K90282385LO	73-0106-23	016310	Lube Oil Tank	Operating