

MARTIN MARIETTA

**Oak Ridge Reservation
Environmental Report
for 1988**

VOLUME 2: DATA PRESENTATION

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**OAK RIDGE RESERVATION ENVIRONMENTAL REPORT
FOR 1988**

VOLUME 2: DATA PRESENTATION

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U.S. DEPARTMENT OF ENERGY
Under Contract No. DE-AC05-84OR21400**

1. INTRODUCTION

1. INTRODUCTION AND GENERAL INFORMATION

The first two volumes of this report are devoted to a presentation of environmental data and supporting narratives for the U.S. Department of Energy's (DOE's) Oak Ridge Reservation (ORR) and surrounding environs during 1988. Volume 1 includes all narrative descriptions, summaries, and conclusions and is intended to be a "stand-alone" report for the ORR for the reader who does not want to review in detail all of the

1988 data. Volume 2 includes the detailed data summarized in a format to ensure that all environmental data are represented in the tables. Narratives are not included in Vol. 2. The tables in Vol. 2 are addressed in Vol. 1. For this reason, Vol. 2 cannot be considered a stand-alone report but is intended to be used in conjunction with Vol. 1.

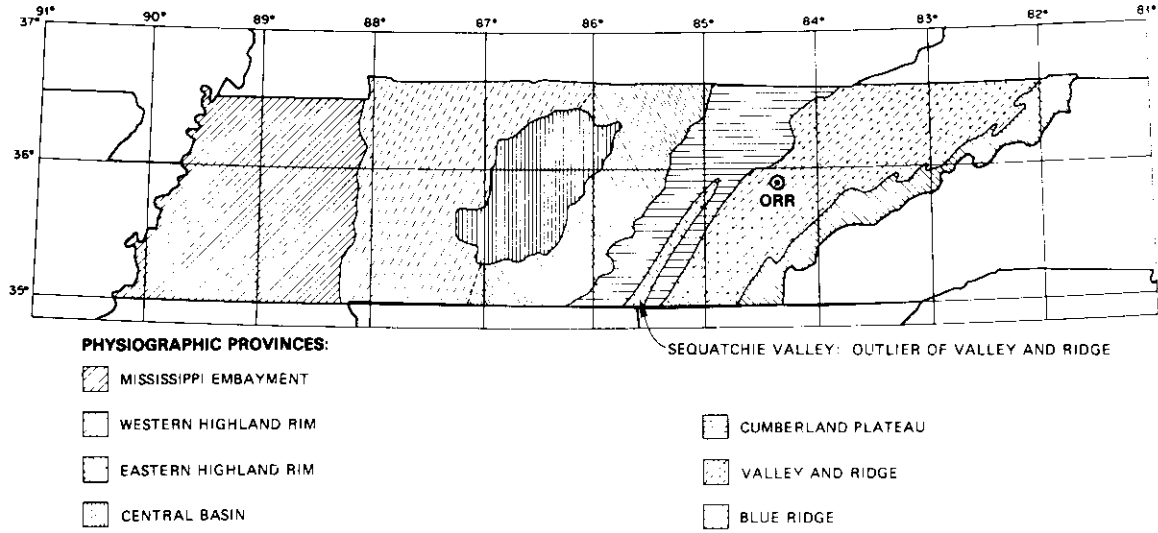


Fig. 1.3.1. Physiographic map of Tennessee.

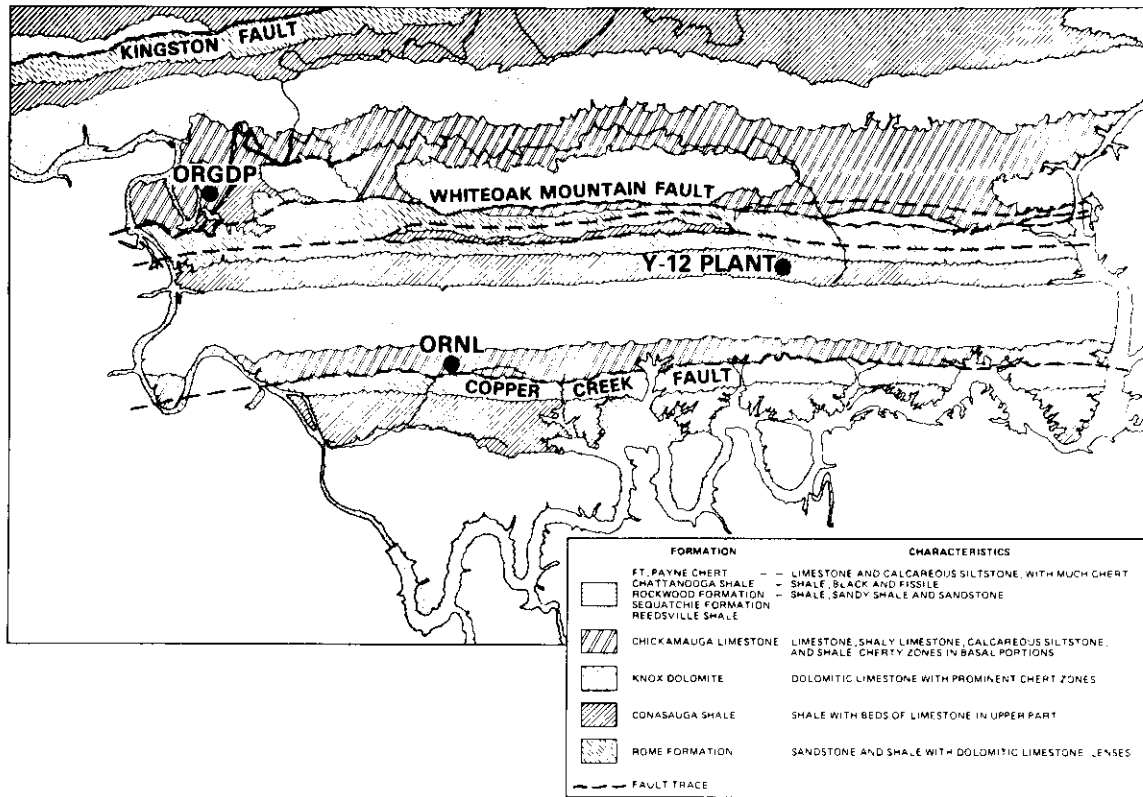


Fig. 1.3.2. Geologic map of the Department of Energy's Oak Ridge Reservation.

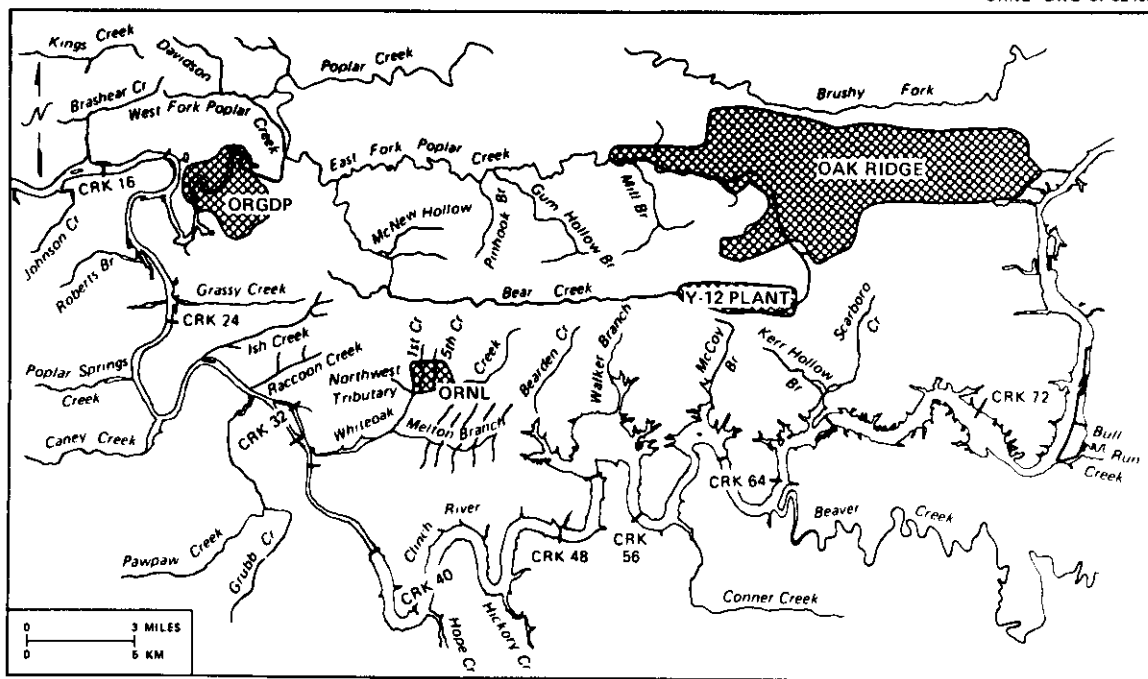


Fig. 1.4.1. Location map of Oak Ridge Reservation tributaries.

Table 1.1.1. Administrative^a units on the ORR in 1988

Description	Area	
	Hectares	Acres
Oak Ridge Reservation ^b	12,684	31,343
Oak Ridge Y-12 Plant	328	811
Oak Ridge National Laboratory	445	1,100
Oak Ridge Gaseous Diffusion Plant	688	1,700
Oak Ridge Associated Universities ^c	121	298
Total	14,266	35,252

^aAdministrative units are those units that are managed by a major installation or by central Energy Systems.

^bThe Oak Ridge Reservation actually encompasses all of the land owned by DOE in the Oak Ridge Area; however, as an "administrative unit," it is all of the land area not controlled by the other units. Each unit includes some land outside the designated fenced area. The total combined fenced area of the three major facilities is 810 ha (2000 acres).

^cOak Ridge Associated Universities manages the Scarboro Facility, as well as, other facilities within the Oak Ridge area.

**Table 1.2.1. Populations
of central East
Tennessee towns^a**

Town/city	Population
<i>Anderson County</i>	
Clinton	5,245
Lake City	2,335
Norris	1,374
Oak Ridge	27,662
Oliver Springs	3,600
<i>Blount County</i>	
Friendsville	694
Alcoa	6,870
Maryville	17,478
<i>Knox County</i>	
Knoxville	183,139
<i>Loudon County</i>	
Greenback	546
Lenoir City	5,446
Loudon	3,940
<i>Morgan County</i>	
Wartburg	761
<i>Roane County</i>	
Harriman	8,303
Kingston	4,441
Rockwood	5,767
<i>Sevier County</i>	
Sevierville	4,566
<i>Union County</i>	
Luttrell	962
Maynardville	924
<i>Campbell County</i>	
Caryville	2,039
Jellico	2,769
Jacksboro	1,620
LaFollette	8,176

^aSource: *Environmental Surveillance of the Oak Ridge Reservation and Surrounding Environs During 1986*, ES/ESH-1, Oak Ridge, Tenn., 1986.

Table 1.4.1. Use classifications for the Clinch River and its tributaries on the ORR^a

Stream	Description	DOM ^b	IND ^c	FISH ^d	REC ^e	IRR ^f	LW&W ^g	NAV ^h
Clinch River	km 7.0-19.2 (Poplar Creek)	✓		✓	✓	✓	✓	✓
Poplar Creek	km 0.0-0.8		✓	✓	✓	✓	✓	
Poplar Creek	km 0.8-2.1			✓	✓	✓	✓	
Poplar Creek	km 2.1-8.8			✓	✓	✓	✓	
East Fork Poplar Creek	km 0.0-7.7			✓	✓	✓	✓	
Bear Creek	km 0.0-origin			✓	✓	✓	✓	
East Fork Poplar Creek	km 7.7-13.3			✓	✓	✓	✓	
East Fork Poplar Creek	km 13.3-dam at Y-12 Plant			✓	✓	✓	✓	
Poplar Creek	km 8.8-19.8			✓	✓	✓	✓	
Poplar Creek	km 19.8-23.0			✓	✓	✓	✓	
Indian Creek	At Poplar Creek (km 22.9); km 0.0-origin			✓	✓	✓	✓	
Poplar Creek	km 23.0-origin			✓	✓	✓	✓	
Clinch River	km 19.2-32.0	✓	✓	✓	✓	✓	✓	
White Oak Creek	km 0.0-origin			✓	✓	✓	✓	
Melton Branch	km 0.0-origin			✓	✓	✓	✓	
Clinch River	km 32.0-63.4	✓	✓	✓	✓	✓	✓	✓
Clinch River	km 63.4-65.8	✓	✓	✓	✓	✓	✓	✓
Scarboro Creek	km 0.0-1.6			✓	✓	✓	✓	
Scarboro Creek	km 1.6-2.1			✓	✓	✓	✓	
Scarboro Creek	km 2.1-origin			✓	✓	✓	✓	
Clinch River	km 65.8-74.7	✓	✓	✓	✓	✓	✓	✓
All other tributaries in the Clinch River basin, named and unnamed, that have not been specifically treated shall be classified								

^aSource: Tennessee Department of Public Health, 1978. *Water Management Plan—Clinch River Basin.*

^bDOM = Domestic water supply.

^cIND = Industrial water supply.

^dFISH = Fish and aquatic life.

^eREC = Recreation.

^fIRR = Irrigation.

^gLW&W = Livestock watering and wildlife.

^hNAV = Navigation.

2.1 AIR

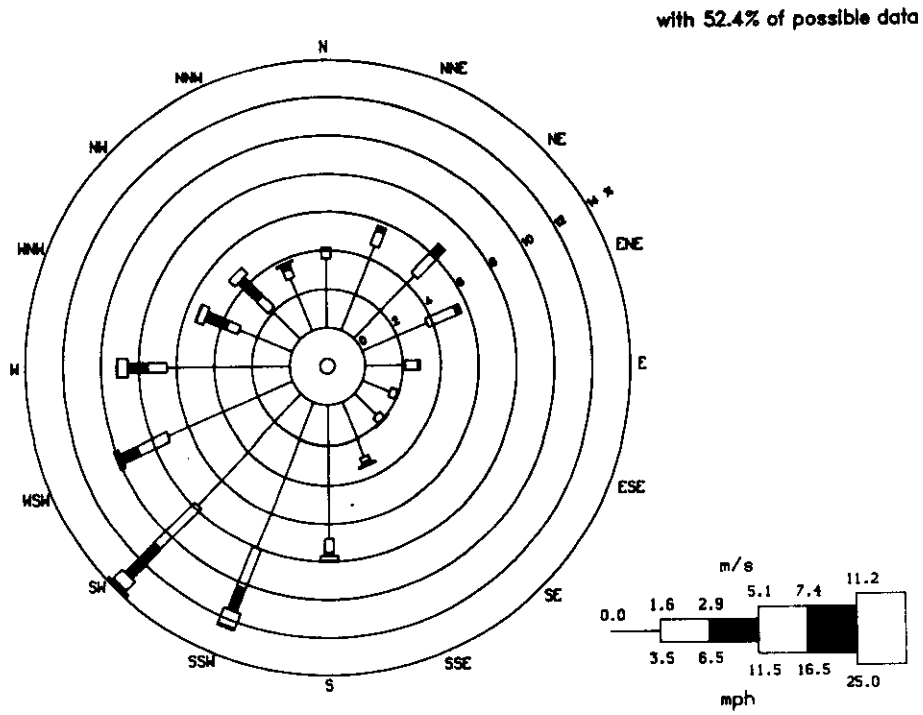


Fig. 2.1.1. 1988 wind rose for ORGDP tower MT1 (10-m level).

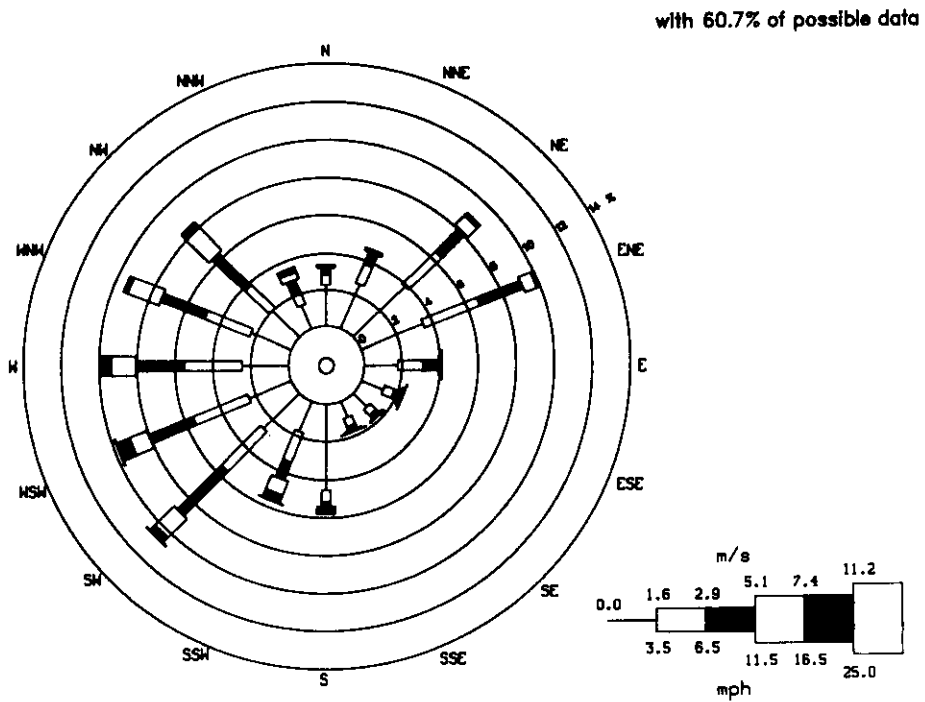


Fig. 2.1.2. 1988 wind rose for ORGDP tower MT1 (60-m level).

ORNL-DWG 89-5770
with 93.2% of possible data

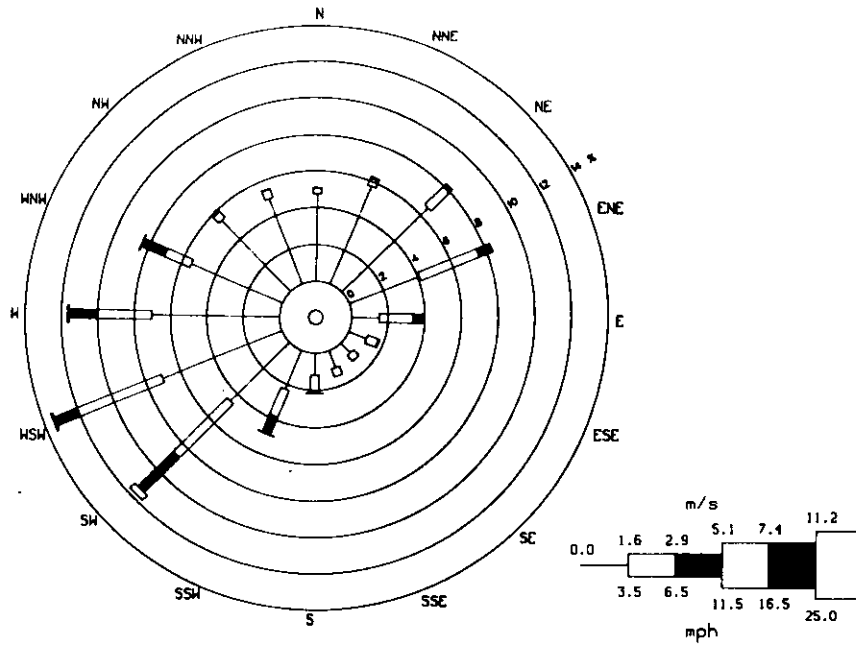


Fig. 2.1.3. 1988 wind rose for ORNL tower MT2 (10-m level).

ORNL-DWG 89-5771
with 93.4% of possible data

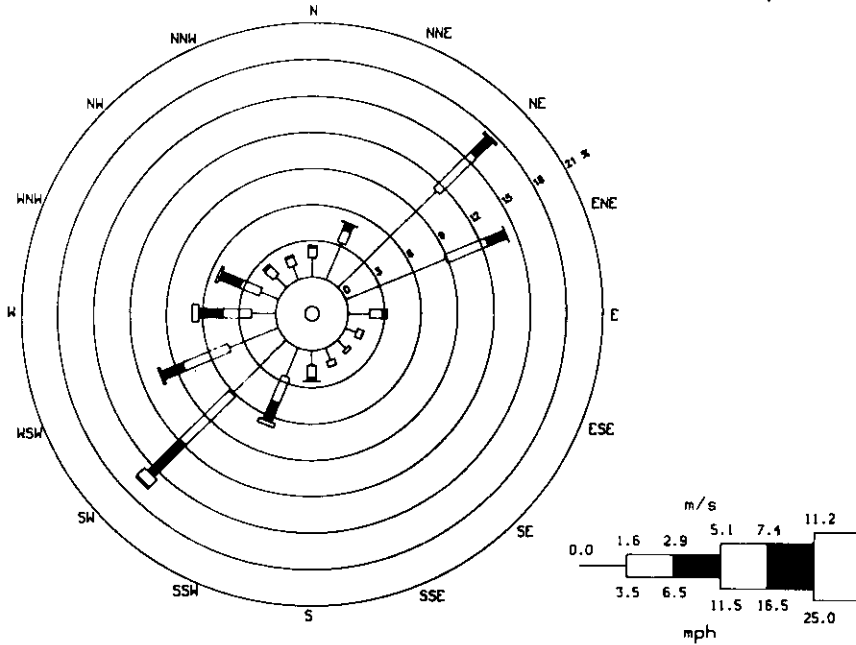


Fig. 2.1.4. 1988 wind rose for ORNL tower MT2 (30-m level).

ORNL-DWG 89-5772
with 92.4% of possible data

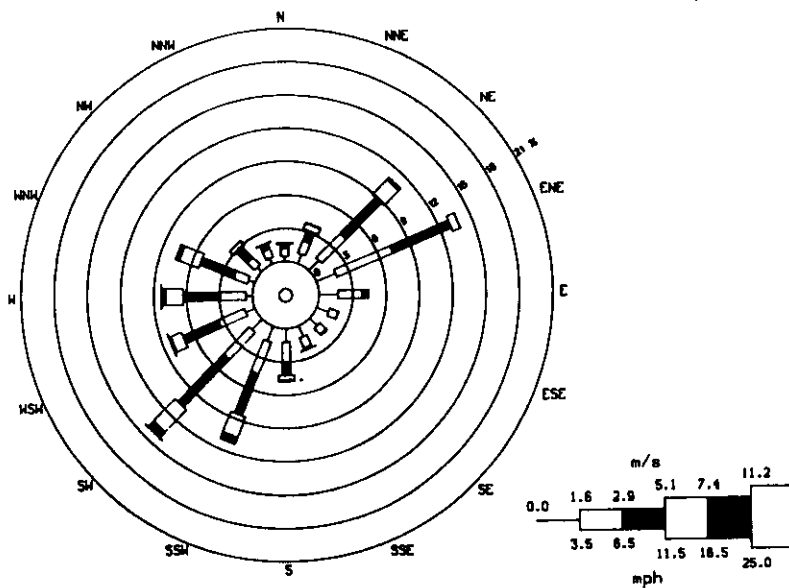


Fig. 2.1.5. 1988 wind rose for ORNL tower MT2 (100-m-level).

ORNL-DWG 89-5768
with 88.4% of possible data

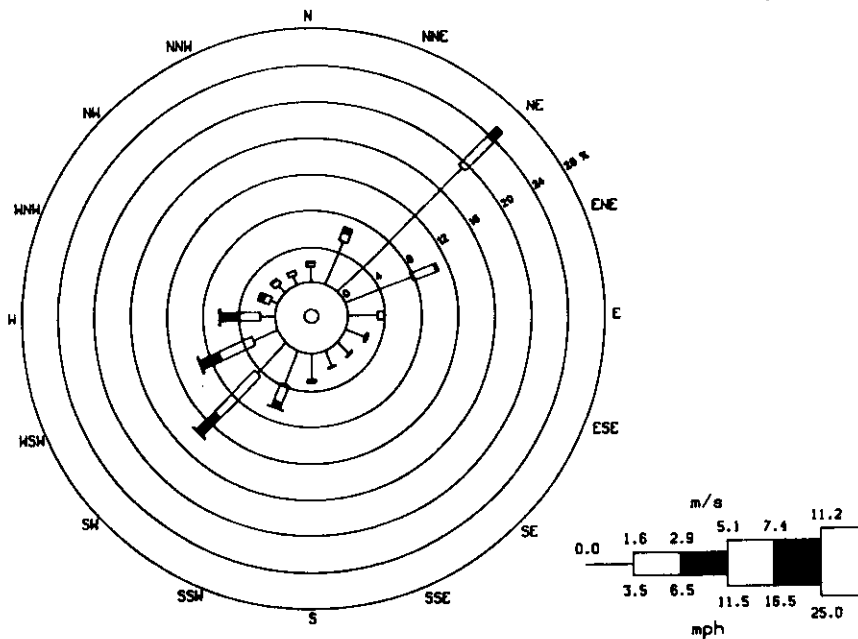


Fig. 2.1.6. 1988 wind rose for ORNL tower MT3 (10-m level).

ORNL-DWG 89-5769
with 92.4% of possible data

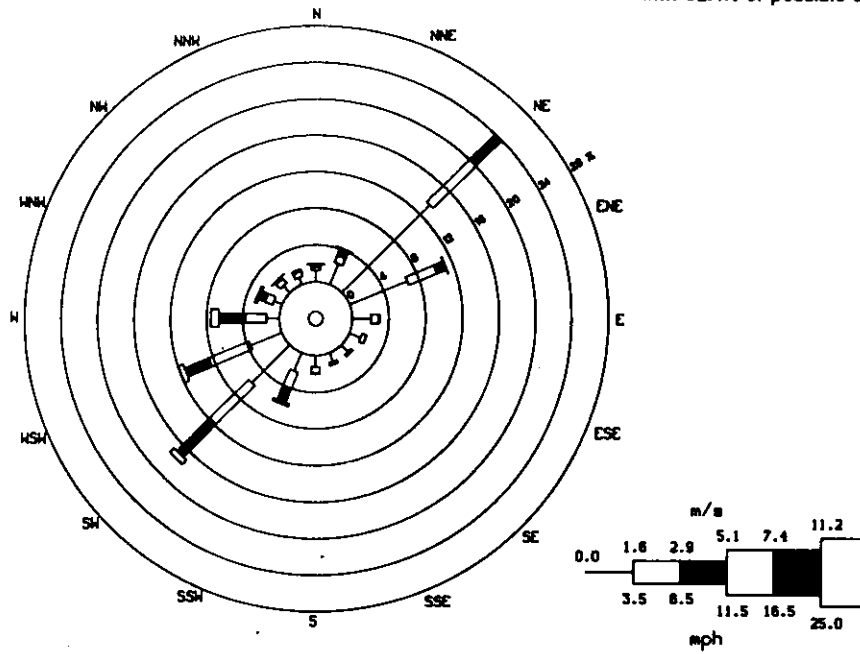


Fig. 2.1.7. 1988 wind rose for ORNL tower MT3 (30-m level).

ORNL-DWG 89-5766
with 86.9% of possible data

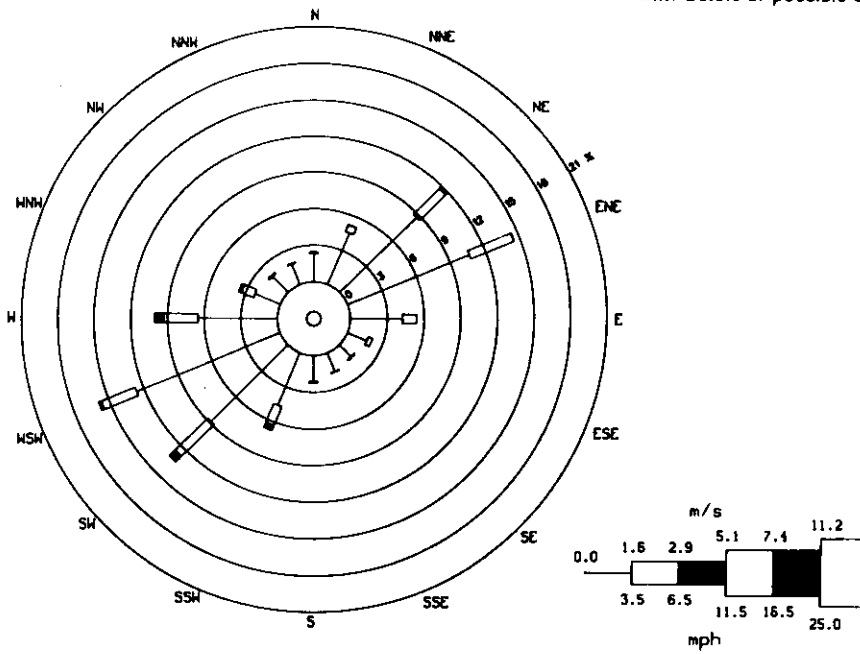


Fig. 2.1.8. 1988 wind rose for ORNL tower MT4 (10-m level).

ORNL-DWG 89-5767
with 88.8% of possible data

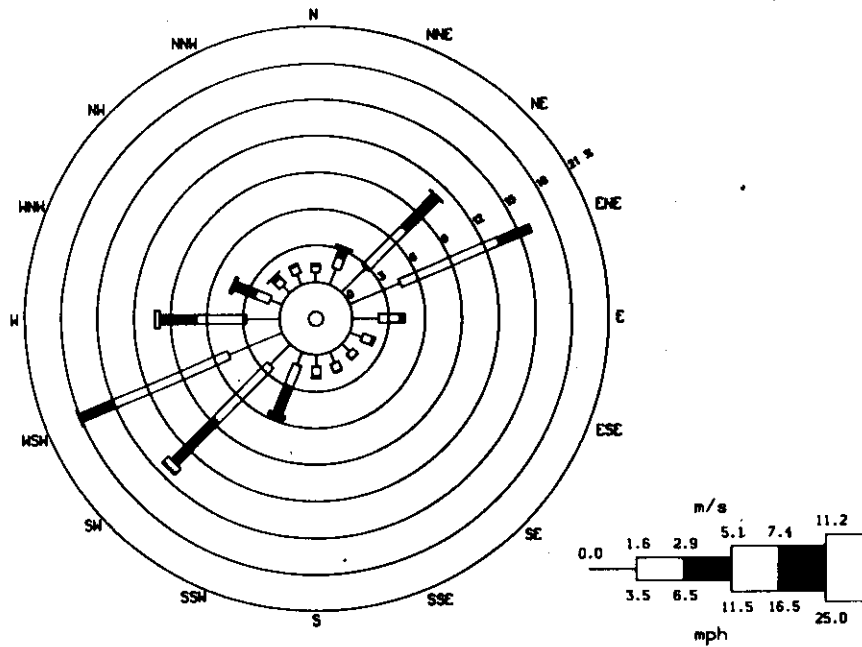


Fig. 2.1.9. 1988 wind rose for ORNL tower MT4 (30-m level).

with 97.1% of possible data

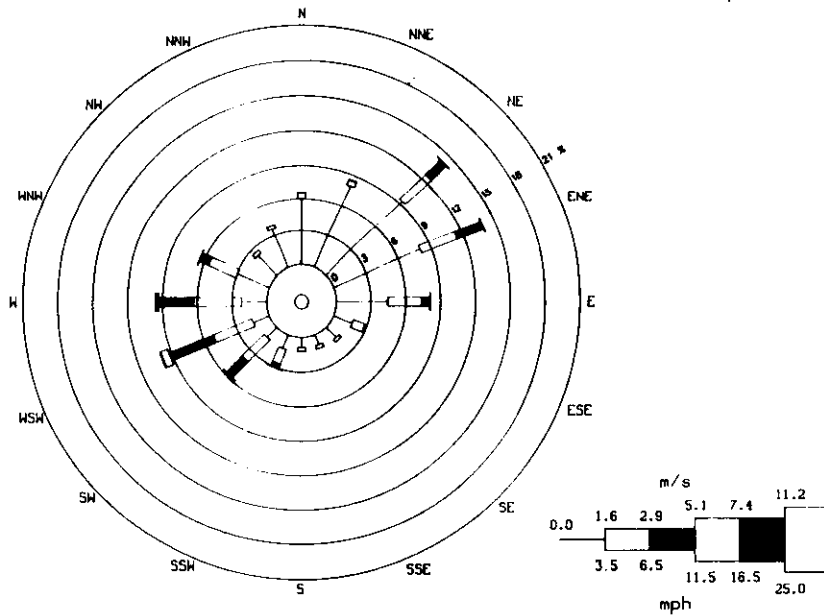


Fig. 2.1.10. 1988 wind rose for Y-12 tower MTE (east) (10-m level).

Table 2.1.1. 1988 monthly fluoride averages—Y-12 Plant^a

Station ID	Average concentrations ($\mu\text{g}/\text{m}^3$)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
01	<0.0235	0.0150	0.0135	0.0183	0.0121	<0.0104	<0.0077	<0.0082	0.0212	<0.0073	<0.0110	0.0133
02	0.0183	0.0189	<0.0169	0.0337	<0.0150	<0.0109	<0.0080	0.0200	<0.0124	<0.0079	<0.0124	0.0431
03	0.0235	0.0289	0.0275	0.0494	0.0279	<0.0104	<0.0270	<0.0207	0.0412	<0.0169	<0.0158	0.0684
04	0.0332	0.0346	0.0431	0.0588	<0.0372	0.0185	<0.0288	0.0607	0.0575	<0.0159	0.0305	0.0945
05	0.0326	0.0245	0.0238	0.0288	0.0254	<0.0123	<0.0390	0.0559	0.0560	<0.0436	<0.0315	0.0464
06	0.0161	0.0219	<0.0403	0.0193	<0.0211	<0.0136	<0.0165	0.0191	0.0258	<0.0163	<0.0216	0.0159
07	0.0257	0.0251	0.0361	0.0238	<0.0373	<0.0174	<0.0083	0.0116	0.0495	<0.0185	<0.0318	0.0181
08	0.0194	0.0375	0.0292	0.0404	<0.0204	<0.0150	<0.0073	0.0104	0.0251	<0.0407	<0.0175	0.0221
09	0.0216	0.0398	0.0364	0.0628	<0.0316	0.0126	<0.0088	<0.0079	<0.0174	<0.0819	<0.0101	0.0128
10	<0.0107	0.0173	<0.0232	0.0334	<0.0205	<0.0095	<0.0081	<0.0079	<0.0126	<0.0095	<0.0087	0.0128
11	0.0136	0.0158	<0.0117	0.0182	<0.0154	<0.0085	<0.0082	<0.0073	<0.0128	<0.0082	<0.0089	0.0161

^aTennessee standard for 30-d av = 1.2 $\mu\text{g}/\text{m}^3$.

Table 2.1.2. 1988 ^{234}U , ^{235}U , ^{236}U , and ^{238}U in air at the Y-12 Plant^a

Station number	Concentration ($10^{-15} \mu\text{Ci}/\text{cm}^3$)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
^{234}U				
1	0.38 ± 0.064	0.79 ± 0.10	0.982 ± 0.126	1.21 ± 0.139
2	0.91 ± 0.131	1.66 ± 0.155	1.34 ± 0.152	2.31 ± 0.226
3	4.22 ± 0.367	3.96 ± 0.317	4.00 ± 0.327	2.77 ± 0.244
4	5.99 ± 0.599	3.54 ± 0.286	3.19 ± 0.348	4.84 ± 0.461
5	4.88 ± 0.476	7.63 ± 0.602	6.14 ± 0.591	5.67 ± 0.520
6	1.24 ± 0.136	1.64 ± 0.158	2.42 ± 0.314	2.56 ± 0.249
7	1.30 ± 0.150	2.78 ± 0.252	1.97 ± 0.229	2.59 ± 0.251
8	1.09 ± 0.143	2.12 ± 0.237	3.50 ± 0.441	2.13 ± 0.222
9	0.91 ± 0.125	2.07 ± 0.183	1.46 ± 0.166	2.59 ± 0.362
10	0.63 ± 0.088	0.67 ± 0.023	1.37 ± 0.157	0.78 ± 0.102
11	0.34 ± 0.074	0.91 ± 0.109	1.80 ± 0.189	1.26 ± 0.140
12	1.06 ± 0.151	0.47 ± 0.069	0.92 ± 0.151	1.59 ± 0.188
^{235}U				
1	0.018 ± 0.013	<i>b</i>	<i>b</i>	0.031 ± 0.018
2	0.041 ± 0.041	<i>b</i>	0.090 ± 0.035	0.077 ± 0.026
3	0.217 ± 0.052	0.017 ± 0.012	0.120 ± 0.034	0.046 ± 0.021
4	0.072 ± 0.037	0.148 ± 0.038	0.075 ± 0.038	0.104 ± 0.040
5	0.100 ± 0.042	0.370 ± 0.066	0.278 ± 0.073	0.041 ± 0.024
6	0.007 ± 0.017	0.042 ± 0.019	<i>b</i>	0.047 ± 0.024
7	0.083 ± 0.032	0.092 ± 0.032	0.067 ± 0.034	0.062 ± 0.028
8	0.310 ± 0.072	0.014 ± 0.024	0.172 ± 0.072	0.050 ± 0.025
9	0.040 ± 0.023	0.033 ± 0.016	0.048 ± 0.078	0.139 ± 0.064
10	0.008 ± 0.022	0.008 ± 0.008	0.088 ± 0.034	0.019 ± 0.014
11	0.091 ± 0.038	<i>b</i>	0.010 ± 0.010	0.030 ± 0.018
12	0.143 ± 0.052	<i>b</i>	0.021 ± 0.021	0.058 ± 0.030

Table 2.1.2 (continued)

Station number	Concentration (10^{-15} $\mu\text{Ci}/\text{cm}^3$)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
^{236}U				
1	0.072 ± 0.026	0.027 ± 0.016	<i>b</i>	0.101 ± 0.033
2	0.133 ± 0.044	0.007 ± 0.007	<i>b</i>	0.128 ± 0.037
3	0.114 ± 0.034	0.007 ± 0.007	0.070 ± 0.024	0.073 ± 0.025
4	0.129 ± 0.052	0.126 ± 0.031	0.047 ± 0.027	0.157 ± 0.047
5	0.056 ± 0.028	0.451 ± 0.070	0.205 ± 0.058	0.087 ± 0.034
6	0.070 ± 0.025	0.092 ± 0.027	<i>b</i>	0.062 ± 0.026
7	0.092 ± 0.032	0.097 ± 0.030	0.042 ± 0.025	0.099 ± 0.034
8	0.263 ± 0.064	0.039 ± 0.023	0.279 ± 0.088	0.089 ± 0.032
9	0.072 ± 0.030	0.028 ± 0.014	0.098 ± 0.033	0.306 ± 0.094
10	0.046 ± 0.021	0.056 ± 0.023	0.086 ± 0.031	0.077 ± 0.028
11	0.091 ± 0.035	<i>b</i>	0.041 ± 0.021	0.098 ± 0.032
12	0.044 ± 0.033	<i>b</i>	0.037 ± 0.026	0.134 ± 0.044
^{238}U				
1	0.032 ± 0.016	0.059 ± 0.026	0.393 ± 0.070	0.140 ± 0.038
2	0.097 ± 0.035	0.060 ± 0.020	0.286 ± 0.056	0.280 ± 0.054
3	0.242 ± 0.049	0.253 ± 0.044	0.419 ± 0.062	0.179 ± 0.039
4	0.191 ± 0.056	0.362 ± 0.054	0.435 ± 0.088	0.337 ± 0.069
5	0.097 ± 0.035	0.379 ± 0.061	0.351 ± 0.074	0.231 ± 0.055
6	0.148 ± 0.036	0.134 ± 0.032	0.423 ± 0.099	0.141 ± 0.038
7	0.244 ± 0.052	0.266 ± 0.050	0.418 ± 0.082	0.296 ± 0.059
8	0.200 ± 0.048	0.342 ± 0.070	0.487 ± 0.116	0.520 ± 0.084
9	0.222 ± 0.053	0.350 ± 0.054	0.474 ± 0.078	2.55 ± 0.358
10	0.076 ± 0.026	0.043 ± 0.020	0.144 ± 0.049	0.316 ± 0.058
11	0.030 ± 0.017	0.097 ± 0.029	0.325 ± 0.061	0.236 ± 0.049
12	0.155 ± 0.047	0.029 ± 0.015	0.102 ± 0.043	0.223 ± 0.055

^aSee Fig. 2.1.16 in Vol. 1 for station locations.

^bNo data available.

Table 2.1.3. 1988 sulfur dioxide in air at the Y-12 Plant^{a,b}

Month/ station ID	Monthly av SO ₂ (ppm)	Max 24-h av SO ₂ (ppm)	Max 3-h av SO ₂ (ppm)
January			
East	0.016	0.035	0.105
West	0.010	0.024	0.050
February			
East	0.018	0.036	0.104
West	0.011	0.027	0.078
March			
East	0.014	0.035	0.081
West	0.013	0.028	0.116
April			
East	0.015	0.039	0.100
West	0.012	0.039	0.070
May			
East	0.013	0.024	0.056
West	0.010	0.020	0.050
June			
East	0.014	0.022	0.059
West	0.013	0.027	0.087
July			
East	0.012	0.022	0.057
West	0.007	0.015	0.040
August			
East	0.013	0.030	0.098
West	0.008	0.020	0.039
September			
East	0.014	0.029	0.077
West	0.009	0.022	0.053
October			
East	0.013	0.025	0.053
West	0.007	0.013	0.048
November			
East	0.010	0.020	0.069
West	0.006	0.019	0.045
December			
East	0.011	0.035	0.058
West	0.009	0.022	0.056

^aSee Fig. 2.1.16 in Vol. 1 for station locations.

^bThe Tennessee 24-h average standard is 0.14 ppm, and the Tennessee 3-h average standard is 0.5 ppm.

Table 2.1.4. 1988 total suspended particulates in air at the Y-12 Plant^a

Date sample completed	Concentration ^{b,c} ($\mu\text{g}/\text{m}^3$)		Date sample completed	Concentration ($\mu\text{g}/\text{m}^3$)	
	East	West		East	West
1/4	<i>d</i>	<i>d</i>	6/26	76	74
1/10	77	50	7/2	62.0	64
1/16	80	51	7/8	74	80
1/22	<i>d</i>	<i>d</i>	7/15	77	110
1/28	15	13	7/20	38	59
2/3	5	<i>d</i>	7/26	83	71
2/9	32	23	8/7	75	85
2/15	17	17	8/13	45	52
2/21	<i>d</i>	<i>d</i>	8/19	59	56
2/27	27	13	8/25	36	53
3/4	4	46	8/31	42	55
3/10	49	50	9/7	83	57
3/16	59	56	9/18	46	61
3/22	62	64	9/24	45	72
3/28	47	52	9/30	12	<i>d</i>
4/3	50	46	10/6	<i>d</i>	<i>d</i>
4/9	41	46	10/12	25	26
4/15	85	96	10/18	<i>d</i>	<i>d</i>
4/21	80	75	10/25	<i>d</i>	<i>d</i>
5/3	92	48	10/31	<i>d</i>	<i>d</i>
5/10	71	73	11/5	28	29
5/15	57	64	11/11	20	3
5/21	65	60	11/17	8	11
5/27	58	77	11/23	18	11
6/2	99	99	11/27	5	9
6/8	94	98	12/5	1	<i>d</i>
6/14	89	87	12/16	0.5	5
6/21	82	72	12/29	<i>d</i>	<i>d</i>

^aSee Fig. 2.1.16 in Vol. 1 for station locations.

^bTennessee primary air quality standard = $260 \mu\text{g}/(\text{m}^3 \cdot 24 \text{ h})$.

^cTennessee secondary air quality standard = $150 \mu\text{g}/(\text{m}^3 \cdot 24 \text{ h})$.

^dInvalid sample or no sample (downtime).

Table 2.1.5. 1988 gross alpha and beta in air at the Y-12 Plant^a

Station number	Concentration (10^{-15} $\mu\text{Ci}/\text{cm}^3$)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
<i>Gross alpha</i>				
1	3.50 \pm 0.610	1.72 \pm 0.585	2.70 \pm 0.562	2.93 \pm 0.657
2	3.83 \pm 0.629	3.03 \pm 0.659	2.97 \pm 0.578	5.01 \pm 0.732
3	6.60 \pm 0.778	6.53 \pm 0.834	5.94 \pm 0.744	5.54 \pm 0.759
4	6.07 \pm 0.751	5.08 \pm 0.765	4.55 \pm 0.670	7.06 \pm 0.833
5	8.71 \pm 0.879	10.7 \pm 1.02	14.7 \pm 1.14	8.18 \pm 0.885
6	3.50 \pm 0.610	4.55 \pm 0.738	5.01 \pm 0.696	6.14 \pm 0.788
7	6.47 \pm 0.771	5.54 \pm 0.787	6.07 \pm 0.751	5.61 \pm 0.849
8	4.35 \pm 0.659	4.22 \pm 0.722	6.71 \pm 0.864	4.68 \pm 0.715
9	4.82 \pm 0.685	4.29 \pm 0.725	4.75 \pm 0.681	7.92 \pm 0.873
10	3.23 \pm 0.594	3.04 \pm 0.749	2.70 \pm 0.562	2.84 \pm 0.614
11	3.43 \pm 0.606	3.50 \pm 0.684	3.69 \pm 0.622	4.05 \pm 0.766
12	3.43 \pm 0.606	3.36 \pm 0.677	4.09 \pm 0.645	5.38 \pm 0.837
<i>Gross beta</i>				
1	23.5 \pm 1.74	21.0 \pm 1.60	20.5 \pm 1.56	21.7 \pm 1.68
2	20.8 \pm 1.58	19.0 \pm 1.49	22.7 \pm 1.69	21.2 \pm 1.62
3	24.9 \pm 1.81	24.6 \pm 1.80	25.9 \pm 1.87	23.6 \pm 1.75
4	22.0 \pm 1.65	22.2 \pm 1.67	24.9 \pm 1.82	20.8 \pm 1.59
5	27.0 \pm 1.94	28.0 \pm 2.00	27.4 \pm 1.96	20.7 \pm 1.59
6	21.4 \pm 1.62	22.2 \pm 1.67	22.6 \pm 1.68	23.1 \pm 1.73
7	27.6 \pm 1.97	23.4 \pm 1.73	28.9 \pm 2.04	24.8 \pm 1.90
8	22.7 \pm 1.69	23.1 \pm 1.72	27.4 \pm 2.03	25.0 \pm 1.83
9	22.8 \pm 1.70	21.2 \pm 1.61	22.1 \pm 1.65	25.2 \pm 1.84
10	22.6 \pm 1.68	18.1 \pm 1.51	20.7 \pm 1.58	21.4 \pm 1.63
11	19.6 \pm 1.51	19.5 \pm 1.52	19.5 \pm 1.51	19.7 \pm 1.62
12	19.9 \pm 1.53	22.5 \pm 1.68	23.2 \pm 1.71	26.6 \pm 2.00

^aSee Fig. 2.1.16 in Vol. 1 for station locations.

Table 2.1.6. 1988 long-lived gross alpha activity in air

Location	Number of samples	Concentration ($1 \times 10^{-15} \mu\text{Ci/mL}$)			
		Max	Min	Av	Standard error
<i>ORNL PAM stations^a</i>					
3	52	1.5	-1.6	-0.26	0.13
4	29	1.5	-1.3	-0.032	0.17
7	40	1.5	-2.3	-0.41	0.15
9	50	1.4	-2.3	-0.29	0.13
20	29	1.4	-1.4	0.0096	0.16
21	40	1.8	-1.5	-0.13	0.16
22	49	1.7	-1.9	-0.30	0.15
Network summary	289	1.8	-2.3	-0.22	0.056
<i>Reservation PAM stations^a</i>					
8	52	1.6	-1.8	-0.14	0.14
23	49	9.8	-1.6	0.17	0.25
31	52	2.8	-1.4	-0.032	0.15
33	46	2.1	-1.6	0.085	0.14
34	50	1.8	-1.6	0.060	0.14
36	50	1.9	-2.0	-0.14	0.15
40	52	2.0	-1.8	-0.19	0.15
41	45	1.9	-1.7	-0.21	0.15
42	52	1.9	-2.0	-0.24	0.14
43	47	2.1	-2.1	-0.13	0.16
44	51	1.5	-1.6	-0.29	0.14
45	50	17	-1.8	0.69	0.37
46	50	2.4	-3.3	-0.17	0.17
Network summary	646	17	-3.3	-0.043	0.051
<i>RAM stations^b</i>					
51	51	2.0	-0.85	0.24	0.096
52	48	3.6	-2.8	-0.067	0.23
53	47	3.2	-1.7	0.59	0.20
55	45	2.2	-1.8	-0.29	0.17
56	46	2.2	-2.0	-0.17	0.16
57	47	2.0	-3.3	0.20	0.16
58	24	4.0	-1.3	0.59	0.36
Network summary	308	4.0	-3.3	0.11	0.072
Overall summary	1243	17	-3.3	-0.048	0.035

^aSee Fig. 2.1.17 in Vol. 1.^bSee Fig. 2.1.18 in Vol. 1

Table 2.1.7. 1988 long-lived gross beta activity in air

Location	Number of samples	Concentration (1×10^{-15} $\mu\text{Ci/mL}$)			Standard error
		Max	Min	Av	
<i>ORNL PAM stations^a</i>					
3	52	40	6.1	24	1.3
4	29	44	25	32	0.85
7	40	43	11	25	1.3
9	50	43	4.2	22	0.90
20	29	43	22	31	1.0
21	40	81	23	33	1.4
22	49	39	9.0	28	0.97
Network summary	289	81	4.2	27	0.49
<i>Reservation PAM stations^a</i>					
8	52	45	11	26	1.2
23	49	66	6.7	28	1.5
31	52	94	11	28	1.5
33	46	44	18	30	0.87
34	50	39	20	29	0.72
36	50	47	16	29	1.0
40	52	33	9.8	22	0.86
41	45	40	11	27	1.0
42	52	45	14	26	0.96
43	47	42	12	26	1.0
44	51	46	14	25	0.96
45	50	67	11	29	1.3
46	50	49	9.1	26	1.3
Network summary	646	94	6.7	27	0.32
<i>RAM stations^b</i>					
51	51	47	1.9	28	1.1
52	48	46	7.8	31	1.2
53	47	61	7.0	35	1.5
55	45	45	4.7	23	1.3
56	46	43	7.8	27	1.0
57	47	48	5.4	31	1.3
58	24	54	4.5	33	2.2
Network summary	308	61	1.9	29	0.53
Overall summary	1243	94	1.9	28	0.24

^aSee Fig. 2.1.17 in Vol. 1.^bSee Fig. 2.1.18 in Vol. 1.

Table 2.1.8. 1988 ¹³¹I concentrations in air

Location	Number of samples	Concentration ($1 \times 10^{-15} \mu\text{Ci/mL}$)				Standard error	Percentage of DCG ^a
		Max	Min	Av			
<i>ORNL PAM stations^b</i>							
3	52	3.2	-3.6	0.25	0.18	<0.01	
4	29	3.3	-1.6	0.43	0.23	<0.01	
7	40	2.5	-3.3	0.16	0.19	<0.01	
9	50	5.2	-2.2	0.49	0.23	<0.01	
20	29	4.9	-1.0	1.1	0.30	<0.01	
21	40	4.5	-3.5	0.73	0.27	<0.01	
22	49	6.7	-4.8	0.78	0.27	<0.01	
Network summary	289	6.7	-4.8	0.54	0.092	<0.01	
<i>Reservation PAM stations^b</i>							
8	52	3.2	-2.0	0.42	0.16	<0.01	
23	49	4.5	-2.7	0.91	0.23	<0.01	
31	52	3.6	-2.7	0.47	0.18	<0.01	
33	46	4.9	-2.9	0.59	0.23	<0.01	
34	50	3.4	-2.5	0.35	0.17	<0.01	
36	50	12	-3.8	1.1	0.31	<0.01	
40	52	4.3	-2.4	0.79	0.19	<0.01	
41	45	5.9	-1.7	0.53	0.22	<0.01	
42	52	4.4	-1.8	0.31	0.20	<0.01	
43	47	3.6	-4.7	0.43	0.21	<0.01	
44	51	2.8	-3.8	0.30	0.17	<0.01	
45	50	3.0	-2.4	0.024	0.17	<0.01	
46	50	4.7	-2.5	0.31	0.22	<0.01	
Network summary	646	12	-4.7	0.50	0.058	<0.01	
Overall summary	935	12	-4.8	0.51	0.049	<0.01	

^aPercentage of DCG = average/derived concentration guide (DCG) × 100. The DCG for ¹³¹I is $400,000 \times 10^{-15} \mu\text{Ci/mL}$.

^bSee Fig. 2.1.17 in Vol. 1.

Table 2.1.9. 1988 tritium activity in air

Location ^a	Number of samples	Concentration (10 ⁻⁶ pCi/mL)				Percentage of DCG ^b
		Max	Min	Av	Standard error	
3	12	70	-320	-9.8	28	<0.01
8	12	54	-350	-17	30	<0.01
Overall summary	24	70	-350	-14	20	<0.01

^aSee Fig. 2.1.17 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) × 100. The DCG for tritium is 0.1 pCi/mL. This assumes that 50% of the tritium is absorbed through the skin.

Table 2.1.10. 1988 continuous air monitoring data for ⁶⁰Co (composite samples)

Location ^a	Number of samples	Concentration (10 ⁻¹⁵ μCi/mL)				Percentage DCG ^b
		Max	Min	Av	Standard error	
ORNL PAMS	4	<0.071	0.035	<0.054	0.0083	<0.01
34	4	<0.30	0.049	<0.22	0.059	<0.01
36	4	<0.35	-0.035	<0.18	0.10	<0.01
40	4	<0.34	-0.0056	<0.20	0.082	<0.01
41	4	<0.36	-0.018	<0.23	0.085	<0.01
45	4	<0.30	-0.098	<0.15	0.090	<0.01
46	4	<0.34	-0.085	<0.20	0.10	<0.01
Reservation PAMS	4	<0.10	-0.016	<0.039	0.024	<0.01
RAMS	4	<0.055	-0.011	<0.025	0.015	<0.01

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) × 100. The DCG = 80,000 × 10⁻¹⁵ μCi/mL.

**Table 2.1.11. 1988 continuous air monitoring data
for ^{137}Cs (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci}/\text{mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.15	0.064	0.10	0.019	<0.01
34	4	<0.29	0.027	<0.14	0.055	<0.01
36	4	<0.32	0.041	<0.15	0.068	<0.01
40	4	<0.34	0.044	<0.18	0.061	<0.01
41	4	<0.36	-0.084	<0.12	0.099	<0.01
45	4	<0.22	-0.0030	<0.098	0.053	<0.01
46	4	0.27	0.042	0.17	0.048	<0.01
Reservation PAMS	4	<0.10	0.0081	<0.048	0.019	<0.01
RAMS	4	0.072	-0.021	0.027	0.025	<0.01

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = $400,000 \times 10^{-15}$ $\mu\text{Ci}/\text{mL}$.

**Table 2.1.12. 1988 continuous air monitoring data
for ^{238}Pu (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci}/\text{mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.0019	-0.000044	0.00087	0.00047	<0.01
34	4	0.0018	-0.0033	-0.00099	0.0013	<0.01
36	4	0.0032	-0.021	-0.0047	0.0056	<0.01
40	4	0.0063	-0.12	-0.029	0.032	<0.01
41	4	0.017	-0.0043	0.0044	0.0052	0.015
45	4	0.013	-0.00058	0.0040	0.0031	0.013
46	4	0.0040	-0.0045	0.00016	0.0019	<0.01
Reservation PAMS	4	0.0012	-0.00067	0.000088	0.00042	<0.01
RAMS	4	0.0022	-0.00017	0.00054	0.00055	<0.01

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = 30×10^{-15} $\mu\text{Ci}/\text{mL}$.

**Table 2.1.13. 1988 continuous air monitoring data
for ^{239}Pu (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci/mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.0010	-0.00064	0.00021	0.00034	<0.01
34	4	0.0019	-0.0096	-0.0041	0.0024	<0.01
36	4	-0.0035	-0.015	-0.0083	0.0024	<0.01
40	4	0.00034	-0.015	-0.0076	0.004	<0.01
41	4	0.0012	-0.0030	-0.0013	0.00099	<0.01
45	4	0.000029	-0.039	-0.011	0.0093	<0.01
46	4	0.0014	-0.0065	-0.0016	0.0017	<0.01
Reservation PAMS	4	0.000042	-0.0030	-0.00093	0.00069	<0.01
RAMS	4	0.00017	-0.00083	-0.00034	0.00021	<0.01

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = 20×10^{-15} $\mu\text{Ci/mL}$.

**Table 2.1.14. 1988 continuous air monitoring data
for ^{228}Th (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci/mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.10	0.024	0.053	0.017	0.13
34	4	0.50	0.065	0.21	0.099	0.53
36	4	0.53	0.084	0.26	0.100	0.65
40	4	0.41	0.0098	0.20	0.096	0.50
41	4	0.85	0.056	0.34	0.180	0.85
45	4	0.62	0.078	0.27	0.120	0.68
46	4	0.51	0.065	0.24	0.110	0.60
Reservation PAMS	4	0.090	0.019	0.046	0.016	0.12
RAMS	4	0.073	0.021	0.046	0.011	0.12

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = 40×10^{-15} $\mu\text{Ci/mL}$.

**Table 2.1.15. 1988 continuous air monitoring data
for ^{230}Th (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci/mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.049	0.0070	0.022	0.0097	0.055
34	4	0.23	0.0054	0.11	0.059	0.28
36	4	0.25	0.011	0.13	0.065	0.33
40	4	0.22	0.0097	0.098	0.053	0.25
41	4	0.33	0.0065	0.11	0.074	0.28
45	4	0.38	0.012	0.12	0.088	0.30
46	4	0.21	0.015	0.076	0.046	0.19
Reservation PAMS	4	0.046	0.0054	0.022	0.0095	0.055
RAMS	4	0.031	0.0065	0.019	0.0062	0.048

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = 40×10^{-15} $\mu\text{Ci/mL}$.

**Table 2.1.16. 1988 continuous air monitoring data
for ^{232}Th (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci/mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.021	0.0062	0.013	0.0038	0.19
34	4	0.024	0.0069	0.015	0.0047	0.21
36	4	0.050	0.011	0.027	0.0092	0.39
40	4	0.052	0.0072	0.026	0.0098	0.37
41	4	0.073	0.0050	0.030	0.015	0.43
45	4	0.038	0.0070	0.020	0.0073	0.29
46	4	0.038	0.0099	0.019	0.0064	0.27
Reservation PAMS	4	0.026	0.0058	0.015	0.0048	0.21
RAMS	4	0.028	0.0087	0.018	0.0048	0.26

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = 7×10^{-15} $\mu\text{Ci/mL}$.

**Table 2.1.17. 1988 continuous air monitoring data
for total Sr (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci/mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.12	0	0.069	0.027	<0.01
34	4	0.33	0.060	0.20	0.066	<0.01
36	4	0.075	-0.035	0.015	0.027	<0.01
40	4	0.35	0	0.17	0.098	<0.01
41	4	0.30	-0.038	0.059	0.082	<0.01
45	4	0.66	0.020	0.23	0.14	<0.01
46	4	0.12	-0.11	0.020	0.051	<0.01
Reservation PAMS	4	0.095	0.014	0.041	0.019	<0.01
RAMS	4	0.068	-0.00042	0.030	0.015	<0.01

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = $9,000 \times 10^{-15}$ $\mu\text{Ci/mL}$.

**Table 2.1.18. 1988 continuous air monitoring data
for ²³⁴U (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci/mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.10	0.062	0.081	0.0085	0.09
34	4	0.34	0.041	0.14	0.07	0.16
36	4	0.46	0.070	0.25	0.095	0.28
40	4	0.64	0.35	0.49	0.079	0.54
41	4	0.85	0.090	0.34	0.17	0.38
45	4	1.0	0.45	0.70	0.12	0.78
46	4	0.54	0.51	0.53	0.0078	0.59
Reservation PAMS	4	0.20	0.058	0.13	0.029	0.14
RAMS	4	0.13	0.019	0.063	0.025	0.070

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = 90×10^{-15} $\mu\text{Ci/mL}$.

**Table 2.1.19. 1988 continuous air monitoring data
for ^{235}U (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci}/\text{mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.042	0.0036	0.014	0.0094	0.014
34	4	0.054	0.0014	0.017	0.012	0.017
36	4	0.074	0.0045	0.024	0.017	0.024
40	4	0.14	0.011	0.057	0.03	0.057
41	4	0.030	0.0087	0.016	0.0046	0.016
45	4	0.30	0.015	0.095	0.069	0.095
46	4	0.22	0.015	0.071	0.05	0.071
Reservation PAMS	4	0.026	0.0031	0.011	0.0051	0.011
RAMS	4	0.0088	0.0015	0.0034	0.0018	<0.01

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = 100×10^{-15} $\mu\text{Ci}/\text{mL}$.

**Table 2.1.20. 1988 continuous air monitoring data
for ^{238}U (composite samples)**

Location ^a	Number of samples	Concentration (10^{-15} $\mu\text{Ci}/\text{mL}$)				
		Max	Min	Av	Standard error	Percentage DCG ^b
ORNL PAMS	4	0.049	0.015	0.028	0.0075	0.028
34	4	0.093	0.022	0.045	0.017	0.045
36	4	0.074	0.029	0.056	0.01	0.056
40	4	0.15	0.081	0.10	0.016	0.10
41	4	0.12	0.032	0.064	0.018	0.064
45	4	1.6	0.11	0.51	0.37	0.51
46	4	0.22	0.051	0.11	0.038	0.11
Reservation PAMS	4	0.19	0.015	0.072	0.041	0.072
RAMS	4	0.033	0.013	0.021	0.0044	0.021

^aSee Figs. 2.1.17 and 2.1.18 in Vol. 1.

^bPercentage of DCG = average/derived concentration guide (DCG) \times 100. The DCG = 100×10^{-15} $\mu\text{Ci}/\text{mL}$.

Table 2.1.21. Air permits at the Y-12 Plant

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-12 Steam Plant	01-0020-01	024150P	Y-12 Steam Plant	O
Y-1501-2-A(01)	01-0020-70	023506P	Bandsaw hood exhaust	O
Y-1501-2-A(02)	01-0020-70	023506P	Insulation shop vacuum exhaust	O
Y-9201-1-(06)	01-0020-15	012664P	Det/water degreaser	O
Y-9201-1-A(01)	01-0020-15	025974P	Welding booths	O
Y-9201-1-A(02)	01-0020-15	025974P	Welding shop	O
Y-9201-1-A(03)	01-0020-15	025974P	Dye penetrant work bench	O
Y-9201-1-A(04)	01-0020-15	025974P	Metal fabrication shop	O
Y-9201-1-A(05)	01-0020-15	025974P	Welding shop	O
Y-9201-1-A(14)	01-0020-15	022885P	Oven	O
Y-9201-1-A(15)	01-0020-15	025974P	Metal fabrication shop	O
Y-9201-1-A(19)	01-0020-15	025974P	Welding head exhaust	O
Y-9201-1-B(16)	01-0020-59	022964P	Tool grinding machines	O
Y-9201-1-B(18)	01-0020-59	022964P	Sandblaster exhaust	O
Y-9201-1-C(3)	01-0020-17	012665P	Graphitic carbon machining	O
Y-9201-1-C(4)	01-0020-17	012665P	Graphitic carbon machining	O
Y-9201-1-D(09)	01-0020-61	025958P	Fabrication shop	O
Y-9201-1-D(10)	01-0020-61	025958P	Fabrication shop	O
Y-9201-1-D(11)	01-0020-61	025958P	Fabrication shop	O
Y-9201-1-D(13)	01-0020-61	025958P	Metal grinders and milling machines	O
Y-9201-2-B(02)	01-0020-43	022888P	Acid wash station	O
Y-9201-2-C(01)	01-0020-67	015146P	Weld booth	O
Y-9201-2-C(02)	01-0020-67	015146P	Weld booth	O
Y-9201-2-C(03)	01-0020-67	015146P	Weld booth	O
Y-9201-3-A(01)	01-0020-55	013002P	Diesel generator	O
Y-9201-4-A(01)	01-0020-60	015112P	Electrochemical machining	O
Y-9201-4-B(02)	01-1020-22	023202P	Paint spray booth	O
Y-9201-5-A(01)	01-0020-29	025964P	Vacuum system	O
Y-9201-5-A(02)	01-0020-29	025964P	Vented hood	O
Y-9201-5-A(03)	01-0020-29	025964P	Oven	O
Y-9201-5-A(04)	01-0020-29	025964P	Oven	O
Y-9201-5-A(05)	01-0020-29	025964P	Surface coating	O
Y-9201-5-A(06)	01-0020-29	025964P	Surface coating	O
Y-9201-5-A(07)	01-0020-29	025964P	TIG welder and cleaning/mixing hood	O
Y-9201-5-A(08)	01-0020-29	025964P	Degreaser	O
Y-9201-5-A(09)	01-0020-29	025964P	Electropolisher, cleaning table	O
Y-9201-5-A(10)	01-0020-29	025964P	Exhaust from bonding facility	O
Y-9201-5-A(11)	01-0020-29	025964P	Vacuum pump	O
Y-9201-5-A(12)	01-0020-21	021086P	Machine shop	O
Y-9201-5-B(01)	01-0020-21	025956P	Machining operations	O
Y-9201-5-B(02)	01-0020-21	025956P	Vacuum inlets	O
Y-9201-5-B(03)	01-0020-21	025956P	Rubber-gel potting	O
Y-9201-5-B(04)	01-0020-21	025956P	Palarite shop—machine exhaust	O
Y-9201-5-B(05)	01-0020-21	025956P	Tool grinding machines	O
Y-9201-5-B(06)	01-0020-21	025956P	Cleaning hood	O
Y-9201-5-B(11)	01-0020-21	021086P	Machine shop	O
Y-9201-5-C(01)	01-1020-43	022888P	Grinding, sanding, and welding operations	O
Y-9201-5-C(02)	01-1020-43	022888P	Spot welding operations	O
Y-9201-5-D(01)	01-1020-44	025902P	Hood	O
Y-9201-5-D(02)	01-1020-44	025902P	Film dryer exhaust fume hood	O
Y-9201-5-E(01)	01-1020-70	025983P	BeO hot press	O
Y-9201-5-E(02)	01-1020-70	025983P	A53 hot press house vacuum	O
Y-9201-5-E(08)	01-1020-70	025983P	Room exhaust	O
Y-9201-5-F(01)	01-0020-36	025973P	Carbon foam saw room	O
Y-9201-5-F(02)	01-0020-36	025973P	Carbon foam urethane mixing vat	O
Y-9201-5-F(03)	01-0020-36	025973P	Carbon foam mixing and pour room	O

Table 2.1.21 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-9201-5-F(04)	01-0020-36	025973P	Oven	O
Y-9201-5-F(05)	01-0020-36	025973P	Oven	O
Y-9201-5-G(01)	01-0020-44	025896P	Arc melt	O
Y-9201-5-G(02)	01-0020-44	025896P	De Vilbiss hood	O
Y-9201-5-G(03)	01-0020-44	025896P	Nitric acid dip tanks	O
Y-9201-5-G(04)	01-0020-44	025896P	Acid pickling tanks	O
Y-9201-5-G(05)	01-0020-44	025896P	Abrasive saws	O
Y-9201-5-G(06)	01-0020-44	025896P	Scrap metal recycle	O
Y-9201-5-G(07)	01-0020-44	025896P	Vapor degreaser	O
Y-9201-5-H(01)	01-0020-16	026019P	Mixing process material	O
Y-9201-5-H(02)	01-0020-16	026019P	Setup and sample area	O
Y-9201-5-H(03)	01-0020-16	026019P	Vapor blaster	O
Y-9201-5-H(04)	01-0020-16	026019P	Nickel plating tank exhaust	O
Y-9201-5-H(05)	01-0020-16	026019P	Material handling	O
Y-9201-5-H(06)	01-0020-16	026019P	Material handling	O
Y-9201-5-H(07)	01-0020-16	026019P	Glove box & blending station	O
Y-9201-5-H(08)	01-0020-16	026019P	Inspection house vacuum	O
Y-9201-5-I(01)	01-1020-69	024965P	Laser etcher	O
Y-9201-5-I(24)			Abrasive saws	
Y-9201-5N-A(01)	01-0020-18	025950P	Machine shop exhaust	O
Y-9201-5N-B(03)	01-0020-30	025962P	Electroplating process	O
Y-9201-5N-B(04)	01-0020-30	025962P	Electroplating process	O
Y-9201-5N-B(05)	01-0020-30	025962P	Electropolish and KOH stripping	O
Y-9201-5N-B(06)	01-0020-30	025962P	Incinerator	O
Y-9201-5N-B(07)	01-0020-30	025962P	Grit blaster	O
Y-9201-5N-B(08)	01-0020-30	025962P	Degreaser	O
Y-9201-5N-B(09)	01-0020-30	025962P	Storage tank	O
Y-9201-5N-B(10)	01-0020-30	025962P	Storage tank	O
Y-9201-5N-B(11)	01-0020-30	025962P	Grit blaster	O
Y-9201-5N-B(12)	01-0020-30	025962P	Vacuum pump exhaust	O
Y-9202-A-(01)	01-0020-21	022883P	Glove box	O
Y-9202-A-(02)	01-0020-21	022883P	Glove box	O
Y-9202-A-(03)	01-0020-21	022883P	Glove box	O
Y-9202-A-(04)	01-0020-21	022883P	Glove box	O
Y-9204-2-A(01)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(02)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(03)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(04)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(05)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(06)	01-0020-46	024598P	Storage tank	O
Y-9204-2-A(07)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(08)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(09)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(10)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(11)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(12)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(13)	01-0020-46	026107P	Storage tank	O
Y-9204-2-B(14)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(15)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(16)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(17)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(18)	01-0020-71	025954P	Caustic scrubber exhaust	O
Y-9204-2-B(19)	01-0020-71	025954P	Caustic scrubber exhaust	O
Y-9204-2-B(20)	01-0020-71	025954P	Storage area	O
Y-9204-2-B(21)	01-0020-71	025954P	Reduction cell	O

Table 2.1.21 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-9204-2-B(22)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(23)	01-0020-71	025954P	Caustic scrubber exhaust	O
Y-9204-2-B(24)	01-0020-71	025954P	Caustic scrubber exhaust	O
Y-9204-2-B(25)	01-0020-71	025954P	Lithium metal wash station	O
Y-9204-2-B(26)	01-0020-71	025954P	Cleaning station	O
Y-9204-2-B(27)	01-0020-71	025954P	Lithium remelt oven	O
Y-9204-2-B(28)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-C(29)	01-1020-19	025900P	Classified	O
Y-9204-2-C(30)	01-1020-19	025900P	Classified	O
Y-9204-2-C(31)	01-1020-19	025900P	Classified	O
Y-9204-2-C(32)	01-1020-19	025900P	Classified	O
Y-9204-2-C(33)	01-1020-19	025900P	Classified	O
Y-9204-2-C(34)	01-1020-19	025900P	Classified	O
Y-9204-2-C(35)	01-1020-19	025900P	Classified	O
Y-9204-2-C(36)	01-1020-19	025900P	Classified	O
Y-9204-2-C(37)	01-1020-19	025900P	Classified	O
Y-9204-2-C(38)	01-1020-19	025900P	Classified	O
Y-9204-2-C(39)	01-1020-19	025900P	Classified	O
Y-9204-2-C(40)	01-1020-19	025900P	Classified	O
Y-9204-2-C(41)	01-1020-19	025900P	Classified	O
Y-9204-2-C(42)	01-1020-19	025900P	Classified	O
Y-9204-2-C(43)	01-1020-19	025900P	Classified	O
Y-9204-2-C(44)	01-1020-19	025900P	Classified	O
Y-9204-2-C(45)	01-1020-19	025900P	Classified	O
Y-9204-2-C(46)	01-1020-19	025900P	Classified	O
Y-9204-2-C(47)	01-1020-19	025900P	Classified	O
Y-9204-2-C(48)	01-1020-19	025900P	Classified	O
Y-9204-2-C(49)	01-1020-19	025900P	Classified	O
Y-9204-2-C(50)	01-1020-19	025900P	Classified	O
Y-9204-2-C(51)	01-1020-19	025900P	Classified	O
Y-9204-2-D(52)	01-1020-57	025967P	Storage tanks	O
Y-9204-2-D(53)	01-1020-57	025967P	Station	O
Y-9204-2-D(54)	01-1020-57	025967P	Salvage vats	O
Y-9204-2-D(55)	01-1020-57	025967P	Storage tank	O
Y-9204-2-D(56)	01-1020-57	025967P	Lithium chloride crystallizer	O
Y-9204-2-D(57)	01-1020-57	025967P	Lithium chloride crystallizer	O
Y-9204-2-D(58)	01-1020-57	025967P	Neutralizer	O
Y-9204-2-D(59)	01-1020-57	025967P	3 lab hoods	O
Y-9204-2-D(60)	01-1020-57	025967P	Process tank	O
Y-9204-2-D(61)	01-1020-57	025967P	Lithium chloride crystallizer	O
Y-9204-2-D(62)	01-1020-57	025967P	Lithium hydroxide neutralizer	O
Y-9204-2-D(63)	01-1020-57	025967P	HCl head tanks	O
Y-9204-2-D(64)	01-1020-57	025967P	Process tanks	O
Y-9204-2-D(65)	01-1020-57	025967P	Process tank	O
Y-9204-2-D(66)	01-1020-57	025967P	Neutralizer	O
Y-9204-2-D(67)	01-1020-57	025967P	Neutralizer	O
Y-9204-2-E(068)	01-1020-55	025959P	Oven	O
Y-9204-2-E(069)	01-1020-55	025959P	Oven	O
Y-9204-2-E(070)	01-1020-55	025959P	Tungsten screener	O
Y-9204-2-E(071)	01-1020-55	025959P	Dry box vent	O
Y-9204-2-E(072)	01-1020-55	025959P	Glove boxes	O
Y-9204-2-E(073)	01-1020-55	025959P	Material handling	O
Y-9204-2-E(074)	01-1020-55	025959P	Glove boxes	O
Y-9204-2-E(075)	01-1020-55	025959P	Outgassing/annealing ovens	O
Y-9204-2-E(076)	01-1020-55	025959P	Material handling	O

Table 2.1.21 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-9204-2-E(077)	01-1020-55	025959P	Glove boxes	O
Y-9204-2-E(078)	01-1020-55	025959P	Reactor unloading station	O
Y-9204-2-E(079)	01-1020-55	025959P	Reactor unloading station	O
Y-9204-2-E(080)	01-1020-55	025959P	Glove boxes	O
Y-9204-2-E(081)	01-1020-55	025959P	Vacuum pump	O
Y-9204-2-F(082)	01-0020-51	025897P	Classified	O
Y-9204-2-F(083)	01-0020-51	025897P	Classified	O
Y-9204-2-F(084)	01-0020-51	025897P	Classified	O
Y-9204-2-F(085)	01-0020-51	025897P	Classified	O
Y-9204-2-F(086)	01-0020-51	025897P	Classified	O
Y-9204-2-F(087)	01-0020-51	025897P	Classified	O
Y-9204-2-G(088)	01-1020-42	022896P	Inspection operation	O
Y-9204-2-G(089)	01-1020-42	022896P	Metal working	O
Y-9204-2-G(090)	01-1020-42	022896P	Metal working	O
Y-9204-2-G(091)	01-1020-42	022896P	Vacuum pumps	O
Y-9204-2-G(092)	01-1020-42	022896P	Vacuum pumps	O
Y-9204-2-G(093)	01-1020-42	022896P	Vacuum pumps	O
Y-9204-2-G(094)	01-1020-42	022896P	Grinders and belt sanders	O
Y-9204-2-G(095)	01-1020-42	022896P	Welding booth	O
Y-9204-2-G(096)	01-1020-42	022896P	Etching vats	O
Y-9204-2-G(097)	01-1020-42	022896P	Glue mixing	O
Y-9204-2-G(098)	01-1020-42	022896P	Laser welder	O
Y-9204-2-G(099)	01-1020-42	022896P	Vacuum pump	O
Y-9204-2-G(100)	01-1020-42	022896P	Vacuum pump	O
Y-9204-2-G(101)	01-1020-42	022896P	Glove box	O
Y-9204-2-H(01)	01-1020-42	022897P	Etching vats	O
Y-9204-2-H(02)	01-1020-42	022897P	Glue mixing	O
Y-9204-2-H(03)	01-1020-42	022897P	Vacuum pumps	O
Y-9204-2-H(04)	01-1020-42	022897P	Vacuum pumps	O
Y-9204-2-H(05)	01-1020-42	022897P	Vacuum pumps	O
Y-9204-2-H(06)	01-1020-42	022896P	Vacuum pumps	O
Y-9204-2-I(94)	01-1020-71	026067P	Maintenance shop	O
Y-9204-2-I(95)	01-1020-71	026067P	Maintenance shop	O
Y-9204-2E-A(01)	01-0020-68	022891P	Oven	O
Y-9204-2E-A(02)	01-0020-68	022891P	Vacuum pumps	O
Y-9204-2E-A(03)	01-0020-68	022891P	Vacuum pumps	O
Y-9204-2E-A(04)	01-0020-68	022891P	Hood exhaust	O
Y-9204-2E-A(05)	01-0020-68	022891P	Lathes	O
Y-9204-2E-A(06)	01-0020-68	022891P	Hood	O
Y-9204-2E-A(07)	01-0020-68	022891P	Hood	O
Y-9204-2E-A(08)	01-0020-68	022891P	Degreaser	O
Y-9204-2E-A(09)	01-0020-68	022891P	Electropolishers	O
Y-9204-2E-A(10)	01-0020-68	022891P	Surface coating	O
Y-9204-2E-A(11)	01-0020-68	022891P	Welding booth	O
Y-9204-2E-A(16)	01-0020-68	022891P	Laser welder vent	O
Y-9204-2E-A(17)	01-0020-68	022891P	Glove box	O
Y-9204-2E-A(18)	01-0020-68	022891P	Storage tank	O
Y-9204-2E-A(19)	01-0020-68	022891P	Hood exhaust and weld booth	O
Y-9204-2E-B(12)	01-1020-41	025953P	X-ray testing	O
Y-9204-2E-B(14)	01-1020-41	025953P	Hoods	O
Y-9204-2E-B(15)	01-1020-41	025953P	Hoods	O
Y-9204-2E-C(12)	01-1020-68	022890P	Machining operations	O
Y-9204-2E-C(13)	01-1020-68	022890P	Cut off saw and grinder	O
Y-9204-2E-R(10)			Saw and grinder hood	
Y-9204-2E-S(11)	01-1020-01	022394P	Holding tank	O

Table 2.1.21 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-9204-2E-T(12)	01-1020-02	022393P	Welding station	O
Y-9204-4-A(01)	01-1020-56	022697P	Sandblaster	O
Y-9204-4-A(02)	01-1020-56	022697P	Wash tank	O
Y-9204-4-A(03)	01-1020-56	022697P	Quench tanks	O
Y-9204-4-A(04)	01-1020-56	022697P	1000 ton press	O
Y-9204-4-A(05)	01-1020-56	022697P	7500 ton press	O
Y-9204-4-A(06)	01-1020-56	022697P	Exhaust from press pit area	O
Y-9204-4-A(07)	01-1020-56	022697P	Plasma torch cutting machine	O
Y-9204-4-A(08)	01-1020-56	022697P	Vacuum quench furnace	O
Y-9204-4-A(09)	01-1020-56	022697P	Ingot cooler	O
Y-9204-4-A(10)	01-1020-56	022697P	Exhaust from lathe	O
Y-9204-4-A(11)	01-1020-56	022697P	Grinding facility	O
Y-9204-4-A(12)	01-1020-56	022697P	Dye penetrant	O
Y-9204-4-A(13)	01-1020-56	022697P	Salt baths	O
Y-9204-4-A(14)	01-1020-56	022697P	Quench tanks	O
Y-9204-4-A(15)	01-1020-56	022697P	Preheat furnace exhaust	O
Y-9204-4-A(16)	01-1020-56	022697P	Preheat furnace exhaust	O
Y-9204-4-A(17)	01-1020-56	022697P	Oven exhaust	O
Y-9204-4-A(18)	01-1020-56	022697P	Vacuum furnace quench chamber	O
Y-9204-4-B(01)	01-0020-72	025961P	Rolling mill	O
Y-9204-4-B(02)	01-0020-72	025961P	Quenching	O
Y-9204-4-B(03)	01-0020-72	025961P	Rolling mill & salt bath	O
Y-9204-4-B(04)	01-0020-72	025961P	Rolling mill	O
Y-9204-4-B(05)	01-0020-72	025961P	Metal working & annealing	O
Y-9204-4-B(06)	01-0020-72	025961P	Metal working	O
Y-9204-4-B(07)	01-0020-72	025961P	Laboratory hoods and darkroom sink	O
Y-9204-4-B(08)	01-0020-72	025961P	Laboratory hoods	O
Y-9204-4-B(09)	01-0020-72	025961P	Laboratory hoods	O
Y-9204-4-B(10)	01-0020-72	025961P	Assembly process	O
Y-9204-4-B(11)	01-0020-72	025961P	Assembly process	O
Y-9204-4-C(01)	01-1020-36	025968P	Degreaser and welding booth	O
Y-9204-4-D(01)	01-1020-35	025963P	Exhaust hood	O
Y-9204-4-E(01)	01-0020-33	025002P	Storage tank	O
Y-9204-4-E(02)	01-0020-33	025002P	Nickel plating line	O
Y-9204-4-E(03)	01-0020-33	025002P	Storage tank	O
Y-9204-4-E(04)	01-0020-33	025002P	Storage tank	O
Y-9204-4-E(05)	01-0020-33	025002P	Storage tank	O
Y-9206-A(01)	01-0020-48	012892P	Storage tank	O
Y-9206-A(02)	01-0020-48	012892P	Storage tank	O
Y-9206-A(03)	01-0020-48	012892P	Storage tank	O
Y-9206-B(01)	01-0020-03	026765P	Vacuum system	O
Y-9206-B(02)	01-0020-03	026765P	Lab hood	O
Y-9206-B(03)	01-0020-03	026765P	Lab hood	O
Y-9206-B(04)	01-0020-03	026765P	Calciner vent	O
Y-9206-B(05)	01-0020-03	026765P	Reactors	O
Y-9206-B(06)	01-0020-03	026765P	Caustic scrubber	O
Y-9206-B(07)	01-0020-03	026765P	Alloy cake dissolver	O
Y-9206-B(08)	01-0020-03	026765P	Incinerator	O
Y-9206-B(09)	01-0020-03	026765P	Incinerator	O
Y-9206-B(10)	01-0020-03	026765P	Hood	O
Y-9206-B(11)	01-0020-03	026765P	Hood	O
Y-9206-B(12)	01-0020-03	026765P	Incinerator	O
Y-9206-B(13)	01-0020-03	026765P	Uranium chemical recovery	O
Y-9206-C(01)	01-1020-24	026766P	Classified	O
Y-9206-C(02)	01-1020-24	026766P	Classified	O

Table 2.1.21 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-9206-C(12)	01-1020-24	023349P	Acetic acid drum vents	O
Y-9206-C(14)	01-1020-24	023349P	Storage tank	O
Y-9206-D(13)	01-1020-38	025901P	Maintenance shop weld booth	O
Y-9212-A(01)	01-1020-72		U recovery	O
Y-9212-A(02)	01-1020-72		Centrifuging, blending, etc.	O
Y-9212-A(03)	01-1020-72		Oven	O
Y-9212-A(04)	01-1020-72		Process vents	O
Y-9212-A(05)	01-1020-72		Sampling lab hoods	O
Y-9212-A(06)	01-1020-72		Reduction fluid beds	O
Y-9212-A(07)	01-1020-72		Conversion fluid beds	O
Y-9212-A(08)	01-1020-72		Metal reduction	O
Y-9212-A(10)	01-1020-72		Fluorine cylinder rack enclosure	O
Y-9212-A(11)	01-1020-72		Emergency vent	O
Y-9212-A(12)	01-1020-72		Emergency vent	O
Y-9212-A(13)	01-1020-72		Chloride removal system	O
Y-9212-A(14)	01-1020-72		Temporary decon facility	O
Y-9212-A(15)	01-1020-72		East caustic scrubber	O
Y-9212-A(16)	01-1020-72		U metal pickling	O
Y-9212-A(17)	01-1020-72		Reduction field beds	O
Y-9212-A(18)	01-1020-72		Conversion fluid beds	O
Y-9212-A(19)	01-1020-72		D-wing pan filters	O
Y-9212-A(20)	01-1020-72		Process vents	O
Y-9212-A(21)	01-1020-72		Decontamination pan filter hood	O
Y-9212-A(22)	01-1020-72		Muffle furnace	O
Y-9212-A(23)	01-1020-72		Hoods, furnace	O
Y-9212-A(24)	01-1020-72		Chip burner enclosure	O
Y-9212-A(25)	01-1020-72		Sand transfer system	O
Y-9212-A(26)	01-1020-72		HF emergency vent	O
Y-9212-A(27)	01-1020-72		Emergency release vents	O
Y-9212-A(28)	01-1020-72		Exhaust fan	O
Y-9212-B(01)	01-0020-02	025955P	Degreaser	O
Y-9212-B(02)	01-0020-02	025955P	Electropolisher	O
Y-9212-B(03)	01-0020-02	025955P	Metal chip washing system	O
Y-9212-B(04)	01-0020-02	025955P	Machining	O
Y-9212-B(05)	01-0020-02	022671P	Area exhaust	O
Y-9212-B(06)	01-0020-02	022671P	Hood	O
Y-9212-B(07)	01-0020-02	022671P	Machining	O
Y-9212-B(08)	01-0020-02	022671P	Tool grinding	O
Y-9212-B(09)	01-0020-02	022671P	Hood	O
Y-9212-B(10)	01-0020-88	023332P	U-grinding glovebox	O
Y-9212-C(01)	01-0020-05	025984P	Hood and glovebox	O
Y-9212-C(02)	01-0020-05	025984P	Furnace gas purge vents	O
Y-9212-C(03)	01-0020-05	025984P	Hoods and safe bottles	O
Y-9212-C(04)	01-0020-05	025984P	Dry hoods	O
Y-9212-C(05)	01-0020-05	025984P	Dissolver hood	O
Y-9212-C(06)	01-0020-05	025984P	Dissolver hood	O
Y-9212-C(07)	01-0020-05	025984P	Dissolver tray scrubber exhaust	O
Y-9212-C(08)	01-0020-05	025984P	Shear and saw hood	O
Y-9212-C(09)	01-0020-05	025984P	Precipitation process	O
Y-9212-D(01)	01-1020-46	025904P	Weld booths	O
Y-9212-E(01)	01-1020-48	025969P	Tool grinding	O
Y-9212-E(02)	01-1020-48	025969P	Tool grinding	O
Y-9212-F(01)	01-1020-49	025960P	Two deburr benches	O
Y-9212-F(02)	01-1020-49	025960P	Machining	O
Y-9212-F(03)	01-1020-49	025960P	Machining	O

Table 2.1.21 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-9212-F(04)	01-1020-49	025960P	Machining	O
Y-9212-F(05)	01-1020-49	025960P	Machining	O
Y-9212-G(01)	01-1020-47	022942P	Seal-peal wax	O
Y-9212-W(19)	01-0020-20	012688P	Uranium chip degreasing	O
Y-9215-A(01)	01-0020-37	022130P	Machine shop	O
Y-9215-B(02)	01-0020-38	012880P	Turco pretreat spray hood	O
Y-9215-B(05)	01-1020-51	022882P	Machining operations	O
Y-9215-B(10)	01-1020-51	022882P	Metal working	O
Y-9215-B(18)	01-1020-51	022882P	Oven	O
Y-9215-B(20)	01-1020-51	022882P	Hydroform press	O
Y-9215-C(02)	01-1020-52	025948P	Room 101 area exhaust	O
Y-9215-C(03)	01-1020-52	025948P	Vapor blaster	O
Y-9215-C(10)	01-1020-52	025948P	Nickel plating	O
Y-9215-C(11)	01-1020-52	025948P	Exhaust	O
Y-9215-C(16)	01-1020-52	022998P	Annealing	O
Y-9215-C(17)	01-1020-52	025948P	Inspection house vacuum	O
Y-9215-C(19)	01-1020-52	025948P	Machine shop	O
Y-9215-D(12)	01-1020-53	025966P	Hoods & plating area exhaust	O
Y-9215-D(13)	01-1020-53	025966P	Plating process	O
Y-9215-D(14)	01-1020-53	025966P	Electropolisher & KOH stripping	O
Y-9215-D(15)	01-1020-53	025966P	Incinerator	O
Y-9215-E(06)	01-1020-54	025972P	Lab hood	O
Y-9215-E(07)	01-1020-54	025972P	Lab hoods	O
Y-9215-E(08)	01-1020-54	025972P	Lab hoods	O
Y-9219-A(01)	01-1020-67	023853P	Degreasing unit	O
Y-9401-2-A(01)	01-0020-34	012876P	Degreasing unit	O
Y-9401-2-B(02)	01-0020-06	012461P	Cyanide plating tanks	O
Y-9401-2-C(03)	01-0020-07	012462P	Hydrochloric acid pickle tank	O
Y-9401-2-D(04)	01-0020-08	012463P	Hydrochloric acid pickle tank	O
Y-9401-2-E(05)	01-0020-09	012464P	Nickel & chrome plating tanks	O
Y-9401-2-F(06)	01-0020-10	012465P	Nitric acid pickle tank	O
Y-9401-2-G(07)	01-0020-88	021446P	Electroplating tank	O
Y-9401-2-H(08)	01-0020-88	021446P	Pickling tank	O
Y-9401-2-J(10)	01-0020-88	021446P	Plating tanks	O
Y-9401-2-K(11)	01-0020-88	021446P	Plating tanks	O
Y-9401-2-L(12)	01-0020-88	021446P	Plating tanks	O
Y-9401-2-M(13)	01-0020-88	021446P	Plating tanks	O
Y-9401-2-N(14)	01-0020-88	021446P	Plating tanks	O
Y-9401-2-P(15)	01-0020-88	021446P	Hood	O
Y-9401-2-Q(16)	01-0020-88	021446P	Plating tanks	O
Y-9401-2-R(17)	01-0020-88	021446P	Hood	O
Y-9401-2-S(18)	01-0020-88	021446P	Hood	O
Y-9401-2-T(19)	01-1020-37	995208P	Storage tanks	C
Y-9401-2-T(20)	01-1020-37	995208P	Storage tanks	C
Y-9401-2-T(21)	01-1020-37	995208P	Storage tanks	C
Y-9401-2-T(22)	01-1020-37	995208P	Storage tanks	C
Y-9401-2-T(23)	01-1020-37	995208P	Storage tanks	C
Y-9401-3-A	01-1020-31	027419F	Boilers	O
Y-9401-3-B(1)	01-1020-32	027419F	Boilers	O
Y-9401-3-C	01-1020-33	027419F	Boilers	O
Y-9401-3-D(2)	01-1020-34	027419F	Boilers	O
Y-9401-3-E	01-0030-39	022578P	Open coal storage pile	O
Y-9401-3-F(04)	01-1020-27	023498P	3 storage tanks	O
Y-9401-3-G(01)	01-1020-61	026472P	Oil storage tank	O
Y-9401-3-G(02)	01-1020-61	995278P	Vent from lime silo	C

Table 2.1.21 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-9401-3-H(01)	01-1020-61	995278P	Sulfuric acid storage tank	C
Y-9401-3-I(1)	01-1020-66	022385P	Degreasing operations	O
Y-9401-4-A(01)	01-0020-65	022240P	Waste shredder and compactor	O
Y-9401-5-A(01)	01-0020-92	026108P	Uranium chip oxidizer	O
Y-9404-11-A(1)			Purification plant	
Y-9404-11-A(2)			Purification plant	
Y-9404-11-A(3)			Purification plant	
Y-9404-11-A(4)			Purification plant	
Y-9404-16-A(02)	01-1020-50	995259P	Storage tank	C
Y-9404-5-A(01)	01-0020-27	012865P	Spray booth	O
Y-9404-5-B(02)	01-0020-25	012866P	Spray booth	O
Y-9404-5-B(03)	01-0020-25	012866P	Spray booth	O
Y-9404-5C(1)			Distillation unit	
Y-9404-9-C(03)	01-0020-40	012882P	PVC curing ovens	O
Y-9404-9-D(04)	01-0020-40	012882P	PVC curing ovens	O
Y-9404-9-E(05)	01-0020-40	012882P	PVC curing ovens	O
Y-9616-7-A(01)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(02)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(03)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(04)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(05)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(06)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(07)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(08)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(09)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(10)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(11)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-A(12)	01-1020-74	026502P	West end treatment facility	O
Y-9616-7-ATOD(1)	01-0020-99	994608P	Storage tanks	C
Y-9616-7-E(02)	01-1020-12	994714P	Neutralization vessel	C
Y-9616-7-F(03)	01-1020-13	994715P	Storage tank	C
Y-9616-7-G(04)	01-1020-14	994716P	Storage tank	C
Y-9616-7-H(03)	01-0020-54	013001F	Respirator hood	O
Y-9620-2A	01-0020-50	012894P	Storage tank	O
Y-9623-A(01)	01-1020-25	022973P	Vent from reactor vessels	O
Y-9623-A(02)	01-1020-25	022973P	Vent from eight tanks	O
Y-9623-A(03)	01-1020-25	022973P	Lab hood	O
Y-9623-A(04)	01-1020-25	022973P	Lime silo	O
Y-9623-A(05)	01-1020-25	022973P	Storage tank	O
Y-9623-A(06)	01-1020-25	022973P	Storage tank	O
Y-9623-C(02)			Storage tank	
Y-9623-E(04)			Lime silo	
Y-9623-F(05)	01-1020-06	022996P	Cylindrical reactor	O
Y-9623-G(05)			Cylindrical reactor	
Y-9623-H(06)	01-1020-25	995582P	Plating rinsewater treatment system	C
Y-9712-A(01)	01-1020-65	023851P	Degreasing units	O
Y-9720-19-A(01)	01-0020-41	012885P	Curing oven	O
Y-9720-19-C(01)	01-0020-23	012864P	Teflon sintering oven	O
Y-9720-19-D(03)	01-0020-27	012869P	Plastics spray booth	O
Y-9720-20-A(01)	01-1020-39	025971P	Small maintenance shop	O
Y-9720-3-A(01)	01-1020-58	023019P	Foam packaging	O
Y-9720-3-A(02)	01-1020-58	023019P	Foam packaging	O
Y-9720-41-A(01)	01-1020-63	9952739	Waste oil/solvent tanks	C
Y-9720-41-A(02)	01-1020-63	995273P	Waste oil/solvent tanks	C
Y-9720-41-A(03)	01-1020-63	995273P	Waste oil/solvent tanks	C

Table 2.1.21 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-9720-41-A(04)	01-1020-63	995273P	Waste oil/solvent tanks	C
Y-9720-41-A(05)	01-1020-63	995273P	Waste oil/solvent tanks	C
Y-9720-5-A	01-1020-75	027379P	Hood	O
Y-9720-6-A(1)	01-0020-26	012867P	Paint spray booth	O
Y-9720-6-A(2)	01-0020-26	012867P	Paint spray booth	O
Y-9720-6-B(01)	01-0020-75	015154P	Woodworking operation	O
Y-9720-6-B(03)	01-0020-26	012867P	Drying oven	O
Y-9720-6-C(01)	01-0020-76	015155P	2 welding booths	O
Y-9720-6-C(02)	01-0020-76	015155P	Welding booth	O
Y-9720-6-D(01)	01-0020-70	015149P	Insulator shop (band saw)	O
Y-9720-6-D(02)	01-0020-70	015149P	Insulator shop (band saw)	O
Y-9720-6-E(01)	01-0020-83	016548P	Clean room laboratory	O
Y-9728-A(01)	01-0020-54	013001F	Respirator hood	O
Y-9728-A(02)	01-0020-77	015156P	Dry cleaning machine	O
Y-9728-B(02)	01-0020-54	013001F	Laundry dryers	O
Y-9728-B(03)	01-0020-54	013001F	Laundry dryer	O
Y-9728-B(04)	01-0020-54	013001F	Laundry dryer	O
Y-9731-A(01)	01-0020-85	992777I	Incinerator	C
Y-9737-A(01)	01-0020-22	012863P	Oven	O
Y-9737-B(02)	01-0020-78	015157P	Plating tank	O
Y-9737-C(02)	01-0020-78	015157P	PC board etcher	O
Y-9737-D(02)	01-0020-78	015157P	Solder centrifuge	O
Y-9737-E(02)	01-0020-78	015157P	Wave solder machine	O
Y-9737-F(02)	01-0020-78	015157P	Oil bath	O
Y-9737-G(03)	01-0020-79	015160P	Fume hood	O
Y-9737-H(04)	01-0020-79	015160P	Varnish room exhaust	O
Y-9737-I(05)	01-0020-79	015160P	Cleaning hood	O
Y-9738-A(01)	01-0020-14	025975P	Sandblaster	O
Y-9738-A(02)	01-0020-14	025975P	Hood with fan	O
Y-9738-A(03)	01-0020-14	025975P	Sandblaster	O
Y-9738-A(04)	01-0020-14	025975P	Hood with fan	O
Y-9738-A(05)	01-0020-14	025975P	Hood with fan	O
Y-9739-A(01)			Print copier	
Y-9739-B(02)			Printfold diazo blueprint copier	
Y-9754-2-A(01)	01-0020-52	012897P	Gasoline storage tank	O
Y-9767-4-A(01)	01-0020-35	012877P	Chilled water circulating system	O
Y-9808-A(01)	01-1020-22	026109P	Spray booth	O
Y-9809-A(01)	01-0020-93	025899P	Oxide storage vaults	O
Y-9811-A(01)	01-0020-42	022896P	Paper shredder	O
Y-9811-B(02)	01-1020-45	025903P	Incinerator	O
Y-9812-A(01)	01-1020-29	022474P	Vented storage tank	O
Y-9812-A(02)	01-1020-29	022474P	Vented storage tank	O
Y-9812-A(03)	01-1020-29	022474P	Vented storage tank	O
Y-9815-A(03)	01-0020-11	022480P	Vent from reactors	O
Y-9815-A(04)	01-0020-11	022480P	Storage tank	O
Y-9815-A(05)	01-0020-11	022480P	Storage tank	O
Y-9815-A(06)	01-0020-11	022480P	Storage tank	O
Y-9815-A(07)	01-0020-11	022480P	Storage tank	O
Y-9815-A(08)	01-0020-11	022480P	Storage tank	O
Y-9818-A(01)	01-0020-12	023666P	Storage tank	O
Y-9818-A(02)	01-0020-12	023666P	Storage tank	O
Y-9818-A(03)	01-0020-12	023666P	Ozonation tank	O
Y-9818-A(04)	01-0020-12	023666P	Basement exhaust	O
Y-9818-A(05)	01-0020-12	023666P	Acid line vent	O
Y-9818-A(06)	01-0020-12	023666P	Ozone generators	O

Table 2.1.21 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type ^a
Y-9818-A(07)	01-0020-12	023666P	Storage tank	O
Y-9818-A(08)	01-0020-12	023666P	Storage tank	O
Y-9818-A(09)	01-0020-12	023666P	Storage tank	O
Y-9818-A(10)	01-0020-12	023666P	Nitric acid tank	O
Y-9818-A(11)	01-0020-12	023666P	Nitric acid tank	O
Y-9818-A(12)	01-0020-12	023666P	Nitric acid tank	O
Y-9929-1-A(01)	01-0020-56	013003F	Boiler	O
Y-9929-F(01)	01-0020-39	012881P	Open yard coal storage	O
Y-9995-A(01)	01-0020-21	021086P	Analytical laboratory	O
Y-9998-A(01)	01-0020-13	025957P	Swagging machines	O
Y-9998-A(02)	01-0020-13	025957P	Swagging machines	O
Y-9998-A(03)	01-0020-13	025957P	Storage tank	O
Y-9998-A(04)	01-0020-13	025957P	Nitric acid pickling tanks	O
Y-9998-A(05)	01-0020-13	025957P	Hood	O
Y-9998-A(06)	01-0020-13	025957P	Foundry operations	O
Y-9998-B(01)	01-1020-40	026110P	Metal working	O
Y-KHQ			Reactive waste open burn	

^aO = operating; C = construction.

Table 2.1.22. Air permits at ORNL

ORNL source number	Emission source reference number	Permit number	Source	Permit type ^a
X-1506	73-0112-02	012452P	Hood	O
X-2000-02	73-0112-75	024473P	Furnace, ovens, hoods, pumps	O
X-2000-09	73-0112-32	024135P	Laser with wet scrubber	O
X-2013-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-2013-04	73-0112-52	024913P	Vapor blaster	O
X-2018-02	73-0112-13	024250P	Parts washer (degreaser)	O
X-2018-03	73-0112-44	024117P	Oven	O
X-2026-06	73-0112-77	024759P	Rad laboratory	O
X-2510-T1	73-0112-63	024402P	Tank, propane	O
X-2519-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-2519-1/5	73-0112-03	023799F	Five boilers at steam plant	O
X-2519-T1	73-0112-57	024915P	Tank, sulfuric acid	O
X-2522-TIA	73-0112-10	024114P	Tank, fuel oil	O
X-2525-01	73-0112-14	013013P	Degreaser	O
X-2525-02	73-0112-65	026944P	Parts washer (degreaser)	O
X-2525-03	73-0112-65	026944P	Parts washer (degreaser)	O
X-2525-04	73-0112-38	023809P	Machine shop	O
X-2525-06	73-0112-95	027257P	Machine shop	O
X-2525-08	73-0112-62	024949P	Spray booth and oven	O
X-2525-11	73-0112-49	024151P	Electroplating shop	O
X-2525-13	73-0112-54	027392P	Vapor blaster and buffers	O
X-2525-T1	73-0112-72	024475P	Tank, waste oil	O
X-2525-T2	73-0112-72	024475P	Tank, waste oil	O
X-2547-02	73-0112-65	026944P	Parts washer (degreaser)	O
X-3003-06	73-0112-29	023760P	Tank, sulfur hexafluoride	O
X-3003-08	73-0112-29	023760P	Tank, sulfur hexafluoride	O
X-3004-T1	73-0112-46	024136P	Tank, nitric acid	O
X-3004-T2	73-0112-46	024136P	Tank, nitric acid	O
X-3004-T3	73-0112-46	024136P	Tank, nitric acid	O
X-3005-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-3005-02	73-0112-18	027214P	Parts washer (degreaser)	O
X-3012-01	73-0112-74	024449P	Furnace	O
X-3012-02	73-0112-50	024252P	Degreaser	O
X-3025-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-3039-01	73-0112-93	026525P	Off gas and hot cell ventilation	O
X-3074-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-3103-T1	73-0112-42	024113P	Tank, sulfuric acid	O
X-3104-03	73-0112-81	024511P	Carpenter shop	O
X-3117-T1	73-0112-42	024115P	Tank, sulfuric acid	O
X-3500-02	73-0112-65	026944P	Parts washer (degreaser)	O
X-3500-12	73-0112-73	024450P	Furnace	O
X-3502-01	73-0112-05	013022P	Spray booth	O
X-3502-02	73-0112-06	013023P	Spray booth	O
X-3502-03	73-0112-07	013024P	Spray booth	O
X-3502-09	73-0112-94	027194P	Hood, gluing	O
X-3502-SV1	73-0112-39	023808P	Oven, curing	O
X-3502-SV2	73-0112-40	023807P	Oven, tempering	O
X-3502-SV4	73-0112-30	024309P	Cyclone and carpentry shop	O
X-3504-01	73-0112-80	024451P	Oven	O
X-3544-01	73-0112-70	025552P	PWTP	OM
X-3587-01	73-0112-56	026647P	Electroplating shop	O

Table 2.1.22 (continued)

ORNL source number	Emission source reference number	Permit number	Source	Permit type ^a
X-3608-OI	73-0112-37	995888P	NRWTP air stripper and tanks	C
X-4508-08	73-0112-61	025121P	Acid etching process	O
X-4508-09	73-0112-55	024306P	Sand blaster	O
X-4508-16	73-0112-51	024909P	Spray booth	O
X-4508-T1	73-0112-64	024403P	Tank, freon	O
X-4515-00	73-0112-68	025239P	HTML	O
X-5500-00	73-0112-29	023760P	Tank	O
X-6000-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-6000-02	73-0112-59	024308P	Vapor blaster	O
X-6005-00	73-0112-29	023760P	Tank, sulfur hexafluoride	O
X-6010-00	73-0112-85	025282P	ORELA	O
X-6010-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-7002-01	73-0112-19	024251P	Parts washer (degreaser)	O
X-7002-03	73-0112-65	026944P	Parts washer (degreaser)	O
X-7002-04	73-0112-65	026944P	Parts washer (degreaser)	O
X-7002-T1	73-0112-88	025659P	Tank, waste oil	O
X-7003-01	73-0112-79	024452P	Furnace	O
X-7003-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-7005-00	73-0112-45	024118P	Machining tools	O
X-7007-1/2	73-0112-09	024134P	Spray booth	O
X-7012-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-7021-00	73-0112-58	024307P	Grinding shop	O
X-7021-T1	73-0112-58	025660P	Tank, waste oil	O
X-7025-00	73-0112-92	026070P	TTFF	O
X-7057-01	73-0112-76	024760P	Sand blaster	O
X-7069-C/D	73-0112-11	013030P	Tank, gasoline	O
X-7069-T	73-0112-60	026726P	Two gasoline tanks	O
X-7075-T1	73-0112-90	025661P	Tank, waste oil	O
X-7075-T2	73-0112-90	025661P	Tank, photographic waste	O
X-7075-T3	73-0112-90	025661P	Tank, photographic waste	O
X-7503-00	73-0112-83	025254P	Molten salt reactor	O
X-7600-01	73-0112-20	017930P	Nuclear fuel reprocessing	O
X-7601-T1	73-0112-47	024137P	Tank, nitric acid	O
X-7602-01	73-0112-24	027090P	Boiler, hot water	O
X-7603-01	73-0112-25	022743F	Boiler, steam	O
X-7606-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-7822-00	73-0112-86	025340P	Solid waste shredder	O
X-7830-01	73-0112-71	027132P	EASC	O
X-7831-00	73-0112-84	025281P	Baler and box compactor	O
X-7900-T1	73-0112-43	024116P	Tank, nitric acid	O
X-7900-T2	73-0112-43	024116P	Tank, nitric acid	O
X-7900-T3	73-0112-66	025162P	Tank, nitric acid	O
X-7900-T4	73-0112-66	025162P	Tank, nitric acid	O
X-7910-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-7911-00	73-0112-82	025249P	HFIR, TRU, and TURF	O
X-7934-02	73-0112-53	C24912P	Silver recovery system	O
X-7935-01	73-0112-78	027393P	Equipment cleaning facility	O
X-4500N1-93	73-0112-65	026944P	Parts washer (degreaser)	O
X-4500S1-01	73-0112-87	026021P	Parts washer (degreaser)	O
X-4500S3-50	73-0112-31	024C88P	Mercury purification system	O

^aO = operating; M = under modification; C = construction.

Table 2.1.23. Air Permits at ORGDP

ORGDP source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type ^a
K-402 8-16-990-cool-P-162539	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-402 9 PC	0101-42	012660P	Gas diffusion purge cascade	O
K-402 9-16-989-cool-P-162554	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-502 2-327298 Freon R-114	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-502 2-327300 Freon R-114	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-602 WAP	0106-93	024297P	Evacuation of cascade cells	O
K-602 2-325172 Freon R-114	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-602 4-325285 Freon R-114	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-832 chromate T	1106-10	024947P	Storage tank	O
K-892 chromate T	1106-10	024947P	Storage tank	O
K-892 lime silo	1106-10	025120P	Lime storage silo	O
K-892 sulfuric acid tank, N	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-892 sulfuric acid tank, S	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-894 sulfuric acid tank	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-896 soda silo	1106-24	024758P	Soda ash silo	O
K-902 WAP & jet	0106-93	024298P	Evacuation of cascade cells	O
K-902 3-324383 Freon R-114	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-902 3-324389			Storage tank	
K-902 3-324469 Freon R-114	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-902 3-324470 Freon R-114	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-902 5 PCB (1-4)	1106-10	024947P	PCB storage tanks (4)	O
K-902 6 PCB (1-3)	1106-10	024947P	PCB storage tanks (4)	O
K-902 6 PCB	1106-10	024947P	PCB storage tank	O
K-1001 C Blueprint 1 and 2	1106-11	024943P	Blueprint machines (2)	O
K-1001 Opti-copy	1106-07	024395P	Photographic reproduction	O
K-1004 L oven	0106-95	024299P	Sintering operation	O
K-1004 T center b hood	1106-04	024756P	Resin and hardener mixer with hoods	O
K-1004 T hood	1106-04	024498P	Resin and hardener mixer with hood	O
K-1004 T hood-methchlor	1106-15	025493P	Ultrasonic epoxy parts cleaner	O
K-1004 T south oven	1106-01	024304P	Matrix composites cure	O
K-1004 T west n oven	0106-96	024301P	Matrix composites cure	O
K-1004 T wind 1	1106-27	025843P	Winding and coating operations	O
K-1004 T wind 2	1106-27	025843P	Winding and coating operations	O
K-1004 T wind 3	1106-27	025843P	Winding and coating operations	O
K-1004 T wind 4	1106-27	025843P	Winding and coating operations	O
K-1010 bond hood	1106-06	024502P	Parts clean and adhesives mix	O
K-1010 bond oven	0106-90	024270P	Matrix composites cure	O
K-1023 R oven 323-586	0106-91	024271P	Matrix composites cure	O
K-1024 FT-1	0106-18	025655P	Filter-testing facility	O
K-1035 plate 1	0106-99	024305P	Potting and developing ops	O
K-1035 plate 2	1106-05	024503P	Instrument-cleaning operation	O
K-1035 plate 3	0106-97	024302P	Acid cleaning and decontamination	O
K-1035 plate 4			Degreaser and cleaner	
K-1035 plate 5	0106-98	024303P	Printed circuit board Mfg.	O
K-1037 AVLIS furnace	0106-81	023119P	AVLIS furnace	O
K-1037 AVLIS grieve oven	0106-80	023118P	AVLIS grieve oven (TB-500)	O
K-1037 AVLIS quincy oven	0106-79	023120P	AVLIS quincy oven (73-6 OOM)	O

Table 2.1.23. (continued)

ORGDP source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type ^a
K-1037 dry spray booth	0106-76	994500P	DeVilbiss spray booth ELD #432	PTC
K-1037 grit blast facility	0106-77	022111P	Grit blast facility with baghouse	O
K-1037 MLBH mechanical lab	0106-84	023662P	Mechanical lab, cut and shape parts	O
K-1200 center bay	0106-87	026548P	Center bay	O
K-1200 center bay hood	0106-87	026548P	Center bay hood	O
K-1200 center bay oven	0106-87	026548P	Center bay oven	O
K-1200 FAE	0106-86	9954-92P	Isotope separation facility	PTC
K-1200 north bay oven	0106-922	024272P	Matrix composites cure	O
K-1202 ST-1	1106-20	024911P	Solvents storage tank	O
K-1232 acetic acid tank, N	1106-23	024614P	Acetic acid tank, N	O
K-1232 acetic acid tank, S	1106-23	02414P	Acetic acid tank, S	O
K-1232 lime storage silo			Lime storage silo	
K-1300 B	0106-37	012505P	Hazardous ops emergency vent	O
K-1302 stack	0106-42		Process effluent emissions point	O
K-1401 BOP assembly hood			BOP assembly hood	O
K-1401 composite machining	0106-88	025514P	Composite machining process	O
K-1401 foam pack	1106-12	025490P	Foam-packing operation	O
K-1401 H-304 w acid tank	1106-30	025656P	Acid cleaning of steel parts	O
K-1401 H-306 acid tank	1106-30	025656P	Acid cleaning of steel parts	O
K-1401 HCL tank E	0106-228	024500P	HCl storage tank	O
K-1401 LH glove box 1,2	1106-03	026679P	LH-glove box 1,2	O
K-1401 LH glove box 3	1106-03	026679P	LH-glove box 3	O
K-1401 machine shop	1106-09	025585P	Grinding & machining stations	O
K-1401 seal shop acid cleaning	1106-14	025492P	Seal shop acid-machining stations	O
K-1401 seal shop cleaning	1106-17	025495P	Cleaning process	O
K-1401 seal shop 1	1106-13	025491P	Seal shop process	O
K-1401 slope testing stand	1106-29	9963838	Uranium hexafluoride converters	PTC
K-1401 T-104	1106-32	025658P	Acid cleaning of steel parts	O
K-1401 trichloro e tank	1106-10	024947P	Trichloroethane storage tank	O
K-1401 000 oven, NE	0106-89	995772P	Electric bake oven	PTC
K-1401 121659	0106-09	016306P	Trichloroethane degreaser	O
K-1407 A lime-silo	1106-25	0224455P	Lime storage silo	O
K-1407 H-F-210, lime bin CNF	1106-18	025443P	Hydrated lime storage silo	O
K-1413 propane LBD121422	0106-28	024500P	Propane storage tank	O
K-1414 diesel	1106-02	024335P	Underground storage tank	O
K-1414 UG methanol, unleaded gas	0106-28	024500P	Methanol/gasoline storage tank	O
K-1419 F-200CBP	1106-19	025243P	Sulfuric acid storage tank	O
K-1419 F-4860-CBP	1106-19	0252243P	Sulfuric acid storage tank	O
K-1419 20	0106-83	025250P	Scrubber & cleaning facility	O
K-1420 CP-02	0106-46	026164P	Concrete batch plant	O
K-1420 A1	0106-82	024396P	Flammable waste storage tank	O
K-1420 I-1 incinerator	0106-08	015691P	Waste incinerator	O
K-1420 nitric acid tank, NE	1106-22	024453P	Nitric acid tank, NE	O
K-1420 nitric acid tank, NW	1106-22	024453P	Nitric acid tank, NW	O
K-1420 nitric acid tank, SE	1106-22	024453P	Nitric acid tank, SE	O
K-1420 nitric acid tank, SW	1106-22	024453P	Nitric acid tank, SW	O
K-1420	0106-70	023798P	Phillips vapor degreaser	O

Table 2.1.23. (continued)

ORGDP source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type ^a
K-1420 237306 vapor degreaser	0106-49	023797P	Detrex vapor degreaser	O
K-1423 process	0106-37	023001P	Toll enrichment facility	O
K-1435 TSCA incinerator	0106-78	996254I	TSCA incinerator	PTC
K-1435 C tank farm	0106-75	024105P	Hazardous liquid wastes	O
K-1501 A1,A2,A3	0106-01, 02,03,04 05,06,17	027049F	Steam plant	O
K-1501 sulfuric acid tank	0106-28	024500P	Sulfuric acid storage tank	O
K-1505 E	0106-39	023796P	Coal sizing & conveying system	O
K-1515 north alum tank	0106-28	024500P	Alum sulfate storage tank	O
K-1515 south alum tank	0106-28	024500P	Alum sulfate storage tank	O
K-1580 blueprint	1106-16	025494P	Blueprint machine	O
Y-12 SDDP	1106-33	996949P	Sludge detoxification demo project	PTC

^aO = operating; PTC = permit to construct.



2.2 SURFACE WATER

Table 2.2.1. Radionuclide concentrations in surface water around ORNL in 1988^a

Radionuclide	Number of samples	Concentration (pCi/L)				Percentage of DCG ^c
		Max	Min	Av	Standard ^b error	
<i>Melton Hill Dam</i>						
²⁴¹ Am	12	0.32	0.0046	0.11	0.029	0.37
²⁴⁴ Cm	9	0.32	-0.10	0.044	0.040	0.073
⁶⁰ Co	12	150	-7.6	<15	12	0.31
¹³⁷ Cs	12	8.1	-3.0	<3.2	0.89	0.11
Gross alpha	12	12	0.0	2.8	1.2	<i>d</i>
Gross beta	3	100	12	49	26	<i>d</i>
²³⁸ Pu	12	0.076	-0.70	-0.054	0.060	<0.001
²³⁹ Pu	12	8.6	-0.17	0.80	0.72	2.7
Total Sr ^e	12	23	-1.1	3.4	1.8	0.34
³ H	12	730	-1,500	-190	180	<0.001
<i>White Oak Creek headwaters</i>						
²⁴¹ Am	12	0.32	-4.9	-0.38	0.42	<0.001
²⁴⁴ Cm	9	0.38	-4.1	-0.52	0.45	<0.001
⁶⁰ Co	12	24	-11	<5.8	2.8	0.12
¹³⁷ Cs	12	16	-27	<0.50	3.2	0.017
Gross alpha	12	18	0.0	5.5	1.7	<i>d</i>
Gross beta	3	38	0.0	21	11	<i>d</i>
²³⁸ Pu	12	0.086	-0.019	0.023	0.0087	0.057
²³⁹ Pu	12	0.21	-0.081	0.014	0.023	0.045
Total Sr ^e	12	9.7	-1.9	1.7	0.98	0.17
³ H	12	970	-1,200	190	170	0.0093
<i>7500 bridge</i>						
⁶⁰ Co	12	19	<1.1	<7.3	1.6	0.15
¹³⁷ Cs	12	240	49	100	18	3.5
Total Sr ^e	12	120	46	77	6.7	7.7
³ H	12	120,000	1,000	17,000	11,000	0.85
<i>Melton Branch 2</i>						
⁶⁰ Co	12	89	<2.7	<30	8.1	0.60
¹³⁷ Cs	12	11	<0.27	<5.1	0.89	0.17
Total Sr ^e	12	7.6	-1.9	2.3	0.79	0.23
³ H	12	46,000	6,200	20,000	3,700	1.0
<i>First Creek</i>						
⁶⁰ Co	12	27	-1.9	<6.6	2.2	0.13
¹³⁷ Cs	12	19	-0.54	<4.0	1.5	0.13
Total Sr ^e	12	730	320	520	42	52
<i>Fifth Creek</i>						
⁶⁰ Co	12	8.1	-8.1	<2.7	1.7	0.054
¹³⁷ Cs	12	24	-0.81	<5.7	1.9	0.19
Total Sr ^e	12	160	35	80	13	8.0

Table 2.2.1 (continued)

Radionuclide	Number of samples	Concentration (pCi/L)			Standard ^b error	Percentage of DCG ^c
		Max	Min	Av		
<i>Northwest tributary</i>						
⁶⁰ Co	12	38	-8.1	<7.6	3.8	0.15
¹³⁷ Cs	12	5.4	-5.4	<2.7	1.1	0.091
Total Sr ^e	12	62	0.70	33	6.6	3.3
<i>Raccoon Creek</i>						
⁶⁰ Co	12	8.1	<0.81	<4.3	0.61	0.087
¹³⁷ Cs	12	5.4	-16	<1.5	1.7	0.050
Total Sr ^e	11	210	27	85	18	8.5

^aLocations are shown in Fig. 2.2.4 in Vol. 1.

^bStandard error of the mean.

^cAverage concentration as a percentage of the derived concentration guide (DCG).

^dNot applicable.

^eTotal radioactive Sr (⁸⁹Sr + ⁹⁰Sr).

Table 2.2.2. Radionuclide concentrations in water around ORGDP in 1988

Parameter	No. of samples	Concentration (pCi/L)			Percentage of DCG ^a
		Max	Min	Av	
<i>West Fork Poplar Creek</i>					
²³⁷ Np	12	<1	-0.16	<0.18	<i>b</i>
^{239/240} Pu	12	<2	-0.32	<0.43	<i>b</i>
⁹⁹ Tc	12	<499	-182	<60	<i>b</i>
¹³⁷ Cs	12	<100	-63	<7.6	<i>b</i>
U ^c	12	1.3	<0.7	<0.7	<0.14
U (mg/L)	12	0.002	<0.001	<0.001	
<i>K-1710</i>					
²³⁷ Np	12	<1	-0.08	<0.21	<i>b</i>
^{239/240} Pu	12	<2	-0.28	<0.49	<i>b</i>
⁹⁹ Tc	12	<499	-186	<86.6	<i>b</i>
¹³⁷ Cs	12	<100	-200	<-11.7	<i>b</i>
U ^c	12	8.7	<0.7	<3.4	<0.68
U (mg/L)	12	0.013	<0.001	<0.005	
<i>K-716</i>					
²³⁷ Np	12	<1	-0.17	<0.17	<i>b</i>
^{239/240} Pu	12	<2	-0.47	<0.38	<i>b</i>
⁹⁹ Tc	12	<499	-214	<23	<i>b</i>
¹³⁷ Cs	12	<100	-200	<1.7	<i>b</i>
U ^c	12	5.4	<0.7	<2.0	<0.40
U (mg/L)	12	0.008	<0.001	<0.003	
<i>K-1513</i>					
²³⁷ Np	12	<1	-0.08	<0.28	<i>b</i>
^{239/240} Pu	12	52	-0.25	<7.4	<173
⁹⁹ Tc	12	<499	-262	<37	<i>b</i>
¹³⁷ Cs	12	<100	-84	<13	<i>b</i>
U ^c	12	2	<0.7	<0.7	<0.14
U (mg/L)	12	0.003	<0.001	<0.001	
<i>K-901 at 892</i>					
²³⁷ Np	11	<1	-0.16	<0.32	<i>b</i>
^{239/240} Pu	11	2	-0.08	<0.75	<i>b</i>
⁹⁹ Tc	11	<499	-228	<43	<i>b</i>
¹³⁷ Cs	11	<100	-204	<6	<i>b</i>
U ^c	11	16.8	<0.7	<2.7	<0.54
U (mg/L)	11	0.025	<0.001	<0.004	
<i>K-1770</i>					
²³⁷ Np	11	<1	-0.16	<0.09	<i>b</i>
^{239/240} Pu	11	<2	-0.95	<0.30	<i>b</i>
⁹⁹ Tc	11	<499	-158	<94	<i>b</i>
¹³⁷ Cs	11	<100	-158	<-12.9	<i>b</i>
U ^c	11	3.4	<0.7	<1.3	<0.26
U (mg/L)	11	0.005	<0.001	<0.002	

Table 2.2.2 (continued)

Parameter	No. of samples	Concentration (pCi/L)			Percentage of DCG ^a
		Max	Min	Av	
<i>Clinch River</i>					
²³⁷ Np	12	<1	-0.08	<0.17	<i>b</i>
^{239/240} Pu	12	<2	-230	<-18.5	<i>b</i>
⁹⁹ Tc	12	<499	-155	<54	<i>b</i>
¹³⁷ Cs	12	<100	-100	<3.8	<i>b</i>
U ^c	12	7.4	<0.7	<1.3	<0.26
U (mg/L)	12	0.011	<0.001	<0.002	
<i>Mitchell Branch</i>					
Gross alpha	10	86	-0.7	10.6	
Gross beta	10	221	-14	27.0	
U ^c	10	8.7	<0.7	<2.0	<0.40
U (mg/L)	10	0.013	<0.001	<0.003	

^aAverage concentration as a percentage of the derived concentration guide (DCG) from Draft Order 5400.xx.

^bNot applicable.

^cThe specific activity for natural uranium of 1.49×10^6 g/Ci was used to determine pCi/L.

Table 2.2.3. 1988 ORGDP concentrations at West Fork Poplar Creek

Parameter	Concentration (mg/L)		
	Max	Min	Av
Cr	<0.010	<0.010	<0.010
Cu	0.015	<0.0040	<0.002
Mn	0.28	0.14	0.20
Ni	0.076	<0.05	<0.05
Na	6.8	2.8	5.2
Zn	0.10	<0.02	<0.03
As	0.014	<0.005	<0.006
Cd	<0.002	<0.002	<0.002
Pb	0.018	<0.004	<0.007
COD	15	<5	<7
SS	126	4	28
DS	262	156	206
pH (units)	8.3	7.2	
Cn	0.030	<0.002	<0.008
NH ₃ -N	<0.2	<0.2	<0.2
F ⁻	0.13	<0.10	<0.10
NO ₃ -N	0.53	0.15	0.34
SO ₄	64	21	43

Table 2.2.4. 1988 ORGDP concentrations at Clinch River

Parameter	Concentration (mg/L)		
	Max	Min	Av
Cr	<0.010	<0.010	<0.010
Cu	0.019	<0.0040	<0.0055
Mn	0.20	0.020	0.067
Ni	0.074	<0.05	<0.052
Na	7.8	5.6	6.4
Zn	0.15	<0.02	<0.03
As	<0.005	<0.005	<0.005
Cd	<0.002	<0.002	<0.002
Pb	0.011	<0.004	<0.0047
COD	18	<5	<9.8
SS	36	7	13
DS	278	152	199
pH	8.4	7.6	
Cn	0.016	<0.002	<0.006
NH ₄	0.207	<0.2	<0.201
F ⁻	0.18	<0.1	<0.11
NO ₃ -N	0.32	<0.11	<0.20
SO ₄	29	23	26

Table 2.2.5. 1988 ORGDP concentrations at K-716

Parameter	Concentration (mg/L)		
	Max	Min	Av
Cr	0.013	<0.010	<0.01
Cu	<0.0040	<0.0040	<0.0040
Mn	0.16	0.039	0.09
Ni	0.083	<0.050	<0.053
Na	11.0	3.6	8.3
Zn	0.091	<0.020	<0.030
As	<0.005	<0.005	<0.005
Cd	0.002	<0.002	<0.002
Pb	0.010	<0.004	<0.012
COD	15	<5	<9
SS	47	2	17
DS	236	176	202
pH	8.3	6.9	
Cn	0.027	<0.002	<0.008
NH ₃ -N	<0.2	<0.2	<0.2
F ⁻	0.4	<0.1	<0.2
NO ₃ -N	0.99	0.11	0.55
SO ₄	48	25	35

Table 2.2.6. 1988 ORGDP concentrations at K-901 at 892

Parameter	Concentration (mg/L)		
	Max	Min	Av
Cr	<0.010	<0.010	<0.010
Cu	0.016	<0.0040	<0.005
Mn	0.077	0.020	0.049
Ni	0.073	<0.050	<0.05
Na	7.9	4.8	6.1
Zn	0.15	<0.02	<0.04
As	0.0054	<0.005	<0.005
Cd	<0.002	<0.002	<0.002
Pb	0.0063	<0.004	<0.0042
COD	11	<5	<7
SS	11	3	6
DS	218	156	194
pH	8.9	7.1	
Cn	0.015	<0.002	<0.006
NH ₃ -N	<0.2	<0.2	<0.2
F ⁺	0.1	<0.1	<0.1
NO ₃ -N	0.43	<0.11	0.27
SO ₄	29	24	26

Table 2.2.7. 1988 ORGDP concentrations at K-1513

Parameter	Concentration (mg/L)		
	Max	Min	Av
Cr	<0.010	<0.010	<0.01
Cu	0.0097	<0.0040	<0.085
Mn	0.10	0.014	0.036
Ni	0.077	<0.050	<0.052
Na	7.9	5.1	6.0
Zn	0.046	<0.020	<0.024
As	<0.005	<0.005	<0.005
Cd	<0.002	<0.002	<0.002
Pb	0.0069	<0.004	<0.004
COD	13	<5	<11
SS	19	3	8
DS	266	160	190
pH	8.3	7.0	
Cn	0.026	<0.002	<0.008
NH ₃ -N	<0.2	<0.2	<0.2
F ⁺	0.15	<0.1	<0.10
NO ₃ -N	0.41	<0.11	<0.23
SO ₄	29	23	<29

Table 2.2.8. 1988 ORGDP concentrations at K-1710

Parameter	Concentration (mg/L)		
	Max	Min	Av
Cr	<0.010	<0.010	<0.010
Cu	0.098	<0.0040	<0.0045
Mn	0.18	0.058	0.12
Ni	0.081	<0.050	<0.053
Na	18	3.1	10
Zn	0.086	<0.02	<0.030
As	<0.005	<0.005	<0.005
Cd	0.004	<0.002	<0.002
Pb	0.033	<0.004	<0.007
COD	20	<5	<9
SS	144	1	22
DS	298	174	232
pH	8.2	7.0	
Cn	0.032	<0.002	<0.008
NH ₃ -N	0.25	<0.2	<0.20
F ⁻	1.1	<0.1	<0.45
NO ₃ -N	2.3	0.35	1.5
SO ₄	78	18	45

Table 2.2.9. 1988 ORGDP concentrations at K-1770

Parameter	Concentration (mg/L)		
	Max	Min	Av
Cr	<0.010	<0.010	<0.010
Cu	0.0059	<0.0040	<0.0042
Mn	0.11	0.023	0.043
Ni	0.085	<0.05	<0.053
Na	9.2	4.6	6.1
Zn	0.093	<0.020	<0.027
As	0.006	<0.005	<0.05
Cd	<0.002	<0.002	<0.002
Pb	0.011	<0.004	<0.006
COD	14	<5	<6
SS	16	4	8
DS	240	90	170
pH	8.3	7.7	
Cn	0.031	<0.002	<0.007
NH ₃ -N	<0.2	<0.2	<0.2
F ⁻	0.2	<0.1	<0.11
NO ₃ -N	0.55	<0.11	<0.25
SO ₄	29	24	25

Table 2.2.10. 1988 ORGDP concentrations at Mitchell Branch

Parameter	Concentration (mg/L)		
	Max	Min	Av
Cr	<0.010	<0.010	<0.010
Cu	0.092	<0.0040	<0.005
Mn	0.53	0.038	0.09
Ni	0.078	<0.050	<0.05
Na	2.2	0.78	1.2
Zn	0.077	<0.020	<0.026
As	0.009	<0.005	<0.005
Cd	<0.002	<0.002	<0.002
Pb	0.0092	<0.004	<0.005
COD	14	<5	<7
SS	197	2	46
DS	180	86	137
pH	8.3	7.4	
Cn	0.064	<0.002	<0.016
NH ₃ -N	<0.2	<0.2	<0.2
F ⁻	<0.1	<0.1	<0.1
NO ₃ -N	0.15	<0.11	<0.11
SO ₄	5.0	2.0	3.3

Table 2.2.11. NPDES-permitted outfalls

Outfall number	Effluent description
<i>Oak Ridge Y-12 Plant</i> <i>NPDES Permit Number TN 0002968</i>	
301	Kerr Hollow Quarry
302	Rogers Quarry
303	New Hope Pond
304	Bear Creek
305	Leaking Burial Grounds—Oil Pond 1
306	Seepage from Burial Pit—Oil Pond 2
Category I	Uncontaminated precipitation runoff and/or groundwater
Category II	Cooling water, condensate, building area, and foundation drains and/or precipitation runoff contaminated by area sources of pollution
Category III	Any of the Category I or II outfalls or process wastewater requiring treatment at one of the on-site Y-12 treatment facilities
401–420	Category IV Discharges—Process wastewaters requiring minimal treatment
623	Steam Plant fly ash sluice water
501	Central Pollution Control Facility
502	West End Treatment Facility
503	Steam Plant Wastewater Treatment Facility
504	Plating Rinsewater Treatment Facility
508	Experimental Mobile Wastewater Treatment Facility
506	Building 9204-3 Sump Pump Oil Separator
507	S-3 ponds Liquid Treatment Facility
	Miscellaneous discharge (cooling towers, regeneration wastes, vapor blasters)
<i>Oak Ridge National Laboratory</i> <i>NPDES Permit Number TN 0002941</i>	
X01	ORNL sewage treatment plant
X02	Coal Yard Runoff Treatment Facility
X03	1500 Area (Environmental Sciences)
X04	2000 area
X06	190 Ponds
X07	Process Waste Treatment Plant (3544)
X08	TRU ponds
X09	HFIR ponds
X10	Oak Ridge Research Reactor resin regeneration facility (closed)
X11	Acid neutralization facility (3518)
X13	Melton Branch (ambient station)
X14	White Oak Creek (ambient station)
X15	White Oak Dam
VC7002	Vehicle cleaning facility (7002)
	Cooling towers
EF7002	Equipment maintenance facility (7002)
SP2519	Steam plant boiler drainage (2519)
Category I	Storm drains
Category II	Parking lot drains, storage area drains, once-through cooling water, cooling water blowdown, condensate
Category III	Process and/or laboratory drains

Table 2.2.11 (continued)

Outfall number	Effluent description
<i>Oak Ridge Gaseous Diffusion Plant NPDES Permit Number TN 0002950</i>	
K-1700	K-1407-B effluent, surface runoff, once-through cooling
K-1407-B	Steam plant, coal yard, metals cleaning facility, uranium recovery, chemical process development facility, surface runoff, K-1435 TSCA incinerator
K-1203	Sanitary wastewaters, organic industrial wastewaters
K-1007-B	Potable water from once-through cooling systems, firewater from once-through systems, surface runoff
K-901-A	Lime-softening sludges from firewater makeup treatment, surface runoff
K-710-A	Sanitary wastewater (inactive)
K-1515-C	Water from sludge and backwash systems associated with the potable water plant, surface runoff
K-1407-E and K-1407-F	Steam plant and coal yard effluent (since November 1988)
K-1407-J	Central neutralization facility effluent (since November 1988)

Table 2.2.12. Radionuclide concentrations in water from NPDES stations^a at ORNL in 1988

Radionuclide	Number of samples	Concentration (pCi/L)			Standard ^b error	Percentage of DCG ^c
		Max	Min	Av		
<i>Sewage Treatment Plant (X01)</i>						
⁶⁰ Co	12	15	-24	<2.9	2.8	0.058
¹³⁷ Cs	12	16	<2.7	<6.5	1.0	0.22
Gross beta	12	260	14	170	21	<i>d</i>
Total Sr ^e	12	120	46	78	6.7	7.8
<i>1500 area (X03)</i>						
Gross alpha	12	1,300	0.0	110	110	<i>d</i>
Gross beta	12	5,700	0.0	490	470	<i>d</i>
<i>2000 area (X04)</i>						
⁶⁰ Co	12	11	-14	<4.5	1.9	0.091
¹³⁷ Cs	12	16	-4.1	<4.6	1.7	0.15
Gross beta	12	100	0.0	25	9.4	<i>d</i>
Total Sr ^e	12	9.7	-1.1	3.0	0.93	0.30
<i>190 ponds (X06)</i>						
⁶⁰ Co	12	30	-5.4	<7.5	2.6	0.15
¹³⁷ Cs	12	27	-1.4	13	2.4	0.44
Gross alpha	12	59	0.0	16	5.3	<i>d</i>
Gross beta	12	76	9.7	45	5.0	<i>d</i>
<i>Process Waste Treatment Plant (X07)</i>						
⁶⁰ Co	12	130	30	72	10	1.4
¹³⁴ Cs	2	21	13	17	4.2	0.86
¹³⁷ Cs	12	11,000	1,700	3,700	720	120
¹⁵² Eu	1	57	57	57	<i>d</i>	0.28
Gross alpha	12	110	3.8	36	9.2	<i>d</i>
Gross beta	12	5,400	1,900	3,000	270	<i>d</i>
Total Sr ^e	12	320	0.54	51	27	5.1
<i>TRU ponds (X08)</i>						
Gross beta	10	120	5.7	56	12	<i>d</i>
<i>HFIR pond (X09)</i>						
⁶⁰ Co	9	9,900	2,100	4,700	810	95
¹³⁷ Cs	9	27	-59	<4.0	9.3	0.13
¹⁵² Eu	1	490	490	490	<i>d</i>	2.4
¹⁵⁴ Eu	1	730	730	730	<i>d</i>	3.6
¹⁵⁵ Eu	2	570	120	340	230	0.34
Gross alpha	9	32	4.6	13	3.4	<i>d</i>
Gross beta	9	13,000	320	4,200	1,200	<i>d</i>
⁵⁴ Mn	3	38	-3.2	15	12	0.031
<i>Acid Neutralization Facility (X11)</i>						
Gross alpha	12	19	0.0	5.2	1.8	<i>d</i>
Gross beta	12	59	0.0	31	6.1	<i>d</i>

Table 2.2.12 (continued)

Radionuclide	Number of samples	Concentration (pCi/L)			Standard ^b error	Percentage of DCG ^c
		Max	Min	Av		
<i>Melton Branch 1 (X13)</i>						
⁶⁰ Co	12	180	<2.7	<43	15	0.85
¹³⁷ Cs	12	140	-0.27	<18	12	0.61
Total Sr ^d	12	410	210	320	15	32
³ H	12	2,700,000	970,000	1,800,000	180,000	91
<i>White Oak Creek (X14)</i>						
⁶⁰ Co	12	68	<0.54	<16	5.9	0.31
¹³⁷ Cs	12	160	3.2	76	13	2.5
Total Sr ^d	12	150	59	100	8.6	10
³ H	12	120,000	2,000	32,000	11,000	1.6
<i>White Oak Dam (X15)</i>						
²⁴¹ Am	52	3.5	-1.4	0.26	0.093	0.88
²⁴⁴ Cm	44	4.1	-0.84	0.33	0.099	0.56
⁶⁰ Co	52	15	-1.4	<8.3	0.46	0.17
¹³⁷ Cs	52	170	6.2	40	4.7	1.3
Gross beta	45	1,100	110	320	22	^d
²³⁸ Pu	52	5.4	-3.8	-0.0052	0.14	<0.001
²³⁹ Pu	52	0.43	-0.81	0.055	0.025	0.18
Total Sr ^d	52	300	65	130	5.8	13
³ H	52	410,000	43,000	200,000	17,000	10

^aSee Fig. 2.2.8 in Vol. 1 for NPDES station locations.

^bStandard error of the mean.

^cAverage concentration as a percentage of the derived concentration guide (DCG).

^dNot applicable.

^eTotal radioactive Sr (⁸⁹Sr + ⁹⁰Sr).

Table 2.2.13. 1988 ORGDP radiological effluent at K-1203

Radionuclide	Emission source (Ci)	DCG ^a (pCi/L)	Average concentration (pCi/L)	Percentage of DCG
⁹⁹ Tc	9.77×10^{-3}	100,000	16.8	0.02
²³⁴ U	1.83×10^{-3}	500	3.14	0.63
²³⁵ U	3.15×10^{-4}	600	0.54	0.09
²³⁶ U	2.57×10^{-5}	500	4.4×10^{-2}	8.8×10^{-3}
²³⁸ U	1.06×10^{-3}	600	1.82	0.30

^aDerived concentration guide.**Table 2.2.14. 1988 ORGDP radiological effluent at K-1700**

Radionuclide	Emission source (Ci)	DCG ^a (pCi/L)	Average concentration (pCi/L)	Percentage of DCG
²³⁷ Np	3.78×10^{-5}	30	0.05	0.17
²³⁹ Pu	1.80×10^{-3}	30	2.26	8.0
⁹⁹ Tc	6.69×10^{-2}	100,000	83.9	0.08
¹³⁷ Cs	2.67×10^{-4}	3,000	0.33	0.01
²³⁴ U	2.77×10^{-2}	500	4.62×10^{-5}	9.2×10^{-6}
²³⁵ U	1.32×10^{-3}	600	1.66	0.28
²³⁶ U	2.83×10^{-4}	500	0.36	0.07
²³⁸ U	2.56×10^{-3}	600	32.1	5.4

^aDerived concentration guide.**Table 2.2.15. 1988 ORGDP radiological effluent at K-1007**

Radionuclide	Emission source (Ci)	DCG ^a (pCi/L)	Average concentration (pCi/L)	Percentage of DCG
²³⁷ Np	1.67×10^{-5}	30	8.29×10^{-3}	0.03
²³⁹ Pu	8.90×10^{-5}	30	4.55×10^{-2}	0.15
⁹⁹ Tc	3.99×10^{-2}	100,000	20.4	0.02
¹³⁷ Cs	0	3,000	<i>b</i>	<i>b</i>
²³⁴ U	4.92×10^{-3}	500	2.52	0.50
²³⁵ U	1.32×10^{-4}	600	6.75×10^{-2}	0.01
²³⁶ U	3.50×10^{-5}	500	1.79×10^{-2}	3.6×10^{-3}
²³⁸ U	1.40×10^{-3}	600	0.72	0.12

^aDerived concentration guide.^bNot applicable.

Table 2.2.16. 1988 ORGDP radiological effluent at K-901A

Radionuclide	Emission source (Ci)	DCG ^a (pCi/L)	Average concentration (pCi/L)	Percent DCG
²³⁷ Np	9.05×10^{-6}	30	2.29×10^{-2}	0.08
²³⁹ Pu	1.65×10^{-5}	30	4.17×10^{-2}	0.14
⁹⁹ Tc	1.31×10^{-2}	100,000	33.1	0.03
¹³⁷ Cs	0	3,000	<i>b</i>	<i>b</i>
²³⁴ U	1.76×10^{-3}	500	4.45	0.89
²³⁵ U	8.03×10^{-5}	600	0.20	0.03
²³⁶ U	2.06×10^{-5}	500	5.21×10^{-2}	0.01
²³⁸ U	8.57×10^{-4}	600	2.17	0.36

^aDerived concentration guide.^bNot applicable.**Table 2.2.17. CY 1988 NPDES Permit Number TN 002968**Discharge Point = 301^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Total suspended solids	7	<5	<5	<5	0.
Mercury	7	<0.002	0.0002	<0.0005	0.0003
Lithium	7	1.99	0.034	0.55	0.26
Zirconium	7	<0.002	<0.002	<0.002	0.
Potassium	7	2.6	0.8	1.3	0.25
Sodium	7	0.79	0.36	0.6	0.06
pH (standard units)	8	8.8	7.2	NA@ ^{***} sup b@	0.17
Arsenic	7	<0.04	<0.04	<0.04	0.
Cadmium	7	<0.006	<0.003	<0.006	0.0004
Chromium	7	0.021	<0.006	<0.008	0.002
Copper	7	0.007	<0.002	<0.003	0.0007
Iron	7	0.07	<0.02	<0.39	0.006
Nickel	7	<0.01	<0.007	<0.010	0.0004
Selenium	7	<0.002	<0.002	<0.002	0.
Zinc	7	0.017	0.004	0.009	0.002
Lead	7	<0.02	<0.02	<0.02	0.
Temperature (°C)	7	28.6	8.3	19.3	3.1
Flow (millions gallons per day) ^f	4	0.067	0.0001	0.032	0.016

^aY-12 Plant, Kerr Hollow Quarry.^bNA = not applicable.^fFlow during operations and/or discharging.

Table 2.2.18. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 302^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Total suspended solids	52	18	<5	<6	0.34
Chemical oxygen demand (COD)	52	18	<5	<6.5	0.36
Sulfate (SO ₄)	52	410	50	92.0	6.3
Oil and Grease	52	4	<2	<2.1	0.054
Settleable solids	52	0.1	<0.1	<0.1	0.
Selenium	51	0.032	<0.002	<0.020	0.001
Mercury	52	0.0012	<0.0002	<0.0003	0.0003
Arsenic	51	0.28	0.13	0.2	0.006
Cadmium	51	<0.006	<0.003	<0.005	0.0002
Chromium	51	0.006	<0.006	<0.006	0.
Copper	51	0.057	<0.002	<0.004	0.0012
Iron	51	0.3	<0.02	<0.1	0.0083
Nickel	51	0.02	<0.007	<0.009	0.0003
Zinc	51	0.012	<0.001	<0.004	0.0003
Lead	51	<0.02	<0.02	<0.02	0.
pH (standard units)	115	9	6	NA@ ^{sup} b@	0.044
Temperature (°C)	54	28.3	7	17	0.96
Turbidity (NTU)	52	10	0.7	3.0	0.25
Flow (millions gallons per day) ^c	366	9.39	0.12	0.77	0.03

^aY-12 Plant, Rogers Quarry.^bNA = not applicable.^cFlow during operations and/or discharging.

Table 2.2.19. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 303^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Ammonia (as N)	195	3.2	<0.2	<0.56	0.36
Chromium	199	0.04	0.006	<0.006	0.0002
Fluoride	197	1.5	0.32	1.06	0.012
Lithium	199	0.088	0.009	0.021	0.0007
Surfactants (as MBAS)	96	<0.05	<0.05	<0.05	0
Dissolved solids	199	1200	120	292	6.2
Nickel	199	0.1	<0.0025	<0.010	0.0005
Beryllium	199	0.0011	<0.0001	<0.0001	0.000005
Residual chlorine	67	0.7	<0.1	<0.18	0.02
Perchloroethylene ($\mu\text{g/L}$)	65	78	1.4	<13.23	1.52
Settleable solids	31	0.5	<0.1	<0.1	0.013
Dissolved oxygen (DO)	237	14.3	5.6	9.2	0.07
Oil and Grease	73	6	2	<2.2	0.09
Suspended solids-Total	199	710	5	<14.7	3.78
Zinc	199	0.454	0.017	0.055	0.002
Nitrogen	95	7.2	2.1	3.8	0.08
Cadmium	199	<0.007	<0.00005	<0.004	0.0001
Lead	200	<0.04	<0.0005	<0.02	0.0004
Copper	199	0.078	0.002	0.008	0.0005
Mercury	199	0.021	0.0005	0.002	0.0001
Temperature ($^{\circ}\text{C}$)	147	28.9	3.2	19	0.48
Biochemical oxygen demand (BOD)	182	176	<5	<7.4	1.12
Chemical oxygen demand (COD)	180	174	0.9	1.33	1.34
pH (standard units)	229	8.8	6.5	NA@ ^b sup b@	0.025
Flow (millions gallons per day) ^c	317	26.92	0.0369	7.25	0.166

^aY-12 Plant, New Hope Pond.^bNA = not applicable.^cFlow during operations and/or discharging.

Table 2.2.20. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 304^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Oil and grease	53	8	<2	<2.2	0.12
Biochemical oxygen demand (BOD)	60	40	<3.3	<6.0	0.64
Chemical oxygen demand (COD)	60	49	<5	<9.6	0.97
Dissolved solids	60	450	170	269	8.3
Total suspended solids	60	180	<5	<14	4
Nitrates (as N)	64	26	0.2	9	0.8
Conductivity (umho/cm)	52	890	280	476	16.
Dissolved oxygen (DO)	49	12.9	6.6	9.2	0.21
Turbidity (NTU)	52	86	1.5	12.5	2.41
pH (standard units)	61	8.3	6.6	7.5	0.05
Flow (millions gallons per day) ^b	355	35.72	0.03	1.2	0.16

^aY-12 Plant, Bear Creek.^bFlow during operations and/or discharging.

Table 2.2.21. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 305^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Oil and grease	102	6	<2	<2	0.06
Total suspended solids	103	170	<2.0	<13	2.
Mercury	102	<0.0008	<0.0002	<0.0002	0.000007
pH (standard units)	101	9.3	6.1	NA@ ^{***} sup b@	0.05
Beryllium	102	0.0012	<0.0001	<0.00012	0.00001
Cadmium	102	<0.009	<0.003	<0.006	0.0001
Lead	102	<0.02	<0.02	<0.02	0.
Silver	102	<0.004	<0.004	<0.004	0.
Flow (gallons per day) ^c	240	152000	0	42518	3086

^aY-12 Plant, Oil Pond No. 1.^bNA = not applicable.^cFlow during operations and/or discharging.

Table 2.2.22. CY 1988 NPDES Permit Number TN 002968Discharge Point = 306^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Oil and grease	19	10	<2	<3	.5
Total suspended solids	19	22	<5	<9	1.3
Mercury	19	0.0003	<0.0002	<0.0002	0.00001
pH (standard units)	19	8.3	6	NA ^b sup b@	0.16
Cadmium	19	<0.006	<0.003	<0.005	0.0003
Nickel	19	<0.05	<0.007	<0.012	0.002
Lead	19	<0.02	<0.02	<0.02	0
Silver	19	<0.004	<0.004	<0.004	0
Flow (gallons per day) ^c	210	30400	0	727	216

^aY-12 Plant, Oil Pond No. 2.^bNA = not applicable.^cFlow during operations and/or discharging.**Table 2.2.24. CY 1988 NPDES Permit Number TN 002968**Discharge Point = 308^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Oil and grease	1	<2	<2	<2	0
Total suspended solids	1	28	28	28	0
pH (standard units)	1	7.6	7.6	NA ^b sup b@	0
Temperature (°C)	1	15.6	15.6	15.6	0
Flow (gallons per day) ^c	0	0	0	0	0

^aY-12 Plant, East Borrow Area.^bNA = not applicable.^cFlow during operations and/or discharging.**Table 2.2.23. CY 1988 NPDES Permit Number TN 002968**Discharge Point = 307^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Oil and grease	2	<2	<2	<2	0
Total suspended solids	2	80	15	47.5	32.5
pH (standard units)	2	7.9	6.7	NA ^b sup b@	0.6
Temperature (°C)	2	27.9	8.6	18.3	9.6
Flow (gallons per day) ^c	0	0	0	0	0

^aY-12 Plant, West Borrow Area.^bNA = not applicable.^cFlow during operations and/or discharging.

Table 2.2.25. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 501^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Oil and grease	39	4	0.96	<2	0.08
Cyanide	39	0.014	<0.002	<0.004	0.006
Copper	39	0.306	<0.002	<0.015	0.008
Chromium	39	0.428	<0.006	<0.025	0.011
Lead	39	0.10	<0.02	<0.23	0.002
Nickel	39	0.98	<0.007	<0.204	0.033
Temperature (°C)	38	29.0	7.3	21.3	0.95
Cadmium	39	0.02	<0.003	<0.006	0.0005
Zinc	39	2.30	<0.02	<0.335	0.072
Total toxic organics	39	0.29	<0.01	<0.17	0.007
Total suspended solids	39	34	<5	<8.22	0.89
Silver	39	0.02	<0.004	<0.004	0.0004
pH (standard units)	38	8.8	6.2	NA ^b sup b ^c	0.1
Color (units)	39	100	4	23.6	3.6
Sodium	39	818	141	272.1	20.8
Nitrates (as N)	39	820	<0.1	<21.5	21.0
Surfactants (as MBAS)	39	0.22	<0.05	<0.07	0.01
Beryllium	39	0.0010	<0.0001	<0.0001	0.0003
Phosphorus	39	6.2	0.2	1.1	0.19
Chlorides	39	3100	84	455	107.1
Phenols	39	1.18	<0.001	<0.096	0.42
Sulfates	39	2800	1300	2144	67.5
Fluorides	39	2.2	0.2	0.9	0.08
Aluminum	39	0.64	<0.01	<0.13	0.02
Iron	39	9.3	0.1	2.3	0.4
Mercury	39	0.0068	<0.0002	<0.0004	0.0002
Flow (gallons per day) ^c	38	25686	5508	12073	641

^aY-12 Plant, Central Pollution Control Facility.^bNA = not applicable.^cFlow during operations and/or discharging.

Table 2.2.26. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 502^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Silver	81	0.393	<0.004	<0.014	0.005
Cadmium	81	0.045	<0.003	<0.011	0.001
Cyanide	83	3.8	<0.002	<0.131	0.056
Chromium	81	0.03	<0.006	<0.014	0.001
Copper	81	1.47	0.003	0.116	0.026
Nickel	81	5.01	0.039	1.339	0.143
Lead	81	0.1	<0.02	<0.046	0.004
Zinc	81	2.43	0.016	0.768	0.078
Total toxic organics (TTO)	19	<0.01	<0.01	<0.01	0
Total suspended solids	81	58	<5	<16	1
Oil and grease	84	4	<2	<2	0.04
Temperature (°C)	81	28.3	10.4	18.9	0.44
pH (standard units)	81	8.9	6.2	NA ^b sup b [@]	0.07
Arsenic	81	0.2	<0.04	<0.09	0.01
Aluminum	81	5.04	0.06	0.45	0.06
Mercury	81	0.0004	<0.0002	<0.0002	0.00001
Beryllium	81	0.0205	<0.0001	<0.0005	0.0002
Sulfate	81	37000	750	19556	982
Barium	81	0.197	0.0093	0.05	0.005
Nitrate-N	80	4	<0.1	<0.16	0.05
Fluoride	81	82	0.84	35.7	2.06
Calcium	81	428	9.26	88.26	11.78
Residual chlorine	80	0.2	<0.1	<0.1	0.002
Phosphorous	81	20.5	<0.06	<9.23	0.57
Iron	81	3.69	0.04	0.57	0.06
Cobalt	81	0.206	<0.002	<0.041	0.005
Magnesium	81	65.9	6.69	24.86	1.47
Manganese	81	1.26	0.004	0.15	0.02
Molybdenum	81	1.92	0.098	0.58	0.05
Sodium	81	12700	496	7183	401
Chloride	80	1900	200	920	38
Potassium	81	339	9.85	160	8.74
Uranium, total	64	3.08	0.002	0.429	0.08
²³⁵ U (%)	64	0.72	0.27	0.43	0.01
Flow (gallons per day) ^c	189	68600	0	13837	1311

^aY-12 Plant, West end treatment facility (WETF).^bNA = not applicable.^cFlow during operations and/or discharging.

Table 2.2.27. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 503^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Oil and grease	154	9	<2	<2.3	0.08
Phenols	152	2.66	<0.001	<0.02	0.017
Mercury	154	0.002	<0.0002	<0.0002	0.00002
Selenium	155	0.005	<0.0002	<0.0021	0.00004
Chloride	155	1000	22	287	12
Fluoride	155	12	1.4	2.6	0.08
Total suspended solids	154	36	<4	<5.8	0.31
Sulfate	155	3700	41	1155	41.5
Sulfide	155	23	<0.03	<0.88	0.18
Temperature (°C)	154	31.1	15	25.4	0.3
pH (standard units)	157	8.9	6.1	NA@ ^{***} sup b@	0.05
Aluminum	155	1.75	<0.01	<0.2	0.02
Arsenic	155	<0.04	<0.04	<0.04	0
Barium	155	0.185	0.022	0.10	0.003
Beryllium	155	0.0004	<0.0001	<0.0001	0.000002
Boron	155	10	<0.007	<0.88	0.12
Cadmium	155	<0.006	<0.003	<0.004	0.0001
Calcium	155	1620	38.4	371.7	14.3
Cerium	155	0.02	<0.02	<0.02	0
Chromium	155	<0.006	<0.006	<0.006	0
Cobalt	155	0.007	<0.002	<0.002	0.00004
Copper	155	0.074	<0.002	<0.005	0.001
Gallium	79	<0.01	<0.01	<0.01	0
Iron	155	3.78	<0.02	<0.28	0.04
Lanthanum	155	0.005	<0.003	<0.003	0.00001
Lead	155	<0.02	<0.02	<0.02	0
Lithium	155	0.272	0.012	0.04	0.002
Magnesium	155	57	0.36	23.95	1.16
Manganese	155	0.14	<0.001	<0.012	0.001
Molybdenum	155	0.043	<0.006	<0.007	0.0003
Nickel	155	0.09	<0.007	<0.01	0.001
Niobium	153	0.03	<0.01	<0.01	0.0001
Phosphorus	155	1.23	<0.06	<0.15	0.01
Potassium	155	37.6	3	7	0.3
Scandium	154	0.0021	<0.0004	<0.0004	0.00001
Silver	155	0.019	<0.004	<0.0041	0.0001
Sodium	155	2790	64.1	212	18
Strontium	155	1.04	0.0906	0.52	0.02
Thorium	155	0.01	<0.01	<0.01	0
Titanium	155	0.013	<0.002	<0.004	0.0002
Vanadium	155	0.009	<0.004	<0.004	0.00005
Zinc	155	0.099	<0.004	<0.02	0.001
Zirconium	155	0.041	<0.002	<0.002	0.0003
Flow (Gallons per day) ^c	334	405000	0	140549	5795

^aY-12 Plant, Steam Plant Wastewater Treatment Facility.^bNA = not applicable.^cFlow during operations and/or discharging.

Table 2.2.28. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 504^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Silver	28	0.006	<0.004	<0.004	0.0001
Cadmium	28	0.008	<0.003	<0.004	0.0003
Cyanide	28	0.019	<0.002	<0.005	0.001
Chromium	28	0.056	<0.006	<0.008	0.002
Copper	28	0.021	<0.002	<0.004	0.001
Nickel	28	0.44	<0.009	0.131	0.02
Lead	28	<0.02	<0.02	<0.02	0
Zinc	28	0.462	0.014	0.096	0.018
Total toxic organics (TTO)	28	0.193	<0.01	<0.017	0.007
Total suspended solids	28	54	<5	<7	2
Oil and grease	28	3	<2	<2	0.04
Temperature (°C)	28	28.7	11.3	22	1
pH (standard units)	28	8.8	6.3	NA@ ^b sup b@	0.1
Aluminum	28	1.24	<0.01	<0.29	0.06
Mercury	28	0.0004	<0.0002	<0.0002	0.00001
Beryllium	28	0.0003	<0.0001	<0.0001	0.00001
Sulfate	28	660	25	153	24
Nitrate-N	28	6.4	<0.1	<3	0.4
Fluoride	28	1.7	0.7	1.1	0.05
Phosphorous	28	3.93	0.09	0.9	0.2
Iron	28	3.46	0.05	1.09	0.2
Sodium	28	200	16	48	7
Potassium	28	289	0.9	25	10
Flow (gallons per day) ^c	28	30251	10925	21961	836

^aY-12 Plant, Plating Rinsewater Treatment Facility (PRTF).^bNA = not applicable.^cFlow during operations and/or discharging.

Table 2.2.29. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 501/504^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Oil and grease	29	5	<2	<2.1	0.11
Cyanide	29	0.032	<0.002	<0.007	0.001
Chromium	29	0.015	<0.006	<0.007	0.0004
Copper	29	0.033	<0.002	<0.006	0.001
Lead	29	<0.02	<0.02	<0.02	0
Nickel	29	0.5	0.015	0.136	0.026
Temperature (°C)	29	30.2	10.4	23.5	1.1
Cadmium	29	<0.006	<0.003	<0.005	0.0003
Zinc	29	0.599	0.023	0.120	0.021
Total toxic organics	29	0.37	<0.01	<0.04	0.02
Total suspended solids	29	16	<5	<7	1
Silver	29	<0.004	<0.004	<0.004	0
pH (standard units)	29	8.8	6.5	NA@ ^{***} sup b@	0.1
Potassium	29	259.0	4.0	88	13
Sodium	29	250	31.8	127.2	10.2
Nitrate-N	29	8.6	<0.1	<2.0	0.4
Fluoride	29	1.6	0.6	0.99	0.04
Aluminum	29	0.74	<0.01	<0.22	0.04
Iron	29	1.96	0.1	0.67	0.1
Mercury	29	0.0004	<0.0002	<0.0002	0.00001
Beryllium	29	0.0002	<0.0001	<0.0001	0.000004
Phosphorus	29	4.81	0.12	0.87	0.17
Chloride	29	6000	52	983	274
Sulfate	29	1600	98	777	67
Flow (gallons per day) ^c	29	39077	4789	24924	1620

^aY-12 Plant, Central Pollution Control Facility/Plating Rinse Treatment Facility^bNA = not applicable.^cFlow-during operations and/or discharging.

Table 2.2.30. CY 1988 NPDES Permit Number TN 002968Discharge Point = 506^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
Oil and grease	26	6	<2	<2.5	0.2
pH (standard units)	26	8.1	6.5	NA@ ^{***} sup b@	0.1
Temperature (°C)	25	31.8	21.6	28.1	0.5
Flow (gallons per day) ^c	26	180	180	180	0

^aY-12 Plant, Building 9204-3 Sump Pump Oil Separator.^bNA = not applicable.^cFlow during operations and/or discharging.

Table 2.2.31. CY 1988 NPDES Permit Number TN 002968

Cooling towers^a

Parameter	No. samples	Discharge point	Concentration (mg/L)			Std. error
			Max	Min	Av	
Chromium	4	602	0.024	<0.006	<0.013	0.004
Zinc	4	0.101	0.037	0.074	0.013	
Copper	4	0.046	0.008	0.024	0.008	
Temperature (°C)	4	30.2	23	27	2	
Chlorine, free	4	0.26	<0.1	<0.17	0.04	
pH (standard units)	4	8.9	8.6	NA@"" sup c@	0.07	
Flow (gallons per day) ^b	12	17270	0	7058	1700	
Chromium	4	604	0.021	<0.006	<0.014	0.003
Zinc	4	0.63	0.161	0.312	0.108	
Copper	4	0.026	0.002	0.015	0.005	
Temperature (°C)	4	24.6	15	21	2	
Chlorine, free	4	0.6	0.12	0.34	0.12	
pH (standard units)	4	8.9	8.5	NA	0.12	
Flow (gallons per day) ^b	12	42510	0	12732	4479	
Chromium	4	610	0.031	0.01	0.017	0.005
Zinc	4	0.233	0.07	0.159	0.034	
Copper	4	0.029	0.006	0.019	0.005	
Temperature (°C)	4	30.1	25.4	27.2	1	
Chlorine, free	4	0.12	<0.1	<0.11	0.003	
pH (standard units)	4	8.8	8.5	NA	0.07	
Flow (gallons per day) ^b	12	34530	7957	14152	2472	
Chromium	4	612	0.006	<0.006	<0.006	0
Zinc	4	0.16	0.1	0.126	0.013	
Copper	4	0.077	0.018	0.043	0.014	
Temperature (°C)	4	24.6	19.6	22.7	1	
Chlorine, free	4	0.42	<0.1	<0.24	0.08	
pH (standard units)	4	8.7	8.5	NA	0.06	
Flow (gallons per day) ^b	12	115577	6130	44594	11526	
Chromium	4	613	0.007	<0.006	<0.006	0.001
Zinc	4	0.153	0.106	0.128	0.011	
Copper	4	0.076	0.056	0.064	0.005	
Temperature (°C)	4	27.4	23	24.9	1	
Chlorine, free	4	0.14	<0.1	<0.11	0.01	
pH (standard units)	4	8.9	8.5	NA	0.1	
Flow (gallons per day) ^b	12	236736	11060	59242	18599	
Chromium	4	615	0.036	<0.006	<0.019	0.007
Zinc	4	0.413	0.076	0.176	0.079	
Copper	4	0.038	0.022	0.028	0.004	
Temperature (°C)	4	27.7	25.7	26.5	0.45	
Chlorine, free	4	0.28	<0.1	<0.17	0.04	
pH (standard units)	4	8.9	8.7	NA	0.05	
Flow (gallons per day) ^b	12	10582	3210	5057	665	
Chromium	4	617	0.042	0.011	0.025	0.006
Zinc	4	0.2	0.063	0.112	0.03	
Copper	4	0.068	0.017	0.039	0.011	
Temperature (°C)	4	27.9	19	23	2.38	
Chlorine, free	4	0.24	<0.1	<.15	0.03	
pH (standard units)	4	8.8	8.6	NA	0.05	
Flow (gallons per day) ^b	12	52280	10168	21717	4347	

Table 2.2.31 (continued)

Parameter	No. samples	Discharge point	Concentration (mg/L)			Std. error
			Max	Min	Av	
Chromium	4	618	0.028	<0.006	<0.012	0.005
Zinc	4	0.214	0.078	0.125	0.031	
Copper	4	0.09	0.021	0.059	0.015	
Temperature (°C)	4	28.6	24	27	1.1	
Chlorine, free	4	<0.1	<0.1	<0.1	0	
pH (standard units)	4	8.8	8.5	NA	0.07	
Flow (gallons per day) ^b	12	28140	13327	17644	1157	
Chromium	4	619	0.146	0.007	0.045	0.034
Zinc	4	0.108	0.062	0.082	0.01	
Copper	4	0.057	0.013	0.03	0.01	
Temperature (°C)	4	27.9	18	22	2.3	
Chlorine, free	4	0.16	<0.1	<0.13	0.02	
pH (standard units)	4	8.9	8.4	NA	0.1	
Flow (gallons per day) ^b	12	74650	0	8505	6102	
Chromium	4	622	0.011	<0.006	<0.007	0.001
Zinc	4	0.324	0.131	0.211	0.043	
Copper	4	0.042	0.016	0.025	0.006	
Temperature (°C)	4	29.5	19.8	25.4	2.1	
Chlorine, free	4	0.48	<0.1	0.23	0.09	
pH (standard units)	4	8.9	8.7	NA	0.05	
Flow (gallons per day) ^b	12	16000	5078	8799	977	
Chromium	4	624	<0.006	<0.006	<0.006	0
Zinc	4	0.152	0.08	0.102	0.017	
Copper	4	0.031	0.017	0.026	0.003	
Temperature (°C)	4	22.9	18.8	21.1	0.89	
Chlorine, free	4	0.38	<0.1	<0.23	0.07	
pH (standard units)	4	8.5	8.3	NA	0.05	
Flow (gallons per day) ^b	12	103120	8750	54157	9879	
Chromium	4	626	0.09	0.024	0.047	0.015
Zinc	4	0.072	0.025	0.05	0.012	
Copper	4	0.77	0.036	0.056	0.009	
Temperature (°C)	4	26.2	21.8	23.9	1	
Chlorine, free	4	0.88	<0.1	<0.31	0.19	
pH (standard units)	4	8.8	8.6	NA	0.05	
Flow (gallons per day) ^b	12	45389	0	18675	4357	
Chromium	4	628	0.021	0.011	0.016	0.002
Zinc	4	0.092	0.056	0.071	0.008	
Copper	4	0.057	0.016	0.03	0.009	
Temperature (°C)	4	23.7	14.6	20.2	2	
Chlorine, free	4	0.2	<0.1	<0.13	0.03	
pH (standard units)	4	8.6	8.1	NA	0.12	
Flow (gallons per day) ^b	4	0	0	0	0	
Chromium	2	632	0.025	0.008	0.017	0.009
Zinc	2	0.096	0.087	0.092	0.005	
Copper	2	0.147	0.035	0.091	0.056	
Temperature (°C)	2	29.2	23.5	26	2.8	
Chlorine, free	2	0.1	<0.1	<0.1	0	
pH (standard units)	2	8.9	8.9	NA	0	
Flow (gallons per day) ^b	12	15130	0	3392	1633	

Table 2.2.31 (continued)

Parameter	No. samples	Discharge point	Concentration (mg/L)			Std. error
			Max	Min	Av	
Chromium	3	634	0.053	0.009	0.033	0.013
Zinc	3	0.061	0.045	0.055	0.005	
Copper	3	0.066	0.012	0.033	0.017	
Temperature (°C)	3	25.3	18.4	22.3	2.04	
Chlorine, free	3	0.41	<0.1	<0.26	0.09	
pH (standard units)	3	8.8	8.4	NA	0.12	
Flow (gallons per day) ^b	12	41165	0	16619	4248	

^aY-12 Plant.

^bFlow during operations and/or discharging.

^cNA = not applicable.

Table 2.2.32. CY 1988 NPDES Permit Number TN 002968

Discharge Point = 623^a

Parameter	No. samples	Concentration (mg/L)			Std. error
		Max	Min	Av	
pH (standard units)	44	8.1	6.2	NA@ ^{'''} sup b@	0.07
Flow (gallons per minute) ^c	12	2100	2100	2100	0

^aY-12 Plant, steam plant fly ash sluice water.^bNA = not applicable.^cFlow during operations and/or discharging

Table 2.2.33. CY 1988 Permit Number TN 0002968

Category I outfalls^a

Outfall No.	No. samples	pH (units)			Std. error	Flow ^b (gpd)			Std. error
		Max	Min	Av		Max	Min	Av	
1	1	6.9	6.9	NA ^c	0	34,240	34,240	34,240	0
3	1	8.1	8.1	NA	0	3,044	3,044	3,044	0
6	1	7.4	7.4	NA	0	1,902	1,902	102	0
9	1	6.9	6.9	NA	0	159	159	159	0
15	1	6.8	6.8	NA	0	360	360	360	0
17	1	8	8	NA	0	39,946	39,946	39,946	0
18	1	6.7	6.7	NA	0	760	760	760	0
19	1	6.8	6.8	NA	0	53,218	53,218	53,218	0
32	1	7	7	NA	0	3,946	3,946	3,946	0
41	1	7	7	NA	0	7,609	7,609	7,609	0
44	1	7.5	7.5	NA	0	175	175	175	0
45	1	6.9	6.9	NA	0	34,022	34,022	34,022	0
57	1	7.5	7.5	NA	0	760	760	760	0
86	1	7.4	7.4	NA	0	228	228	228	0
182	1	8.3	8.3	NA	0	1,141	1,141	1,141	0
184	1	7.6	7.6	NA	0	761	761	761	0
198	1	8.3	8.3	NA	0	3,044	3,044	3,044	0

^aY-12 Plant, Category I outfalls.^bFlow during operations and/or discharging.^cNA = not applicable.

Table 2.2.34. CY 1988 NPDES Permit Number TN 0002968
Category II outfalls^a

Outfall No.	No. samples	pH (units)			Std. error	No. samples	Temperature (C)			Std. error	No. samples	Flow ^b (gpd)			Std. error
		Max	Min	Av			Max	Min	Av			Max	Min	Av	
16	4	7.3	6.8	NA ^c	0.1	4	23	4.9	15.2	3.9	4	42,560	950	12,875	9,946
20	4	7.8	7.0	NA	0.2	4	24.2	9.1	17.5	3.1	4	21,565	380	7,579	4,949
23	2	8.1	7.6	NA	0.2	2	20.1	17.0	18.6	1.6	2	90	24	57	33
25	3	8.0	7.6	NA	0.1	1	40	40	40	0	3	190	38	118	44
26	2	7.9	7.7	NA	0.1	1	22.4	22.4	22.4	0	2	47	1.5	24.5	22.8
29	1	6.9	6.9	NA	0	1	25.7	25.7	25.7	0	1	22	22	22	0
35	4	7.7	7.1	NA	0.1	4	24.7	15.3	20	2.2	4	2,282	22	868	540
43	4	7.6	6.9	NA	0.2	4	23.7	12.3	18.5	2.4	4	2,282	190	958	493
46	3	8.0	7.1	NA	0.3	3	35.7	28.4	32.9	2.3	3	1,141	520	856	181
54	4	8.4	7.6	NA	0.2	4	23.1	9.1	17.3	3.0	4	34,240	66	8,698	8,514
58	4	7.8	7.3	NA	0.1	4	23.6	9.1	15.8	3.0	4	285	52	210	55
60	3	8.0	6.7	NA	0.4	3	25.5	10.7	17.7	4.3	3	470	127	262	105
66	3	8.4	8.2	NA	0.1	3	30.5	20.2	23.9	3.3	3	254	32	108	74
68	4	7.8	7.4	NA	0.1	4	33.8	21	27.7	2.7	4	720	64	362	147
73	4	7.7	7.4	NA	0.1	4	24.3	10.7	17.7	2.9	4	22,827	22	5,750	5,692
75	2	8.3	7.2	NA	0.6	2	24.1	18.3	21.2	2.9	2	128	95	111	16
76	1	6.6	6.6	NA	0	1	25.6	25.6	25.6	0	1	180	180	180	0
78	1	6.7	6.7	NA	0	1	25.9	25.9	25.9	0	1	200	200	200	0
80	2	8.0	6.9	NA	0.6	2	25.2	13.5	19.4	5.8	2	42	4	23	19
81	1	6.7	6.7	NA	0	1	27.0	27.0	27.0	0	1	1,141	1,141	1,141	0
87	4	8.3	7.2	NA	0.2	4	24.3	11.1	18.4	2.8	4	36,500	127	9,249	9,084
93	1	6.8	6.8	NA	0	1	25.8	25.8	25.8	0	1	285	285	285	0
94	1	7.0	7.0	NA	0	1	25.9	25.9	25.9	0	1	210	210	210	0
95	1	7.0	7.0	NA	0	1	26.0	26.0	26.0	0	1	380	380	380	0
96	2	8.0	7.3	NA	0.4	2	25.4	13.5	19.4	6.0	2	85	4	44	40
98	1	7.2	7.2	NA	0	1	25.9	25.9	25.9	0	1	380	380	380	0
111	1	7.4	7.4	NA	0	1	26.8	26.8	26.8	0	1	85	85	85	0
112	1	7.2	7.2	NA	0	1	26.2	26.2	26.2	0	1	7,609	7,609	7,609	0
117	3	8.3	6.7	NA	0.5	3	24.9	22.4	23.8	0.7	3	380	35	202	100
131	2	8.0	7.8	NA	0.1	2	19.8	9.0	14.4	5.4	2	24	6	15	9
133	3	7.8	6.9	NA	0.3	3	25.5	7.2	17.1	5.3	3	2,282	1,141	1,648	335
185	2	7.9	7.2	NA	0.4	2	29.6	18.7	24.2	5.4	2	760	190	475	285
201	4	7.8	6.9	NA	0.2	4	25.0	14.3	19.4	2.3	4	147,000	2,282	52,331	34,056
203	2	7.0	6.5	NA	0.2	2	25.2	17.0	21.1	4.1	2	5,707	16	2,861	2,846
204	4	7.3	6.8	NA	0.1	4	25.2	16.1	19.3	2.1	4	14,000	31	3,826	3,401
213	1	7.2	7.2	NA	0	1	26.6	26.6	26.6	0	1	150	150	150	0
238	2	7.8	7.1	NA	0.4	2	18.3	15.9	17.1	1.2	2	5,304	1,141	3,222	2,082
239	2	7.8	7.1	NA	0.4	2	18.3	15.9	17.1	1.2	2	5,304	1,141	3,222	2,082
240	2	7.8	7.1	NA	0.4	2	18.3	15.9	17.1	1.2	2	5,304	1,141	3,222	2,082
241	2	7.8	7.1	NA	0.4	2	18.3	15.9	17.1	1.2	2	5,304	1,141	3,222	2,082

^aY-12 Plant, Category II outfalls. Note: All outfalls not listed did not discharge.

^bFlow during operations and/or discharging.

^cNA = not applicable.

Table 2.2.35. CY 1988 NPDES Permit Number TN 0002968
Category III outfalls^a

Outfall No.	No samples	pH (units)			Temperature (C)			Std. error	Flow units	Flow ^b			Std. error
		Max	Min	Av	Max	Min	Av			Max	Min	Av	
2	4	7.6	6.9	NA ^c	18.2	15.1	16.7	0.2	gpd	380,000	57,066	143,386	78,915
71	4	7.5	7.0	NA	18.3	17.3	15.1	0.1	gpd	154,000	76,000	118,820	16,117
135	4	8.1	7.4	NA	29.9	26.5	28.5	0.2	gpd	508,000	259,000	412,500	54,164
147	4	7.6	7.2	NA	24.3	20.4	21.8	0.1	gpd	17,000	951	9,163	3,452
150	4	7.5	7.1	NA	29.8	25.9	28.2	0.1	Mgd	3.39	0.634	1.711	0.593
157	4	7.5	7.1	NA	29.0	21.2	24.8	0.1	gpd	2,160	190	732.5	478
160	4	7.6	6.9	NA	25.0	23.1	24.0	0.2	gpd	160,000	13,000	57,750	34,488
163	4	7.8	6.8	NA	23.6	20.5	22.4	0.2	gpd	370,000	91,000	272,750	62,182
169	4	7.9	7.1	NA	25.0	18.8	22.1	0.2	gpd	2,900,000	145,000	977,000	648,251
181	4	7.8	7.1	NA	20.8	16.7	19.1	0.1	Mgd	1.6	0.727	1.22	0.197
192	4	7.9	6.6	NA	24.0	22.0	22.8	0.3	gpd	4,230	761	2,674	753

^aY-12 Plant, Category III outfalls. Note: outfalls not listed did not discharge during this period.

^bFlow during operations and/or discharging.

^cNA = not applicable.

Table 2.2.36. CY 1988 NPDES Permit Number TN 002968
Category IV outfalls^a

Outfall No.	No. samples	pH (units)		Std. error	Flow ^b (gpd)			No. flows	Std. error
		Max	Min		Max	Min	Av		
401	0			NF@ ^{***} sup c@	NF	NF		1	0
402	0			NF	NF	NF		1	0
403	48	7.9	3.5	0.1	0.205@ ^{***} sup e@	0.205@ ^{***} sup 2@	0.205@ ^{***} sup e@	1	0
404	45	8	6.5	0.1	675	675	675	1	0
405	42	8.6	6.2	0.1	14,400	14,400	14,400	1	0
406	10	8.5	7.3	0.1	28,800	28,800	28,800	1	0
407	0			NF	NF	NF		1	0
408	45	9	6	0.1	17,280	17,280	17,280	1	0
409	46	7.7	3.8	0.1	252	252	252	1	0
410	46	8.4	6.1	0.1	2,500	2,500	2,500	1	0
411	45	7.7	6.6	0.05	480	480	480	1	0
412	39	8	6.5	0.1	720	720	720	1	0
413	46	8.8	6.5	0.1	720	720	720	1	0
414	45	7.8	6.6	0.05	8,640	8,640	8,640	1	0
415	38	7.9	6.5	0.05	220	220	220	1	0
416	0			NF	NF	NF		1	0
417	0			NF	NF	NF		1	0
418	46	7.7	6.3	0.05	132	132	132	1	0
419	16	7.9	6.5	0.1	600	600	600	1	0
420	1	7	7	0	NF	NF	NF	1	0

^aY-12 Plant.

^bFlow during operations and/or discharging.

^cNF = no flow.

^dNA = not applicable.

^eMillions gallons per day.

Table 2.2.37. CY 1988 NPDES Permit Number TN 002968
Miscellaneous discharge points^a

Parameter	Outfall	No. samples	Concentration (mg/L)			Std. error
			Max	Min	Av	
Total suspended solids	702	3	20	<5	<11.3	4.5
pH (standard units)		3	7.9	6.8	NA ^b sup b@	0.3
Total suspended solids	703	0				
pH (standard units)		1	8.5	6.5	NA	
Total suspended solids	704	1	<5	<5	<5	0
pH (standard units)		0				
Total suspended solids	705	7	10	6	8	2
pH (standard units)		7	7.4	7	NA	0.2

^aY-12 Plant.

^bNA = not applicable.

Table 2.2.38. ORNL NPDES point source discharges

Serial # discharge	Effluent discharges	Flow ^a (L × 10 ⁶ /d)		Receiving stream
		Av	()	
X01	Sewage treatment plant	Av	0.87 (0.23)	WOC
		Max	2.84 0.75	
X02	Coal yard runoff treatment facility	Av	0.09 (0.024)	WOC
		Max	0.83 (0.22)	
X03	1500 area	Av	0.028 (0.0058)	Northwest tributary of WOC
X04	2000 area	Av	0.05 (0.014)	WOC
X06	3539 and 3540 ponds	Av	0.51 (0.135)	WOC
X07	3544 Process Waste Treatment Plant	Av	0.68 (0.18)	WOC
		Max	1.63 (0.43)	
X08	TRU process waste basin	Av	0.19 (0.05)	Melton Branch
X09	HFIR process waste basin	Av	0.61 (0.16)	Melton Branch
X11	3518 Acid Neutralization Facility	Av	0.15 (0.04)	WOC
X13	Melton Branch (ambient station) X08, X09, HFIR cooling tower blowdown, and area runoff	Av	7.57 (2.0)	Melton Branch to WOC
X14	WOC (ambient station) and area runoff	Av	26.50 (7.0)	White Oak lake
X15	White Oak Lake Dam and WOC drainage basin (ambient station)	Av	37.90 (10.0)	Clinch River

^aFlow in millions of gallons per day is given in parentheses.

Source: J. L. Kasten, *Resource Management Plan for the Oak Ridge Reservation, Volume 21: Water Conservation Plan for Oak Ridge Reservation*, ORNL/ESH-1/V21, November 1986.

Table 2.2.39. ORNL Sewage Treatment Plant (X01)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	Continuous	Daily
pH	Weekly	Grab	Weekly
Downstream pH	Weekly	Grab	Weekly
BOD	3/week	24-h composite	3/week
TSS	3/week	24-h composite	3/week
Ammonia	3/week	24-h composite	3/week
Oil and grease	3/week	Grab	3/week
DO	5/week	Grab	5/week
Residual chlorine	3/week	Grab	3/week
Fecal coliform bacteria (geometric mean)	3/week	Grab	3/week
Cyanide (total)	Monthly	Grab	Monthly
Copper (total)	Monthly	24-h composite	Monthly
Mercury (total)	Monthly	24-h composite	Monthly
Silver (total)	Monthly	24-h composite	Monthly
Zinc (total)	Monthly	24-h composite	Monthly
Trichlorethylene	Monthly	Grab	Monthly
Dichlorobromomethane	Monthly	Grab	Monthly
Phenols (total)	Monthly Grab	Monthly	

Table 2.2.40. ORNL coalyard runoff treatment facility (X02)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	Continuous	Daily
pH	Weekly	Grab	Weekly
Temperature	Weekly	Grab	Weekly
Downstream pH	Weekly	Grab	Weekly
TSS	Weekly	24-h composite	Weekly
Oil and grease	Weekly	Grab	Weekly
Chromium (total)	Weekly	24-h composite	Weekly
Copper (total)	Weekly	24-h composite	Weekly
Iron	Weekly	24-h composite	Weekly
Zinc (total)	Weekly	24-h composite	Weekly
Sulfate	Monthly	24-h composite	Monthly
Arsenic (total)	Weekly	24-h composite	Weekly
Cadmium (total)	Weekly	24-h composite	Weekly
Lead (total)	Weekly	24-h composite	Weekly
Manganese (total)	Weekly	24-h composite	Weekly
Nickel (total)	Weekly	24-h composite	Weekly
Selenium (total)	Weekly	24-h composite	Weekly
Silver (total)	Weekly	24-h composite	Weekly

Table 2.2.41. ORNL 1500 area (X03)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Monthly	Continuous	Monthly
pH	Weekly	Grab	Weekly
Downstream pH	Weekly	Grab	Weekly
Temperature	2/month	Grab	2/month
TSS	2/month	24-h composite	2/month
TOC	2/month	Grab	2/month
Oil and grease	2/month	Grab	2/month
Phosphorus (total)	2/month	24-h composite	2/month
Arsenic (total)	2/month	24-h composite	2/month
Cadmium (total)	2/month	24-h composite	2/month
Chromium (total)	2/month	24-h composite	2/month
Copper (total)	2/month	24-h composite	2/month
Iron	2/month	24-h composite	2/month
Lead (total)	2/month	24-h composite	2/month
Nickel (total)	2/month	24-h composite	2/month
Zinc (total)	2/month	24-h composite	2/month

Table 2.2.42. ORNL 2000 area (X04)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Monthly	Continuous	Monthly
pH	Weekly	Grab	Weekly
Downstream pH	Weekly	Grab	Weekly
Temperature	2/month	Grab	2/month
TSS	2/month	24-h composite	2/month
TOC	2/month	Grab	2/month
Oil and grease	2/month	Grab	2/month
Phosphorus (total)	2/month	24-h composite	2/month
Arsenic (total)	2/month	24-h composite	2/month
Cadmium (total)	2/month	24-h composite	2/month
Chromium (total)	2/month	24-h composite	2/month
Copper (total)	2/month	24-h composite	2/month
Lead (total)	2/month	24-h composite	2/month
Nickel (total)	2/month	24-h composite	2/month
Silver (total)	2/month	24-h composite	2/month
Zinc (total)	2/month	24-h composite	2/month

Table 2.2.43. ORNL 3539 and 3540 ponds (X06)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Per batch	Total volume	Per batch
pH	Weekly	Grab	Weekly
Downstream pH	Weekly	Grab	Weekly
Temperature	2/month	Grab	2/month
TSS	2/month	24-h composite	2/month
TOC	2/month	Grab	2/month
Oil and grease	2/month	Grab	2/month
Sulfate	2/month	24-h composite	2/month
Arsenic (total)	2/month	24-h composite	2/month
Cadmium (total)	2/month	24-h composite	2/month
Chromium (total)	2/month	24-h composite	2/month
Copper (total)	2/month	24-h composite	2/month
Lead (total)	2/month	24-h composite	2/month
Nickel (total)	2/month	24-h composite	2/month
Selenium (total)	2/month	24-h composite	2/month
Zinc (total)	2/month	24-h composite	2/month

Table 2.2.44. ORNL Process Waste Treatment Plant (X07)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	Continuous	Daily
pH	Weekly	Grab	Weekly
Downstream pH	Weekly	Grab	Weekly
Temperature	2/month	Grab	2/month
TSS	2/month	24-h composite	2/month
TOC	2/month	Grab	2/month
TTO	2/month	Grab	2/month
Oil and grease	2/month	Grab	2/month
Nitrate (as N)	2/month	24-h composite	2/month
Sulfate	2/month	24-h composite	2/month
Arsenic (total)	2/month	24-h composite	2/month
Cadmium (total)	2/month	24-h composite	2/month
Chromium (total)	2/month	24-h composite	2/month
Copper (total)	2/month	24-h composite	2/month
Lead (total)	2/month	24-h composite	2/month
Nickel (total)	2/month	24-h composite	2/month
Silver (total)	2/month	24-h composite	2/month
Zinc (total)	2/month	24-h composite	2/month

Table 2.2.45. ORNL TRU/TURF process waste basin (X08)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Per discharge	Total volume	Per discharge
pH	1/discharge	Grab	1/discharge
Downstream pH	1/discharge	Grab	1/discharge
Temperature	1/discharge	Grab	1/discharge
TSS	1/discharge	Grab	1/discharge
TOC	1/discharge	Grab	1/discharge
Oil and grease	1/discharge	Grab	1/discharge
Nitrate (as N)	1/discharge	Grab	1/discharge
Sulfate	1/discharge	Grab	1/discharge
Arsenic (total)	1/discharge	Grab	1/discharge
Cadmium (total)	1/discharge	Grab	1/discharge
Chromium (total)	1/discharge	Grab	1/discharge
Copper (total)	1/discharge	Grab	1/discharge
Lead (total)	1/discharge	Grab	1/discharge
Nickel (total)	1/discharge	Grab	1/discharge
Zinc (total)	1/discharge	Grab	1/discharge

Table 2.2.46. ORNL HFIR process waste basin (X09)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Per discharge	Total volume	Per discharge
pH	1/discharge	Grab	1/discharge
Downstream pH	1/discharge	Grab	1/discharge
Temperature	1/discharge	Grab	1/discharge
TSS	1/discharge	Grab	1/discharge
TOC	1/discharge	Grab	1/discharge
Oil and grease	1/discharge	Grab	1/discharge
Nitrate (as N)	1/discharge	Grab	1/discharge
Sulfate	1/discharge	Grab	1/discharge
Arsenic (total)	1/discharge	Grab	1/discharge
Cadmium (total)	1/discharge	Grab	1/discharge
Chromium (total)	1/discharge	Grab	1/discharge
Copper (total)	1/discharge	Grab	1/discharge
Lead (total)	1/discharge	Grab	1/discharge
Nickel (total)	1/discharge	Grab	1/discharge
Zinc (total)	1/discharge	Grab	1/discharge

Table 2.2.47. ORNL 3518 Acid Neutralization Facility (X11)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Per discharge	Total volume	Per discharge
pH	Weekly	Grab	Weekly
Downstream pH	Weekly	Grab	Weekly
Temperature	2/month	Grab	2/month
TSS	2/month	Grab	2/month
TOC	Weekly	Grab	Weekly
Oil and grease	2/month	Grab	2/month
Nitrate (as N)	Weekly	Grab	Weekly
Sulfate	Weekly	Grab	Weekly
Phosphorus (total)	2/month	Grab	2/month
Arsenic (total)	2/month	Grab	2/month
Cadmium (total)	2/month	Grab	2/month
Chromium (total)	2/month	Grab	2/month
Copper (total)	2/month	Grab	2/month
Lead (total)	2/month	Grab	2/month
Nickel (total)	2/month	Grab	2/month
Zinc (total)	2/month	Grab	2/month

Table 2.2.48. ORNL Melton Branch (X13)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	Continuous	Daily
TSS	Monthly	24-h composite	Monthly
Ammonia	Monthly	24-h composite	Monthly
BOD	Monthly	24-h composite	Monthly
TOC	Monthly	Grab	Monthly
pH	Monthly	Grab	Monthly
Fluoride	Monthly	24-h composite	Monthly
Nitrate	Monthly	24-h composite	Monthly
Phosphorus	Monthly	24-h composite	Monthly
Sulfate	Monthly	24-h composite	Monthly
Temperature	Monthly	Grab	Monthly
Conductivity	Monthly	Grab	Monthly
Turbidity	Monthly	Grab	Monthly
Phenols (total)	Monthly	Grab	Monthly
DO	Weekly	Grab	Weekly
TDS	Monthly	Grab	Monthly
Oil and grease	Weekly	Grab	Weekly
Residual chlorine	Weekly	Grab	Weekly
Chloroform	Monthly	Grab	Monthly
Trichloroethylene	Monthly	Grab	Monthly
PCB	Monthly	24-h composite	Monthly
Aluminum (total)	Monthly	24-h composite	Monthly
Arsenic (total)	Monthly	24-h composite	Monthly
Cadmium (total)	Monthly	24-h composite	Monthly
Chromium (total)	Monthly	24-h composite	Monthly
Copper (total)	Monthly	24-h composite	Monthly
Iron (total)	Monthly	24-h composite	Monthly
Lead (total)	Monthly	24-h composite	Monthly
Manganese (total)	Monthly	24-h composite	Monthly
Mercury (total)	Monthly	24-h composite	Monthly
Nickel (total)	Monthly	24-h composite	Monthly
Silver (total)	Monthly	24-h composite	Monthly
Zinc (total)	Monthly	24-h composite	Monthly

Table 2.2.49. ORNL White Oak Creek (X14)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	Continuous	Daily
TSS	Monthly	24-h composite	Monthly
Ammonia	Monthly	24-h composite	Monthly
BOD	Monthly	24-h composite	Monthly
TOC	Monthly	Grab	Monthly
pH	Monthly	Grab	Monthly
Fluoride	Monthly	24-h composite	Monthly
Nitrate	Monthly	24-h composite	Monthly
Phosphorus	Monthly	24-h composite	Monthly
Sulfate	Monthly	24-h composite	Monthly
Temperature	Monthly	Grab	Monthly
Conductivity	Monthly	Grab	Monthly
Turbidity	Monthly	Grab	Monthly
Phenols (total)	Monthly	Grab	Monthly
DO	Weekly	Grab	Weekly
TDS	Monthly	Grab	Monthly
Oil and grease	Weekly	Grab	Weekly
Residual chlorine	Weekly	Grab	Weekly
Chloroform	Monthly	Grab	Monthly
Trichloroethylene	Monthly	Grab	Monthly
PCB	Monthly	24-h composite	Monthly
Aluminum (total)	Monthly	24-h composite	Monthly
Arsenic (total)	Monthly	24-h composite	Monthly
Cadmium (total)	Monthly	24-h composite	Monthly
Chromium (total)	Monthly	24-h composite	Monthly
Copper (total)	Monthly	24-h composite	Monthly
Iron (total)	Monthly	24-h composite	Monthly
Lead (total)	Monthly	24-h composite	Monthly
Manganese (total)	Monthly	24-h composite	Monthly
Mercury (total)	Monthly	24-h composite	Monthly
Nickel (total)	Monthly	24-h composite	Monthly
Silver (total)	Monthly	24-h composite	Monthly
Zinc (total)	Monthly	24-h composite	Monthly

Table 2.2.50. ORNL White Oak Lake (X15)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	Continuous	Daily
TSS	Monthly	24-h composite	Monthly
Ammonia	Monthly	24-h composite	Monthly
BOD	Monthly	24-h composite	Monthly
TOC	Monthly	Grab	Monthly
pH	Monthly	Grab	Monthly
Fluoride	Monthly	24-h composite	Monthly
Nitrate	Monthly	24-h composite	Monthly
Phosphorus	Monthly	24-h composite	Monthly
Sulfate	Monthly	24-h composite	Monthly
Temperature	Monthly	Grab	Monthly
Conductivity	Monthly	Grab	Monthly
Turbidity	Monthly	Grab	Monthly
Phenols (total)	Monthly	Grab	Monthly
DO	Weekly	Grab	Weekly
TDS	Monthly	Grab	Monthly
Oil and grease	Weekly	Grab	Weekly
Residual chlorine	Weekly	Grab	Weekly
Chloroform	Monthly	Grab	Monthly
Trichloroethylene	Monthly	Grab	Monthly
PCB	Monthly	24-h composite	Monthly
Aluminum (total)	Monthly	24-h composite	Monthly
Arsenic (total)	Monthly	24-h composite	Monthly
Cadmium (total)	Monthly	24-h composite	Monthly
Chromium (total)	Monthly	24-h composite	Monthly
Copper (total)	Monthly	24-h composite	Monthly
Iron (total)	Monthly	24-h composite	Monthly
Lead (total)	Monthly	24-h composite	Monthly
Manganese (total)	Monthly	24-h composite	Monthly
Mercury (total)	Monthly	24-h composite	Monthly
Nickel (total)	Monthly	24-h composite	Monthly
Silver (total)	Monthly	24-h composite	Monthly
Zinc (total)	Monthly	24-h composite	Monthly

Table 2.2.51. ORNL category I outfalls (storm drains)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Yearly	Instantaneous	Yearly
pH	Yearly	Grab	Yearly
Temperature	Yearly	Grab	Yearly
Oil and grease	Yearly	Grab	Yearly
TSS	Yearly	Grab	Yearly

Table 2.2.52. ORNL category II outfalls (parking lot drains, storage area drains, once-through water, condensate)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Quarterly	Instantaneous	Quarterly
pH	Quarterly	Grab	Quarterly
Temperature	Quarterly	Grab	Quarterly
Oil and grease	Quarterly	Grab	Quarterly
TSS	Quarterly	Grab	Quarterly

Table 2.2.53. ORNL category III outfalls (process and/or lab drains)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Quarterly	Instantaneous	Quarterly
pH	Quarterly	Instantaneous	Quarterly

Table 2.2.54. ORNL paint facility (PF7007)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	<i>a</i>	Per discharge
pH	1/month	Grab	Per discharge
Oil and grease	1/month	Grab	Per discharge
TSS	1/month	Grab	Per discharge
Phenols (total)	1/quarter	Grab	Per discharge

^aNot applicable.

Table 2.2.55. ORNL steam plant (SP2519)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Quarterly	<i>a</i>	Quarterly
Temperature	Quarterly	Grab	Quarterly
pH	Quarterly	Grab	Quarterly

^aNot applicable.

Table 2.2.56. ORNL vehicle cleaning and equipment maintenance facilities (VC7002 and EF7002)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	<i>a</i>	Daily
pH	1/month	Grab	1/month
Oil and grease	1/month	Grab	1/month
TSS	1/month	Grab	1/month
Phenols (total)	1/month	Grab	1/month
BOD	1/month	Grab	1/month
Fecal coliform bacteria	1/month	Grab	1/month

^aNot applicable.

Table 2.2.57. ORNL cooling systems (cooling tower blowdown)

Parameter	Collection frequency	Type	Analysis frequency
Flow	Quarterly	<i>a</i>	Quarterly
Chromium (total)	Quarterly	Grab	Quarterly
Zinc (total)	Quarterly	Grab	Quarterly
Copper (total)	Quarterly	Grab	Quarterly
Temperature	Quarterly	Grab	Quarterly
Residual chlorine	During addition	Grab	During addition

^aNot applicable.

**Table 2.2.58. 1988 NPDES Permit Number TN 0002941
Discharge Point X01 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Ammonia (as N)	157	1.0	0.020	0.094	0.012
BOD	157	16	<5.0	<5.1	0.070
Bromodichloromethane	12	<0.0050	<0.0020	<0.0033	0.00045
Chlorine (total residual)	157	0.90	<0.010	<0.32	0.011
Chromium (total)	1	<0.0060	<0.0060	<0.0060	
Copper (total)	12	0.020	<0.0060	<0.011	0.0011
Cyanide (total)	12	0.0030	<0.0010	<0.0021	0.00015
Downstream pH (standard units)	52	8.3	6.5	<i>b</i>	<i>b</i>
Fecal coliform (col./100 mL)	154	>600	<1.0	1.4	1.1
Flow (Mgd)	251	0.39	0.048	0.20	0.0028
Mercury (total)	12	0.00020	<0.00020	<0.00020	0
Oil and grease	157	19	<2.0	<2.6	0.16
DO	249	13	4.7	8.1	0.081
pH (standard units)	52	8.1	6.2	<i>b</i>	<i>b</i>
Recoverable phenolics (total)	12	<0.0020	<0.0010	<0.0011	0.000083
Silver (total)	12	<0.0060	<0.0036	<0.0049	0.00032
TSS	157	58	<2.0	<5.8	0.48
Trichloroethene	12	<0.0050	<0.0020	<0.0048	0.00025
Zinc (total)	12	0.080	0.048	0.062	0.0029

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.59. 1988 NPDES Permit Number TN 0002941
Discharge Point X02 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Arsenic (total)	52	0.20	<0.0060	<0.057	0.0041
Cadmium (total)	52	0.038	0.00050	0.0022	0.00071
Chromium (total)	52	<0.024	<0.0036	<0.0073	0.00056
Copper (total)	52	0.31	<0.0018	<0.015	0.0058
Downstream pH (standard units)	249	9.0	6.4	<i>b</i>	<i>b</i>
Flow (Mgd)	249	0.30	0	0.0040	0.0015
Iron (total)	52	47	0.012	1.2	0.90
Lead (total)	52	<0.12	<0.0050	<0.036	0.0023
Manganese (total)	52	0.33	0.0032	0.035	0.0064
Nickel (total)	52	0.14	0.0026	0.013	0.0035
Oil and grease	52	9.0	<2.0	<2.6	0.21
pH (standard units)	249	9.0	6.1	<i>b</i>	<i>b</i>
Selenium (total)	52	0.16	0.0061	0.053	0.0038
Silver (total)	52	<0.030	0.00089	0.0053	0.00053
Sulfate (as SO ₄)	12	2000	900	1400	110
TSS	52	180	<5.0	<11	3.3
Temperature (°C)	123	33	4.3	19	0.74
Zinc (total)	52	0.69	<0.0018	<0.035	0.013

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.60. 1988 NPDES Permit Number TN 0002941
Discharge Point X03 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Arsenic (total)	23	<0.060	<0.018	<0.046	0.0032
Cadmium (total)	23	0.019	<0.0010	<0.0022	0.00078
Chromium (total)	23	0.0097	<0.0036	<0.0055	0.00032
Copper (total)	23	0.087	<0.010	<0.017	0.0033
Downstream pH (standard units)	52	8.7	6.8	<i>b</i>	<i>b</i>
Flow (Mgd)	15	0.092	0.0018	0.040	0.0058
Iron (total)	23	0.34	<0.020	<0.11	0.016
Lead (total)	23	<0.050	<0.018	<0.033	0.0021
Nickel (total)	23	0.0090	<0.0036	<0.0051	0.00028
Oil and grease	23	28	<2.0	<4.8	1.2
TOC	23	17	1.8	5.1	0.74
pH (standard units)	52	8.6	6.6	<i>b</i>	<i>b</i>
Phosphorus (total)	23	1.5	0.20	0.57	0.069
TSS	23	8.0	<2.0	<5.1	0.20
Temperature (°C)	35	29	14	22	0.65
Zinc (total)	23	0.22	0.039	0.099	0.0080

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.61. 1988 NPDES Permit Number TN 0002941
Discharge Point X04 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Arsenic (total)	24	<0.060	<0.018	<0.047	0.0032
Cadmium (total)	24	<0.0030	<0.0010	<0.0014	0.00010
Chromium (total)	24	<0.024	<0.0036	<0.0065	0.0011
Copper (total)	24	0.25	0.0066	0.021	0.010
Downstream pH (standard units)	52	8.4	6.3	<i>b</i>	<i>b</i>
Flow (Mgd)	15	0.048	0.00084	0.016	0.0034
Lead (total)	24	<0.12	<0.018	<0.039	0.0044
Nickel (total)	24	<0.036	<0.0036	<0.0060	0.0013
Oil and grease	24	8.0	<2.0	<2.5	0.28
TOC	24	5.7	1.3	2.3	0.21
pH (standard units)	52	8.3	6.1	<i>b</i>	<i>b</i>
Phosphorus (total)	24	0.84	0.19	0.31	0.031
Silver (total)	24	0.078	<0.0036	<0.0095	0.0032
TSS	24	<5.0	<5.0	<5.0	0
Temperature (°C)	36	28	9.8	19	0.77
Zinc (total)	24	0.15	0.067	0.11	0.0043

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.62. 1988 NPDES Permit Number TN 0002941
Discharge Point X06 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Arsenic (total)	24	<0.060	<0.018	<0.047	0.0031
Cadmium (total)	24	0.089	<0.0010	<0.0055	0.0036
Chromium (total)	24	0.030	<0.0036	<0.013	0.0016
Copper (total)	24	0.19	0.026	0.086	0.0099
Downstream pH (standard units)	52	8.1	6.5	<i>b</i>	<i>b</i>
Flow (Mgd)	12	0.20	0.15	0.16	0.0048
Lead (total)	24	<0.12	<0.018	<0.049	0.0055
Nickel (total)	24	<0.036	<0.0036	<0.0076	0.0013
Oil and grease	24	12	<2.0	<2.8	0.43
TOC	24	18	2.4	4.3	0.63
pH (standard units)	52	8.0	6.0	<i>b</i>	<i>b</i>
Selenium (total)	24	<0.12	<0.024	<0.048	0.0039
Sulfate (as SO ₄)	24	33	22	28	0.55
TSS	24	16	3.0	6.5	0.72
Temperature (°C)	37	27	4.8	19	0.88
Zinc (total)	24	0.24	0.063	0.10	0.0078

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.63. 1988 NPDES Permit Number TN 0002941
Discharge Point X07 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Arsenic (total)	24	<0.060	<0.018	<0.047	0.0032
Cadmium (total)	24	<0.0030	<0.0010	<0.0014	0.00010
Chromium (total)	24	<0.024	<0.0036	<0.0069	0.00091
Copper (total)	24	0.27	<0.0060	<0.050	0.014
Downstream pH (standard units)	52	8.5	6.2	<i>b</i>	<i>b</i>
Flow (Mgd)	249	0.29	0	0.13	0.0067
Lead (total)	24	<0.12	<0.018	<0.036	0.0042
Nickel (total)	24	<0.036	<0.0036	<0.0061	0.0013
Nitrate	24	8.0	<5.0	<5.4	0.19
Oil and grease	24	9.0	<2.0	<2.8	0.35
TOC	24	5.2	<0.30	<2.4	0.19
pH (standard units)	52	8.5	3.5	<i>b</i>	<i>b</i>
Silver (total)	24	<0.030	<0.0036	<0.0059	0.0011
Sulfate (as SO ₄)	24	370	140	230	12
TSS	24	10	<2.0	<5.2	0.26
Temperature (°C)	36	30	7.4	20	1.1
Toxic organics (total)	24	15	0	1.1	0.73
Zinc (total)	24	0.050	<0.0018	<0.012	0.0028

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.64. 1988 NPDES Permit Number TN 0002941
Discharge Point X08 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Arsenic (total)	2	<0.036	<0.036	<0.036	0
Cadmium (total)	2	<0.0012	<0.0012	<0.0012	0
Chromium (total)	2	0.030	<0.0036	<0.017	0.013
Copper (total)	2	0.061	0.014	0.038	0.024
Downstream pH (standard units)	2	7.8	7.5	<i>b</i>	<i>b</i>
Flow (Mgd)	2	0.0042	0.0010	0.0026	0.0016
Lead (total)	2	<0.030	<0.030	<0.030	0
Nickel (total)	2	0.0069	<0.0036	<0.0053	0.0017
Nitrate	2	<5.0	<5.0	<5.0	0
Oil and grease	2	7.0	4.0	5.5	1.5
TOC	2	5.7	2.8	4.3	1.5
pH (standard units)	2	8.4	7.2	<i>b</i>	<i>b</i>
Sulfate (as SO ₄)	2	49	26	38	12
TSS	2	12	<5.0	<8.5	3.5
Temperature (°C)	1	22	22	22	
Zinc (total)	2	0.12	0.067	0.094	0.027

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.65. 1988 NPDES Permit No. TN 0002941
Discharge Point X09 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Arsenic (total)	2	<0.060	<0.018	<0.039	0.021
Cadmium (total)	2	0.0021	0.0017	0.0019	0.00020
Chromium (total)	2	0.014	0.0066	0.010	0.0037
Copper (total)	2	0.047	0.043	0.045	0.0020
Downstream pH (standard units)	1	7.5	7.5	<i>b</i>	<i>b</i>
Flow (Mgd)	2	0.0042	0.0042	0.0042	0
Lead (total)	2	<0.030	<0.018	<0.024	0.0060
Nickel (total)	2	<0.0060	<0.0036	<0.0048	0.0012
Nitrate	2	<5.0	<5.0	<5.0	0
Oil and grease	2	3.0	2.0	2.5	0.50
TOC	2	6.3	6.0	6.2	0.15
pH (standard units)	2	7.9	7.4	<i>b</i>	<i>b</i>
Sulfate (as SO ₄)	2	34	29	32	2.5
TSS	2	5.0	<5.0	<5.0	0
Temperature (°C)	2	28	20	24	3.7
Zinc (total)	2	0.061	0.056	0.059	0.0025

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.66. 1988 NPDES Permit Number TN 0002941
Discharge Point X11 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Arsenic (total)	24	0.067	0.026	0.050	0.0026
Cadmium (total)	24	<0.0030	<0.0010	<0.0015	0.00011
Chromium (total)	24	<0.024	<0.0036	<0.0087	0.00091
Copper (total)	24	0.12	<0.0060	<0.024	0.0060
Downstream pH (standard units)	53	8.6	6.2	<i>b</i>	<i>b</i>
Flow (Mgd)	12	0.051	0.026	0.034	0.0022
Lead (total)	24	<0.12	<0.018	<0.036	0.0042
Nickel (total)	24	<0.036	<0.0036	<0.0090	0.0015
Nitrate	52	<100	2.7	7.9	2.0
Oil and grease	24	7.0	<2.0	<2.6	0.29
TOC	52	10	1.9	5.0	0.27
pH (standard units)	52	8.3	1.6	<i>b</i>	<i>b</i>
Phosphorus (total)	24	5.1	0.90	3.1	0.24
Sulfate (as SO ₄)	52	3400	39	1300	99
TSS	24	78	<5.0	<24	4.2
Temperature (°C)	36	32	12	20	0.63
Zinc (total)	24	0.84	0.14	0.46	0.044

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.67. 1988 NPDES Permit Number TN 0002941
Discharge Point X13 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Aluminum (total)	12	1.3	0.15	0.50	0.093
Ammonia (as N)	12	7.2	0.026	0.71	0.59
Arsenic (total)	12	<0.060	<0.018	<0.045	0.0049
BOD	12	<5.0	<5.0	<5.0	0
Cadmium (total)	12	<0.0020	<0.0020	<0.0020	0
Chlorine (total residual)	52	<0.010	<0.010	<0.010	0
Chloroform	12	<0.0050	<0.0050	<0.0050	0
Chromium (total)	12	0.0086	<0.0036	<0.0056	0.00049
Conductivity (ms/cm)	12	0.80	0.25	0.40	0.049
Copper (total)	12	<0.010	<0.0060	<0.0081	0.00058
TDS	12	290	140	200	11
Flow (Mgd)	249	41	0.090	0.80	0.17
Fluoride (total)	12	1.0	<1.0	<1.0	0
Iron (total)	12	1.1	0.14	0.37	0.078
Lead (total)	12	<0.0040	<0.0040	<0.0040	0
Manganese (total)	12	0.19	0.068	0.11	0.011
Mercury (total)	12	<0.000050	<0.000050	<0.000050	0
Nickel (total)	12	0.0081	<0.0036	<0.0050	0.00041
Nitrate	12	<5.0	<5.0	<5.0	0
Oil and grease	52	9.0	<2.0	<2.8	0.21
TOC	12	6.4	1.9	3.0	0.38
DO	52	19	3.8	9.5	0.36
PCBs (total)	12	<0.00050	<0.00050	<0.00050	0
pH (standard units)	12	8.9	6.7	<i>b</i>	<i>b</i>
Phosphorus (total)	12	1.0	<0.10	<0.33	0.076
Recoverable phenolics (total)	12	<0.0020	<0.0010	<0.0011	0.000083
Silver (total)	12	<0.0050	<0.0050	<0.0050	0
Sulfate (as SO ₄)	12	34	25	30	0.88
TSS	12	62	<5.0	<14	4.8
Temperature (°C)	34	30	1.6	15	1.4
Trichloroethene	12	<0.0050	<0.0050	<0.0050	0
Turbidity (JTU)	12	240	0	48	22
Zinc (total)	12	0.039	<0.0018	<0.015	0.0029

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.68. 1988 NPDES Permit Number TN 0002941
Discharge Point X14 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Aluminum (total)	12	1.3	0.24	0.54	0.10
Ammonia (as N)	12	0.17	0.020	0.071	0.011
Arsenic (total)	12	0.060 ^b	0.018 ^b	0.045 ^b	0.0049
BOD	12	5.0 ^b	5.0 ^b	5.0 ^b	0
Cadmium (total)	12	0.0020 ^b	0.0010	0.0019	0.000083
Chlorine (total residual)	51	0.12	0.010 ^b	0.012 ^b	0.0022
Chloroform	12	0.0080	<0.0030	<0.0050	0.00041
Chromium (total)	12	0.0079	0.0036 ^b	0.0054 ^b	0.00043
Conductivity (ms/cm)	12	0.80	0.20	0.43	0.050
Copper (total)	12	0.015	0.0060 ^b	0.011 ^b	0.00089
TDS	12	320	120	230	15
Flow (Mgd)	246	43	0.32	5.2	0.25
Fluoride (total)	12	1.2	1.0 ^b	1.0 ^b	0.019
Iron (total)	12	1.3	0.089	0.42	0.11
Lead (total)	12	0.030 ^b	0.0040 ^b	0.0062 ^b	0.0022
Manganese (total)	12	0.10	0.021	0.042	0.0069
Mercury (total)	12	0.00010 ^b	0.000050 ^b	0.000080	0.0
Nickel (total)	12	0.0069	0.0036 ^b	0.0049 ^b	0.00036
Nitrate	12	5.0 ^b	5.0 ^b	5.0 ^b	0
Oil and grease	52	14	2.0 ^b	2.5 ^b	0.25
TOC	12	4.0	2.0	2.5	0.16
DO	52	13	5.1	9.1	0.22
PCBs (total)	12	0.00050 ^b	0.00050 ^b	0.00050 ^b	0
pH (standard units)	12	9.0	7.4	^c	^c
Phosphorus (total)	12	1.7	0.10 ^b	0.40 ^b	0.12
Recoverable phenolics (total)	12	0.0020 ^b	0.0010 ^b	0.0011 ^b	0.000083
Silver (total)	12	0.0050 ^b	0.0030 ^b	0.0048 ^b	0.00017
Sulfate (as SO ₄)	12	110	38	56	5.5
TSS	12	17	5.0 ^b	8.6 ^b	1.2
Temperature (°C)	34	29	8.3	18	1.0
Trichloroethene	12	0.0050 ^b	0.0050 ^b	0.0050 ^b	0
Turbidity (JTU)	12	140	0	25	11
Zinc (total)	12	0.076	0.024	0.046	0.0054

^aStandard error of the mean.

^bUndetected.

^cNot applicable.

Table 2.2.69. 1988 NPDES Permit Number TN 0002941
Discharge Point X15 at ORNL

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Aluminum (total)	12	1.9	0.32	0.87	0.14
Ammonia (as N)	12	0.18	0.020	0.073	0.013
Arsenic (total)	12	0.060 ^b	0.018 ^b	0.045 ^b	0.0049
BOD	12	5.0 ^b	5.0 ^b	5.0 ^b	0
Cadmium (total)	12	0.0020 ^b	0.0020 ^b	0.0020 ^b	0
Chlorine (total residual)	52	0.10	0.010 ^b	0.012 ^b	0.0017
Chloroform	12	0.0050 ^b	<0.0010	<0.0038	0.00051
Chromium (total)	12	0.033	0.0036 ^b	0.015 ^b	0.0020
Conductivity (ms/cm)	12	0.80	0.30	0.43	0.044
Copper (total)	12	0.020	0.0060 ^b	0.010 ^b	0.0013
TDS	12	280	140	220	12
Flow (Mgd)	249	84	2.6	6.4	0.42
Fluoride (total)	12	1.1	1.0 ^b	1.0 ^b	0.011
Iron (total)	12	1.9	0.29	0.77	0.15
Lead (total)	12	0.0040	0.0040 ^b	0.0040 ^b	0
Manganese (total)	12	0.19	0.038	0.074	0.013
Mercury (total)	12	0.00010 ^b	0.000050 ^b	0.000059	0.0
Nickel (total)	12	0.0095	0.0036 ^b	0.0052 ^b	0.00049
Nitrate	12	5.0 ^b	5.0 ^b	5.0 ^b	0
Oil and grease	52	38	2.0 ^b	4.9 ^b	1.0
TOC	12	4.2	2.2	3.2	0.21
DO	52	16	4.0	9.7	0.35
PCBs (total)	12	0.00050 ^b	0.00050 ^b	0.00050 ^b	0
pH (standard units)	12	9.2	6.5	^c	^c
Phosphorus (total)	12	1.1	0.20	0.31	0.073
Silver (total)	12	0.0050 ^b	0.0050 ^b	0.0050 ^b	0
Sulfate (as SO ₄)	12	69	35	53	2.7
TSS	12	61	5.0 ^b	18 ^b	5.0
Temperature (°C)	34	32	1.6	17	1.5
Trichloroethene	12	0.0050 ^b	0.0050 ^b	0.0050 ^b	0
Turbidity (JTU)	12	78	8.0	30	5.2
Zinc (total)	12	0.058	0.012	0.028	0.0036

^aStandard error of the mean.

^bUndetected.

^cNot applicable.

**Table 2.2.70. 1988 NPDES Permit Number TN 0002941
Discharge Point EF7002 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard ^a error
Oil and grease	4	8.0	<2.0	<3.5	1.5
pH (standard units)	4	8.5	6.8	<i>b</i>	<i>b</i>

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.71. 1988 NPDES Permit Number TN 0002941
Discharge Point PF7007 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Downstream pH (standard units)	1	7.7	7.7	<i>b</i>	<i>b</i>
Oil and grease	1	<2.0	<2.0	<2.0	
pH (standard units)	1	7.5	7.5	<i>b</i>	<i>b</i>
Recoverable phenolics (total)	2	<0.0010	<0.0010	<0.0010	0
TSS	1	<5.0	<5.0	<5.0	0

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.72. 1988 NPDES Permit Number TN 0002941
Discharge Point SP2519 at ORNL**

Parameter	Number of samples	Value			Standard ^a error
		Max	Min	Av	
Flow (Mgd)	3	0.00011	0.000091	0.000097	0.0
pH (standard units)	4	9.8	7.7	<i>b</i>	<i>b</i>
Temperature (°C)	4	41	28	33	3.0

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.73. 1988 NPDES Permit Number TN 0002941
Discharge Point VC7002 at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
BOD	12	6.0	<5.0	<5.1	0.083
Downstream pH (standard units)	10	8.0	7.0	<i>b</i>	<i>b</i>
Fecal coliform (col./100 mL)	12	>600	<1.0	<160	77
Oil and grease	12	14	<2.0	<3.8	1.0
pH (standard units)	12	7.7	6.5	<i>b</i>	<i>b</i>
Recoverable phenolics (total)	12	0.021	<0.0010	<0.0039	0.0016
TSS	12	320	<5.0	<34	26

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.74. 1988 NPDES Permit Number TN 0002941
Discharge Point Cooling Systems at ORNL**

Radionuclide	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Chlorine (total residual)	66	2.7	<0.010	<0.10	0.045
Chromium (total)	69	0.23	<0.0036	<0.022	0.0047
Copper (total)	69	1.1	<0.0060	<0.13	0.023
Downstream pH (standard units)	30	8.7	7.0	<i>b</i>	<i>b</i>
Flow (Mgd)	75	0.25	0.00043	0.031	0.0073
pH(standard units)	41	9.0	7.4	<i>b</i>	<i>b</i>
Temperature (°C)	84	37	9.1	24	0.65
Zinc (total)	68	160	0.047	4.6	2.8

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.75. 1988 NPDES Permit Number TN 0002941
Category I Outfalls at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Downstream pH (standard units)	17	8.4	6.5	<i>b</i>	<i>b</i>
Flow (Mgd)	17	0.053	0.000072	0.010	0.0043
Oil and grease	17	20	<2.0	<6.4	1.5
pH (standard units)	17	8.6	7.0	<i>b</i>	<i>b</i>
Temperature (°C)	17	21	6.1	11	0.87
TSS	17	700	<5.0	<150	54

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.76. 1988 NPDES Permit Number TN 0002941
Category II Outfalls at ORNL**

Parameter	Number of samples	Concentration (mg/L)			Standard ^a error
		Max	Min	Av	
Downstream pH (standard units)	62	8.8	6.7	<i>b</i>	<i>b</i>
Flow (Mgd)	146	0.26	0.000043	0.034	0.0047
Oil and grease	146	4500	<2.0	<58	39
pH (standard units)	146	8.5	5.3	<i>b</i>	<i>b</i>
Temperature (°C)	146	66	9.7	21	0.91
TSS	146	770	<5.0	<45	9.5

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.77. 1988 NPDES Permit Number TN 0002941
Category III Outfalls at ORNL**

Parameter	Number of samples	Value			Standard ^a error
		Max	Min	Av	
Flow (Mgd)	81	4.0	0.0000043	0.15	0.066
pH (standard units)	82	8.7	5.0	<i>b</i>	<i>b</i>

^aStandard error of the mean.

^bNot applicable.

**Table 2.2.78. 1988 NPDES Permit Number TN 0002950
Discharge Point K-1700 at ORGDP**

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
1,1,1-Trichloroethane, µg/L	114	8	<5	<5	0.1363
Aluminum, mg/L	114	8.1	<0.1	<0.431	0.0868
Beryllium, mg/L	114	<0.001	<0.001	<0.001	0.0000
Cadmium, mg/L	113	0.0027	<0.002	<0.002	0.0000
Chemical oxygen demand (COD), mg/L	225	688	<4	<11.9	3.0429
Chromium, mg/L	114	0.018	<0.01	<0.010	0.0001
Dissolved solids, mg/L	114	1526	138	564.0	21.6983
Fluoride, mg/L	114	14	0.1	1.02	0.1366
Lead, mg/L	113	0.023	<0.004	<0.005	0.0003
Mercury, mg/L	114	0.0007	<0.0002	<0.0002	0.0000
Methylene chloride, µg/L	114	<5	<5	<5	0.00
Nitrate nitrogen, mg/L	114	3.7	<0.11	<0.453	0.0481
Oil and grease, mg/L	113	7.3	<2	<2.11	0.0584
pH	354	8.8	6.3	<i>a</i>	0.0169
Selenium, mg/L	113	0.0059	<0.005	<0.005	0.0000
Silver, mg/L	114	0.024	<0.01	<0.010	0.0001
Suspended solids, mg/L	223	41	<1	<6.51	0.8328
Temperature, °C	354	52	3.7	19.7	0.3284
Tetrachloroethene, µg/L	114	<5	<5	<5	0.000
Trichloroethene, µg/L	114	87	<5	<42.1	1.4488
Turbidity, NTU	225	300	1.2	9.59	1.6651
Zinc, mg/L	114	0.068	<0.02	<0.025	0.0009

^aNot applicable.

Table 2.2.79. 1988 NPDES Permit Number TN 0002950
Discharge Point K-1407B at ORGDP

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
1 1 1-Trichloroethane, µg/L	266	10	<5	<5	0.2491
1 1 2 2-Tetrachloroethane, µg/L	266	<5	<5	5	0.0000
1 1 2-Trichloroethane, µg/L	266	<5	<5	5	0.0000
1 1-Dichloroethane, µg/L	266	5	<5	<5	0.000
1 1-Dichloroethene, µg/L	266	5	<5	<5	0.000
1 2 4-Trichlorobenzene, µg/L	11	<6	<5	<5	0.000
1 2-Dichlorobenzene, µg/L	11	<6	<5	<5	0.000
1 2-Dichloroethane, µg/L	266	<5	<5	<5	0.0000
1 2-Dichloropropane, µg/L	266	<5	<5	<5	0.0000
1 3-Dichlorobenzene, µg/L	11	<6	<5	<5	0.0946
1 4-Dichlorobenzene, µg/L	11	<6	<5	<5	0.0946
2 4 6-Trichlorophenol, µg/L	11	<6	<5	<5	0.0946
2 4-Dichlorophenol, µg/L	11	<6	<5	<5	0.0946
2 4-Dimethylphenol, µg/L	11	<6	<5	<5	0.0946
2 4-Dinitrophenol, µg/L	11	<29	<5	<7.1	0.4535
2 4-Dinitrotoluene, µg/L	11	<6	<5	<5	0.0946
2 6-Dinitrotoluene, µg/L	11	<6	<5	<5	0.0946
2-Chloroethylvinyl ether, µg/L	266	<10	<10	<10	0.0000
2-Chloronaphthalene, µg/L	11	<6	<5	<5	0.0946
2-Chlorophenol, µg/L	11	<6	<5	<5	0.0946
2-Nitrophenol, µg/L	11	<6	<5	<5	0.0946
3 3'-Dichlorobenzidine, µg/L	11	<12	<10	<10.2	0.1909
4 6-Dinitro-2-methylphenol, µg/L	11	<29	<25	<25.8	0.4745
4-Biomophenyl-phenylether, µg/L	11	<6	<5	<5	0.0946
4-Chloro-3-methylphenol, µg/L	11	<6	<5	<5	0.0946
4-Chlorophenyl-phenylether, µg/L	11	<6	<5	<5	0.0946
4-Nitrophenol, µg/L	11	<29	<25	<25.8	0.4745
Acenaphthene, µg/L	11	<6	<5	<5	0.0946
Acenaphthylene, µg/L	11	<6	<5	<5	0.0946
Aluminum, mg/L	108	0.99	<0.1	<0.24	0.0204
Ammonia nitrogen, mg/L	64	1.18	<0.1	<0.21	0.0667
Anthracene, µg/L	11	<6	<5	<5	0.0946
Antimony, mg/L	108	0.27	<0.05	<0.052	0.0038
Arsenic, mg/L	60	0.021	<0.005	<0.007	0.0005
Barium, mg/L	108	<0.1	<0.1	<0.1	0.0000
Benzene, µg/L	266	<5	<5	<5	0.0000
Benidine, µg/L	11	<6	<5	<5	0.0946
Benzo(a)anthracene, µg/L	11	<6	<5	<5	0.0946
Benzo(a)pyrene, µg/L	11	<6	<5	<5	0.0946
Benzo(b)fluoranthene, µg/L	11	<6	<5	<5	0.0946
Benzo(ghi)perylene, µg/L	11	<6	<5	<5	0.0946
Benzo(k)fluoranthene, µg/L	11	<6	<5	<5	0.0946
Beryllium, mg/L	108	0.0012	<0.001	<0.0010	0.0000
Bis(2-chloroethoxy)methane, µg/L	11	<6	<5	<5	0.0946
Bis(2-chloroethyl)ether, µg/L	11	<6	<5	<5	0.0946
Bis(2-chloroisopropyl)ether, µg/L	11	<6	<5	<5	0.0946
Bis(2-ethylhexyl)phthalate, µg/L	11	83	<5	<6.7	6.6330
Boron, mg/L	108	12	<0.004	<0.302	0.1225
Bromide, mg/L	55	3.7	<0.2	<1.74	0.0534
Bromodichloromethane, µg/L	266	<5	<5	4.8422	0.0000

Table 2.2.79 (continued)

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Bromoform, µg/L	266	<5	<5	<5	0.0000
Bromomethane, µg/L	266	<10	<10	<10	0.0000
Butylbenzylphthalate, µg/L	11	<6	<5	<5	0.0946
Cadmium, mg/L	178	0.025	<0.002	<0.002	0.0002
Calcium, mg/L	108	440	25	140	6.5249
Carbon tetrachloride, µg/L	266	<5	<5	<5	0.0000
Chemical oxygen demand (COD), mg/L	246	59	<5	<14.5	0.8283
Chloride, mg/L	55	994	168	466	29.2269
Chlorobenzene, µg/L	266	5	<5	<5	0.000
Chloroethane, µg/L	266	<10	<10	<10	0.000
Chloroform, µg/L	266	5	<5	<5	0.000
Chloromethane, µg/L	266	<10	<10	<10	0.000
Chromium, mg/L	117	0.022	<0.01	<0.01	0.0002
Chrysene, µg/L	11	<6	<5	<5	0.0946
Cis-1 3-dichloropropene, µg/L	266	5	<5	<5	0.0000
Cobalt, mg/L	108	<0.1	<0.1	<0.1	0.0000
Copper, mg/L	117	0.025	<0.004	<0.006	0.0005
Cyanide, mg/L	64	0.198	<0.002	<0.033	0.0046
Di-n-butylphthalate, µg/L	11	<6	<5	<5	0.0946
Di-n-octylphthalate, µg/L	11	<6	<5	<5	0.0946
Dibenz(a h)anthracene, µg/L	11	<6	<5	<5	0.0946
Dibromochloromethane, µg/L	266	<5	<5	5	0.0000
Diethylphthalate, µg/L	11	<6	<5	<5	0.0946
Dimethylphthalate, µg/L	11	<6	<5	<5	0.0946
Dissolved solids, mg/L	225	3,910	14	1,637	69.5520
Ethylbenzene, µg/L	127	<5	<5	<5	0.000
Fluoranthene, µg/L	11	<6	<5	<5	0.0946
Fluorene, µg/L	11	<6	<5	<5	0.0946
Fluoride, mg/L	225	57	<0.1	<3.32	0.2824
Freon 113, µg/L	11	48	<5	<10.8	1.2179
Hexachlorobenzene, µg/L	11	<6	<5	<5	0.0946
Hexachlorobutadiene, µg/L	11	<6	<5	<5	0.0946
Hexachlorocyclopentadiene, µg/L	11	<6	<5	<5	0.0946
Hexachloroethane, µg/L	11	<6	<5	<5	0.0946
Indeno(1 2 3-cd)pyrene, µg/L	11	<6	<5	<5	0.0946
Iron, mg/L	108	2.0	0.054	0.41	0.0780
Isophorone, µg/L	11	<6	<5	<5	0.0946
Lead, mg/L	187	0.21	<0.004	<0.021	0.0022
Lithium, mg/L	108	0.037	<0.001	<0.018	0.0008
Magnesium, mg/L	108	26	11	18.5	0.3975
Manganese, mg/L	117	0.28	0.013	0.066	0.0123
Mercury, mg/L	117	0.0004	<0.0002	<0.0002	0.0000
Methylene chloride, µg/L	266	<5	<5	<5	0.000
Molybdenum, mg/L	108	0.04	<0.01	<0.011	0.0005
N-nitroso-di-n-propylamine, µg/L	45	<6	<5	<5	0.0946
N-nitrosodimethylamine, µg/L	45	<6	<5	<5	0.0946
N-nitrosodiphenylamine, µg/L	45	<6	<5	<5	0.0946
Naphthalene, µg/L	45	<6	<5	<5	0.0946
Nickel, mg/L	117	1.6	<0.05	<0.105	0.0175
Niobium, mg/L	108	0.03	<0.007	<0.008	0.0003
Nitrate nitrogen, mg/L	117	15	<0.11	<1.25	0.2050
Nitrobenzene, µg/L	11	<6	<5	<5	0.0946
Oil and grease, mg/L	110	51	<2	<2.71	0.4466

Table 2.2.79 (continued)

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
PCB (aroclor-1016), µg/L	45	<5	<0.5	<0.810	0.2155
PCB (aroclor-1221), µg/L	45	<5	<0.5	<0.810	0.2155
PCB (aroclor-1232), µg/L	45	<5	<0.5	<0.810	0.2155
PCB (aroclor-1242), µg/L	45	<5	<0.5	<0.810	0.2155
PCB (aroclor-1248), µg/L	45	<5	<0.5	<0.810	0.2155
PCB (aroclor-1254), µg/L	45	<6	<1	<1.620	0.4310
PCB (aroclor-1260), µg/L	45	<6	<1	<1.620	0.4310
Pentachlorophenol, µg/L	11	<29	<25	<25.8	0.5715
pH	282	9.2	6.3	<i>a</i>	
Phenanthrene, µg/L	11	<6	<5	<5	0.0946
Phenol, µg/L	11	<6	<5	<5	0.0946
Phenols, mg/mg/L	11	0.03	<0.001	<0.005	0.0013
Phosphorus, mg/L	108	8.4	<0.2	<0.627	0.1143
Potassium, mg/l	108	81.0	3.2	12.9	
Pyrene, µg/L	11	<6	<5	<5	0.0946
Selenium, mg/L	107	0.0079	<0.005	<0.005	0.0000
Silicon, mg/L	108	5.4	0.89	2.06	0.0853
Silver, mg/L	108	0.021	<0.01	<0.010	0.0001
Sodium, mg/L	117	1300	<0.05	372	21.3465
Strontium, mg/L	108	0.34	0.1	0.21	0.0053
Sulfate, mg/L	64	1410	293	542	31.6146
Sulfide, mg/L	55	1.1	<1	<1.09	0.0182
Sulfite, mg/L	55	4	<2	<2.04	0.0364
Surfactants, mg/L	51	<0.2	<0.2	<0.2	0.0000
Suspended solids, mg/L	225	28	<1	<8.4	1.1393
Temperature, °C	355	33	1.3	19.2	0.4187
Tetrachloroethene, µg/L	266	12	<5	<5.1	0.0933
Thallium, mg/L	51	<0.01	<0.01	<0.01	0.0000
Thorium, mg/L	108	<0.2	<0.2	<0.20	0.0000
Tin, mg/L	51	0.028	<0.01	<0.012	0.0007
Titanium, mg/L	108	0.054	<0.003	<0.005	0.0008
Toluene, µg/L	266	<5	<5	<5	0.0000
Total organic carbon (TOC), mg/L	108	45	<1	<13.8	1.0915
Total phosphate, mg/L	55	15.1	0.4	3.1	0.3328
Total residual chlorine, mg/L	55	<0.01	<0.01	<0.01	0.0000
Total organic nitrogen, mg/l	45	3.1	<0.2	<0.85	
Total toxic organics, ug/l	45	156	<5	<35	
Trans-1 2-dichloroethene, µg/L	266	79	<5	<18.6	2.5985
Trans-1 3-dichloropropene, µg/L	266	<5	<5	<5	0.0000
Trichloroethene, µg/L	266	85	<5	<17.1	1.2533
Uranium, mg/L	64	4.94	<0.001	<0.452	0.0946
Vanadium, mg/L	108	<0.5	<0.5	<0.5	0.0000
Vinyl chloride, µg/L	266	12	<5	<5.5	0.1908
Zinc, mg/L	117	0.11	<0.02	<0.024	0.0012
Zirconium, mg/L	108	0.028	<0.001	<0.005	0.0004

**Table 2.2.80. 1988 NPDES Permit Number TN 0002950
Discharge Point K-1203 at ORGDP**

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
1,1,1-Trichloroethane, µg/L	14	<5	<5	<5	0.0000
Ammonia nitrogen, mg/L	167	2	<0.2	<0.211	0.0108
Beryllium, mg/L	14	<0.001	<0.001	<0.001	0.0000
Biological oxygen demand (bod), mg/L	167	20	<5	<5.31	0.1453
Cadmium, mg/L	14	<0.002	<0.002	<0.002	0.0000
Chlorine, ppm	365	0.21	0.01	0.072	0.0019
Dissolved oxygen, ppm	365	15.8	5.4	9.30	0.0651
Fecal coliform	365	355	<1	<3.88	
Lead, mg/L	14	0.008	<0.004	<0.006	0.0004
Mercury, mg/L	14	0.0004	<0.0002	<0.0003	0.0000
Methylene chloride, µg/L	14	5	<5	<5	0.000
pH	422	8.9	5.6	<i>a</i>	0.0204
Selenium, mg/L	14	<0.005	<0.005	<0.005	0.0000
Settleable solids, ml/L	280	0.6	<0.1	<0.121	0.0034
Silver, mg/L	14	<0.01	<0.01	<0.01	0.0000
Suspended solids, mg/L	165	15.4	<1	<4.80	0.3714
Temperature, °C	353	29.4	7	17.9	0.3047
Tetrachloroethene, µg/L	14	<5	<5	<5	0.0000
Trichloroethene, µg/L	14	<5	<5	<5	0.0000
Zinc, mg/L	14	0.097	<0.02	<0.051	0.0062

^aNot applicable.

**Table 2.2.81. 1988 NPDES Permit Number TN 0002950
Discharge Point K-1007B at ORGDP**

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Chemical oxygen demand (COD), mg/L	123	36	<5	<12.3	0.6370
Chromium, mg/L	59	0.010	<0.01	<0.0101	0.0000
Dissolved oxygen, ppm	380	>20	3.6	10.0	0.1547
Fluoride, mg/L	60	1	<0.1	<0.144	0.0213
Oil and grease, mg/L	60	5.3	<2	<2.06	0.0550
pH	380	10	7	<i>a</i>	0.0269
Suspended solids, mg/L	112	26	<2	<8.19	0.4485
Temperature, °C	380	33	0.01	16.5	0.4121

^aNot applicable

**Table 2.2.82. 1988 NPDES Permit Number TN 0002950
Discharge Point K-901A at ORGDP**

Parameter	Number of samples	Concentration			
		Max	Min	Av	Standard error
Chemical oxygen demand (COD), mg/L	92	29	<2	<10.2	0.5611
Chromium, mg/L	45	0.077	<0.01	<0.019	0.0018
Dissolved oxygen, ppm	311	15.2	4.4	8.18	0.1506
Fluoride, mg/L	45	0.23	<0.1	<1.34	0.0072
Oil and grease, mg/L	45	3	<2	<2.04	0.0296
pH	311	9.3	7.2	<i>a</i>	0.0215
Suspended solids, mg/L	88	30	2	13.6	0.7513
Temperature, °C	311	28.5	1.3	16.7	0.4365
Turbidity, NTU	92	89	3.2	18.7	1.2057

^aNot applicable.

**Table 2.2.83. 1988 NPDES Permit Number TN 0002950
Discharge Point K-1515 at ORGDP**

Parameter	Number of samples	Concentration			
		Max	Min	Av	Standard error
Aluminum, mg/L	52	17	0.16	0.70	0.3185
Chemical oxygen demand (COD), mg/L	53	22	<5	<7.03	0.5515
pH	322	9	6	<i>a</i>	0.0307
Sulfate, mg/L	53	40	16	25.8	0.6409
Suspended solids, mg/L	51	20	<1	<6.54	0.6009
Temperature, °C	309	30	0.3	16.1	0.4224

^aNot applicable.

Table 2.2.84. 1988 mercury concentrations in ORNL area surface water^a

Station	Number of samples	Concentration ($\mu\text{g/L}$)				Percentage DWL ^c
		Max	Min	Av	Standard ^b error	
101	3	0.20	0.20	0.20	0	10
103	3	0.20	0.20	0.20	0	10
106	6	0.30	<0.10	<0.18	0.040	9.2
116	3	0.10	0.10	0.10	0	5.0
143	6	<0.10	<0.050	<0.075	0.011	3.8
162	3	0.10	0.10	0.10	0	5.0
163	3	0.10	0.10	0.10	0	5.0
164	3	0.20	0.10	0.13	0.033	6.7
181	6	0.20	<0.050	<0.092	0.023	4.6
202	6	0.30	0.10	0.18	0.030	9.2
204	6	0.20	<0.10	<0.15	0.022	7.5
206	3	0.20	0.20	0.20	0	10
207	6	0.20	0.10	0.17	0.021	8.3
208	3	0.20	0.20	0.20	0	10
209	3	0.20	0.20	0.20	0	10
217	6	0.20	<0.10	<0.12	0.016	5.8
218	6	<0.10	<0.050	<0.075	0.011	3.8
222	3	0.20	0.10	0.13	0.033	6.7
232	3	0.10	0.10	0.10	0	5.0
241	3	0.10	0.10	0.10	0	5.0
243	3	0.10	0.10	0.10	0	5.0
244	3	0.10	0.10	0.10	0	5.0
246	3	0.10	0.10	0.10	0	5.0
247	6	0.20	<0.10	<0.15	0.022	7.5
248	6	0.20	<0.10	<0.15	0.022	7.5
261	3	0.30	0.10	0.17	0.066	8.3
262	6	<0.10	<0.050	<0.075	0.011	3.8
265	6	<0.10	<0.050	<0.075	0.011	3.8
268	6	<0.10	<0.050	<0.075	0.011	3.8
281	6	<0.10	<0.050	<0.075	0.011	3.8
301	6	0.10	0.10	0.10	0	5.0
302	6	0.30	<0.10	<0.20	0.044	10
303	3	0.30	0.20	0.27	0.033	13
304	6	0.20	0.10	0.15	0.022	7.5
305	6	0.30	<0.10	<0.20	0.044	10
306	3	0.20	0.20	0.20	0	10
307	3	0.10	0.10	0.10	0	5.0
308	3	0.10	0.10	0.10	0	5.0
309	6	2.2	0.10	1.1	0.44	55
310	6	0.20	<0.10	<0.15	0.022	7.5
311	6	<0.10	<0.050	<0.083	0.010	4.2
313	6	0.20	<0.10	<0.15	0.022	7.5
314	6	0.20	<0.10	<0.12	0.016	5.8
341	6	0.50	0.20	0.37	0.061	18
343	6	<0.10	<0.050	<0.075	0.011	3.8
361	3	0.10	0.10	0.10	0	5.0
362	3	0.10	0.10	0.10	0	5.0
363	6	0.30	<0.050	<0.11	0.039	5.4
364	3	0.10	0.10	0.10	0	5.0
367	6	2.2	1.1	1.5	0.17	76
368	6	0.40	<0.050	<0.14	0.052	7.1
381	6	<0.10	<0.050	<0.075	0.011	3.8
382	6	<0.10	<0.050	<0.075	0.011	3.8

Table 2.2.84 (continued)

Station	Number of samples	Concentration ($\mu\text{g/L}$)			Standard ^b error	Percentage DWL ^c
		Max	Min	Av		
384	6	<0.10	<0.050	<0.075	0.011	3.8
386	6	<0.10	<0.050	<0.075	0.011	3.8
750	6	0.20	0.10	0.15	0.022	7.5
FLU	6	0.40	0.20	0.30	0.044	15
HDW	3	0.10	0.10	0.10	0	5.0
LCS	3	0.20	0.10	0.17	0.033	8.3
MBS	6	<0.10	<0.050	<0.075	0.011	3.8
MHD	5	<0.10	<0.050	<0.070	0.012	3.5
MHO	1	<0.10	<0.10	<0.10		5.0
WOD	6	<0.10	<0.050	<0.075	0.011	3.8
X01	8	<0.10	<0.050	<0.081	0.0091	4.1
X02	6	0.30	<0.10	<0.20	0.044	10
X03	6	0.20	0.10	0.15	0.022	7.5
X04	6	0.50	0.10	0.33	0.076	17
X06	6	0.30	<0.10	<0.17	0.033	8.3
X07	6	<0.10	<0.050	<0.083	0.010	4.2
X08	4	0.10	<0.050	<0.063	0.012	3.1
X09	6	<0.10	<0.050	<0.075	0.011	3.8
X11	3	0.30	0.30	0.30	0	15
X12	6	<0.10	<0.050	<0.075	0.011	3.8

^aSee Figs. 2.2.8–2.2.10 in Vol. 1.

^bStandard error of the mean.

^cAverage as a percent of EPA Primary Drinking Water Regulation level.

**Table 2.2.85. 1988 NPDES Permit Number TN 0002950
Discharge Point K-1407-J at ORGDP**

Parameter	Number of samples	Concentration		
		Max	Min	Av
Total toxic organics, $\mu\text{g/L}$	7	96	19	32.5
1 1 1-Trichloroethane, $\mu\text{g/L}$	35	<5	<5	<5
1 1 2 2-Tetrachloroethane, $\mu\text{g/L}$	35	<5	<5	<5
1 1 2-Trichloroethane, $\mu\text{g/L}$	35	<5	<5	<5
1 1-Dichloroethane, $\mu\text{g/L}$	35	<5	<5	<5
1 1-Dichloroethene, $\mu\text{g/L}$	35	<5	<5	<5
1 2 4-Trichlorobenzene, $\mu\text{g/L}$	2	<8	<5	<6.5
1 2-Dichlorobenzene, $\mu\text{g/L}$	2	<8	<5	<6.5
1 2-Dichloroethane, $\mu\text{g/L}$	35	<5	<5	<5
1 2-Dichloropropane, $\mu\text{g/L}$	35	<5	<5	<5
1 3-Dichlorobenzene, $\mu\text{g/L}$	2	<8	<5	<6.5
1 4-Dichlorobenzene, $\mu\text{g/L}$	2	<8	<5	<6.5
2,4, 6-Trichlorophenol, $\mu\text{g/L}$	2	<8	<5	<6.5
2,4-Dichlorophenol, $\mu\text{g/L}$	2	<8	<5	<6.5
2,4-Dimethylphenol, $\mu\text{g/L}$	2	<8	<5	<6.5
2,4-Dinitrophenol, $\mu\text{g/L}$	2	<8	<5	<6.5
2,4-Dinitrotoluene, $\mu\text{g/L}$	2	<8	<5	<6.5
2,6-Dinitrotoluene, $\mu\text{g/L}$	2	<8	<5	<6.5
2-Chloroethylvinyl ether, $\mu\text{g/L}$	35	<10	<10	<10
2-Chloronaphthalene, $\mu\text{g/L}$	2	<8	<5	<6.5
2-Chlorophenol, $\mu\text{g/L}$	2	<8	<5	<6.5
2-Nitrophenol, $\mu\text{g/L}$	2	<8	<5	<6.5
3,3'-Dichlorobenzidine, $\mu\text{g/L}$	2	<17	<10	<13.5
4,6-Dinitro-2-methylphenol, $\mu\text{g/L}$	2	<8	<25	<33.5
4-Biomophenyl-phenylether, $\mu\text{g/L}$	2	<8	<5	<6.5
4-Chloro-3-methylphenol, $\mu\text{g/L}$	2	<8	<5	<6.5
4-Chlorophenyl-phenylether, $\mu\text{g/L}$	2	<25	<5	<6.5
4-Nitrophenol, $\mu\text{g/L}$	2	42	<25	<28.3
Acenaphthene, $\mu\text{g/L}$	2	<8	<5	<6.5
Acenaphthylene, $\mu\text{g/L}$	2	<8	<5	<6.5
Aluminum, mg/L	14	0.74	<0.1	<0.23
Ammonia nitrogen, mg/L	7	0.2	<0.2	<0.2
Anthracene, $\mu\text{g/L}$	2	<8	<5	<6.5
Antimony, mg/L	7	0.088	<0.05	0.057
Aroclor-1016, $\mu\text{g/L}$	7	<0.5	<0.5	<0.5
Aroclor-1221, $\mu\text{g/L}$	7	<0.5	<0.5	<0.5
Aroclor-1232, $\mu\text{g/L}$	7	<0.5	<0.5	<0.5
Aroclor-1242, $\mu\text{g/L}$	7	<0.5	<0.5	<0.5
Aroclor-1248, $\mu\text{g/L}$	7	<0.5	<0.5	<0.5
Aroclor-1254, $\mu\text{g/L}$	7	<1	<1	<1
Aroclor-1260, $\mu\text{g/L}$	7	<1	<1	<1
Arsenic, mg/L	7	0.0057	<0.005	0.005
Barium, mg/L	14	<0.1	<0.1	<0.1
Benzene, $\mu\text{g/L}$	35	<5	<5	<5
Benzidine, $\mu\text{g/L}$	2	<8	<5	<6.5
Benzo(a)anthracene, $\mu\text{g/L}$	2	<8	<5	<6.5
Benzo(a)pyrene, $\mu\text{g/L}$	2	<8	<5	<6.5
Benzo(b)fluoranthene, $\mu\text{g/L}$	2	<8	<5	<6.5
Benzo(g,h,i)perylene, $\mu\text{g/L}$	2	<8	<5	<6.5
Benzo(k)fluoranthene, $\mu\text{g/L}$	2	<8	<5	<6.5

Table 2.2.85 (continued)

Parameter	Number of samples	Concentration		
		Max	Min	Av
Beryllium, mg/L	14	0.0024	<0.001	<0.0012
Bis(2-chloroethoxy)methane, µg/L	2	<8	<5	<6.5
Bis(2-chloroethyl)ether, µg/L	2	<8	<5	<6.5
Bis(2-chloroisopropyl)ether, µg/L	2	<8	<5	<6.5
Bis(2-ethylhexyl)phthalate, µg/L	2	<8	<5	<6.5
Boron, mg/L	14	1.1	0.040	0.2235
Bromide, mg/L	14	<2	<2	<2
Bromodichloromethane, µg/L	35	<5	<5	<5
Bromoform, µg/L	35	<5	<5	<5
Bromomethane, µg/L	35	<10	<10	<10
Butylbenzylphthalate, µg/L	2	<8	<5	<6.5
Cadmium, mg/L	14	0.0048	<0.002	<0.0024
Calcium, mg/L	14	130	33	79
Carbon tetrachloride, µg/L	35	19	<5	<6.4
Chemical oxygen demand (COD), mg/L	28	46	<5	<15
Chloride, mg/L	7	1740	177	905
Chlorobenzene, µg/L	35	<5	<5	<5
Chloroethane, µg/L	35	<10	<10	<10
Chloroform, µg/L	35	13	<5	<5.2
Chloromethane, µg/L	35	<10	<10	<10
Chromium, mg/L	14	0.041	<0.01	<0.015
Chrysene, µg/L	2	<8	<5	<6.5
Cis-1,3-dichloropropene, µg/L	35	<5	<5	<5
Cobalt, mg/L	14	<0.1	<0.1	<0.1
Copper, mg/L	14	0.41	<0.004	<0.109
Cyanide, mg/L	7	0.024	0.002	0.012
Di-n-butylphthalate, µg/L	2	<8	<5	<6.5
Di-n-octylphthalate, µg/L	2	<8	<5	<6.5
Dibenz(a,h)anthracene, µg/L	2	<8	<5	<6.5
Dibromochloromethane, µg/L	35	<5	<5	<6.5
Diethylphthalate, µg/L	2	<8	<5	<6.5
Dimethylphthalate, µg/L	2	<8	<5	<6.5
Dissolved solids, mg/L	28	6924	180	2837
Ethylbenzene, µg/L	35	<5	<5	<5
Fluoranthene, µg/L	2	<8	<5	<6.5
Fluorene, µg/L	2	<8	<5	<6.5
Fluoride, mg/L	28	124	0.3	25.6
Hexachlorobenzene, µg/L	2	<8	<5	<6.5
Hexachlorobutadiene, µg/L	2	<8	<5	<6.5
Hexachlorocyclopentadiene, µg/L	2	<8	<5	<6.5
Hexachloroethane, µg/L	2	<8	<5	<6.5
Indeno(1 2 3-cd)pyrene, µg/L	2	<8	<5	<6.5
Iron, mg/L	14	6.5	0.48	2.31
Isophorone, µg/L	2	<8	<5	<6.5
Total organic nitrogen, µg/L	7	0.73	<0.17	<0.43
Lead, mg/L	14	0.037	<0.004	<0.0183
Lithium, mg/L	14	0.059	0.0048	0.031
Magnesium, mg/L	14	21	11	15.4
Manganese, mg/L	14	0.15	0.041	0.089

Table 2.2.85 (continued)

Parameter	Number of samples	Concentration		
		Max	Min	Av
Surfactants	7	<0.2	<0.2	<0.2
Mercury, mg/L	14	0.001	<0.0002	<0.0004
Methylene chloride, µg/L	35	<5	<5	<5
Molybdenum, mg/L	14	0.038	<0.01	<0.014
N-nitroso-di-N-propylamine, µg/L	2	<8	<5	<6.5
N-nitrosodimethylamine, µg/L	2	<8	<5	<6.5
N-nitrosodiphenylamine, µg/L	2	<8	<5	<6.5
Naphthalene, µg/L	2	<8	<5	<6.5
Nickel, mg/L	14	0.15	<0.05	<0.0819
Niobium, mg/L	14	0.014	<0.007	<0.0088
Nitrate nitrogen, mg/L	14	2.4	<0.11	<1.18
Nitrobenzene, µg/L	2	<8	<5	<6.5
Oil and grease, mg/L	7	<2	<2	<2
Pentachlorophenol, µg/L	2	42	<25	<28
pH	49	9.0	6.4	
Phenanthrene, µg/L	2	<8	<5	<6.5
Phenol, µg/L	2	<8	<5	<6.5
Phenols, mg/mg/L	7	0.03	<0.003	<0.027
Phosphate (total)	7	10	1.2	5.9
Phosphorus, mg/L	14	0.8	<0.2	<0.24
Potassium, mg/l	14	9.8	2.5	7.26
Pyrene, µg/L	2	<8	<5	<6.4
Selenium, mg/L	7	<0.005	<0.005	<0.005
Silicon, mg/L	14	16	1	5.5
Silver, mg/L	14	<0.01	<0.01	<0.01
Sodium, mg/L	14	2500	11	1016
Strontium, mg/L	14	0.17	0.088	0.127
Sulfate, mg/L	7	1200	320	654
Sulfide, mg/L	7	2	<1	<1.2
Sulfite, mg/L	7	<2	<2	<2
Suspended solids, mg/L	28	33	6	12
Temperature, °C	49	100	9	14.8
Tetrachloroethene, µg/L	35	96	<5	<24
Thallium, mg/L	7	<0.01	<0.01	<0.01
Thorium, mg/L	14	<0.2	<0.2	<0.20
Tin, mg/L	7	<0.01	<0.01	<0.01
Titanium, mg/L	14	0.044	<0.003	<0.016
Toluene, µg/L	35	<5	<5	<5
Total organic carbon (TOC), mg/L	14	120	<5	<18.4
Total residual chlorine, mg/L	7	47	<0.01	<11.5
Trans-1 2-dichloroethene, µg/L	35	6	<5	<5
Trans-1 3-dichloropropene, µg/L	35	<5	<5	<5
Trichloroethene, µg/L	35	17	<5	<5.5
Uranium, mg/L	7	2.8	0.104	1.3
Vanadium, mg/L	14	<0.5	<0.5	<0.5
Vinyl chloride, µg/L	35	<10	<10	<10
Zinc, mg/L	14	0.46	0.035	0.11
Zirconium, mg/L	14	0.0093	<0.001	0.0024

Table 2.2.86. ORGDP K-1407-B pond toxicity end points during 1988

Month	Fathead minnows		<i>Ceriodaphnia</i>	
	Survival NOEC ^a (%)	Growth NOEC (%)	Survival NOEC (%)	Reproduction NOEC (%)
February	100	100	100	100
April	100	100	100	100
June	100	100	100	100
August	100	100	100	100
October	100	100	<i>b</i>	<i>b</i>
December ^c	100	100	12	<i>d</i>

^aNOEC = No observed effect concentration.

^bControls unacceptable.

^cConducted on K-1407-J.

^dNot applicable.

Table 2.2.87. ORGDP K-1407-E and K-1407-F pond toxicity end points during 1988

Month	Fathead minnows		<i>Ceriodaphnia</i>	
	Survival NOEC ^a (%)	Growth NOEC (%)	Survival NOEC (%)	Reproduction NOEC (%)
January	40	40	50	50
April	100	100	100	100
June	100	100	100	100
August	100	100	100	100
October	100	100	<50	<i>a</i>
December	100	100	50	100

^aNot applicable.

**Table 2.2.88. 1988 NPDES Permit Number TN 0002950
Discharge Point K-1407-E/F at ORGDP**

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
PCB (aroclor-1016), µg/L	4	<0.5	<0.5	<0.5	
PCB (aroclor-1221), µg/L	4	<0.5	<0.5	<0.5	
PCB (aroclor-1232), µg/L	4	<0.5	<0.5	<0.5	
PCB (aroclor-1242), µg/L	4	<0.5	<0.5	<0.5	
PCB (aroclor-1248), µg/L	4	<0.5	<0.5	<0.5	
PCB (aroclor-1254), µg/L	4	<1	<1	<1	
PCB (aroclor-1260), µg/L	4	<1	<1	<1	
Arsenic, mg/L	4	<0.005	<0.005	<0.005	
Cadmium, mg/L	4	<0.003	<0.003	<0.003	
Chromium, mg/L	4	<0.01	<0.01	<0.01	
Copper, mg/L	4	0.013	<0.004	<0.0085	
Iron, mg/L	4	0.68	0.66	0.67	
Lead, mg/L	4	0.05	<0.004	<0.0347	
Manganese, mg/L	4	0.2	0.093	0.131	
Oil and grease, mg/L	4	<2	<2	<2	
pH		9.0	6.6		
Selenium, mg/L	4	<0.005	<0.005	<0.005	
Silver, mg/L	4	<0.01	<0.01	<0.01	
Sulfate, mg/L	1	1100	914	1007.00	
Suspended solids, mg/L	4	10	7	8.00	
Temperature, °C	30	13.6	2.2	7.79	
Zinc, mg/L	4	<0.02	<0.02	<0.02	

^aNot applicable.

2.3 GROUNDWATER

Table 2.3.1. Constituents in groundwater at the Y-12 Plant site, 1988

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
<i>Beta-4 Security Pit</i>							
Barium, total, mg/L	6	6	2.3	0.17	0.72	1	1
Chromium, total, mg/L	5	6	0.21	<0.010	<0.076	0.05	2
Iron, total, mg/L	6	6	200.0	4.5	54.0	0.3	6
Lead, total, mg/L	1	6	0.10	<0.050	<0.10	0.05	1
Manganese, total, mg/L	6	6	17.0	0.39	4.3	0.05	6
pH, units	<i>a</i>	48	7.6	6.2	<i>a</i>	6.5-8.5	4
<i>Burial Grounds</i>							
Acetone, µg/L	7	111	65.0	<10.0	<27.0	<i>b</i>	<i>a</i>
Barium, total, mg/L	94	117	1.9	<0.10	<0.39	1	7
Benzene, µg/L	19	111	95.0	<5.0	<30.0	5	19
Cadmium, total, mg/L	26	117	0.090	<0.010	<0.018	0.01	9
Carbon disulfide, µg/L	2	111	36.0	<5.0	<20.0	<i>b</i>	<i>a</i>
Carbon tetrachloride, µg/L	4	111	76.0	<5.0	<30.0	5	4
Chloride, mg/L	113	117	46,000.0	<1.0	<600.0	250	15
Chloroethane, µg/L	8	111	180.0	<10.0	<99.0	<i>b</i>	<i>a</i>
Chloroform, µ/L	7	111	33.0	<5.0	<20.0	<i>b</i>	<i>a</i>
Chromium, total, mg/L	29	117	0.17	<0.010	<0.039	0.05	7
Copper, total, mg/L	15	24	6.6	<0.0040	<0.75	1	3
Dissolved solids, mg/L	117	117	5,950.0	68.0	670.0	500	31
Gross alpha, pCi/L	<i>a</i>	117	82.0	-340.0	-0.82	15	7
Gross beta, pCi/L	<i>a</i>	117	910.0	-46.0	43.0	50	21
Iron, total, mg/L	23	24	33.0	<0.0040	<2.6	0.3	17
Lead, total, mg/L	93	117	0.70	<0.10	<0.040	0.05	16
Manganese, total, mg/L	24	24	2.2	0.023	0.16	0.05	14
Methylene chloride, µg/L	17	111	99.0	<5.0	<30.0	<i>b</i>	<i>a</i>
pH, units	<i>a</i>	468	10.4	5.1	<i>a</i>	6.5-8.5	218
Radium, pCi/L	5	28	5.9	<2.7	<4.1	5	2
Sulfate, mg/L	111	116	340.0	<20.0	<24.0	250	3
Tetrachloroethene, µg/L	35	111	3,300.0	<5.0	<700.0	<i>b</i>	<i>a</i>
Toluene, µg/L	8	111	56.0	<5.0	<20.0	<i>b</i>	<i>a</i>
Trans-1,2-dichloroethene, µg/L	21	87	7,800.0	<5.0	<1,000.0	<i>b</i>	<i>a</i>
Trichloroethene, µg/L	32	111	3,700.0	<5.0	<400.0	5	31
Vinyl chloride, µg/L	15	111	2,400.0	<10.0	<520.0	2	15
Xylenes, µg/L	4	111	13.0	<5.0	<9.0	<i>b</i>	<i>a</i>
1,1-Dichloroethane, µg/L	22	111	5,500.0	<5.0	<1,000.0	<i>b</i>	<i>a</i>
1,1-Dichloroethene, µg/L	18	111	5,600.0	<5.0	<1,000.0	7	14
1,1,1-Trichloroethane, µg/L	15	111	4,900.0	<5.0	<1,000.0	200	6
1,1,2-Trichloroethane, µg/L	5	111	180.0	<5.0	<100.0	<i>b</i>	<i>a</i>
1,2-Dichloroethane, µg/L	9	111	100.0	<5.0	<50.0	5	9
1,2-Dichloroethene, total, µg/L	2	24	2,900.0	<5.0	<1,000.0	<i>b</i>	<i>a</i>
2-Butanone, µg/L	6	111	1,500.0	<10.0	<630.0	NR	NA

Table 2.3.1 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
<i>Burial Grounds—LLWDDD Lysimeter Demonstration Site</i>							
Dissolved solids, mg/L	2	2	1,160.0	258.0	710.0	500	1
Iron, total, mg/L	3	3	26.0	0.84	9.2	0.3	3
Lead, total, mg/L	1	3	0.069	<0.0040	<0.069	0.05	1
Manganese, total, mg/L	3	3	2.4	0.0085	0.81	0.05	i
pH, units	a	8	6.6	6.0	a	6.5–8.5	4
Radium, pCi/L	1	2	13.0	<2.7	<13.0	5	1
<i>Burial Grounds—LLWDDD Packaging</i>							
Cadmium, total, mg/L	2	14	4.3	<0.0030	<2.2	0.01	1
Chromium, total, mg/L	2	14	0.052	<0.010	<0.046	0.05	i
Dissolved solids, mg/L	14	14	564.0	102.0	240.0	500	1
Gross alpha, pCi/L	a	14	62.0	0.050	6.4	15	1
Gross beta, pCi/L	a	14	150.0	–0.92	25.0	50	3
Iron, total, mg/L	14	14	28.0	0.067	3.4	0.3	9
Lead, total, mg/L	6	14	0.071	<0.0040	<0.019	0.05	1
Manganese, total, mg/L	14	14	3.7	0.0097	0.40	0.05	6
pH, units	a	56	9.2	6.6	a	6.5–8.5	4
<i>Chestnut Ridge Security Pit</i>							
Carbon tetrachloride, µg/L	6	41	100.0	<5.0	<50.0	5	6
Gross alpha, pCi/L	a	41	23.0	–2.0	3.0	15	1
Gross beta, pCi/L	a	41	2,700.0	–0.82	82.0	50	4
Lead, total, mg/L	24	41	0.430	<0.0040	<0.045	0.05	4
pH, units	a	164	9.5	6.6	a	6.5–8.5	10
Radium, pCi/L	3	39	7.0	<2.7	<5.0	5	1
Tetrachloroethene, µg/L	24	41	180.0	<5.0	<40.0	b	a
Trans-1,2-dichloroethene, µg/L	3	30	27.0	<5.0	<20.0	b	a
Trichloroethene, µg/L	4	41	7.0	<5.0	<6.0	5	4
1,1-Dichloroethane, µg/L	23	41	300.0	<5.0	<70.0	b	a
1,1-Dichloroethene, µg/L	15	41	95.0	<5.0	<40.0	7	13
1,1,1-Trichloroethane, µg/L	30	41	990.0	<5.0	<200.0	200	9
<i>Chestnut Ridge Sediment Disposal Basin</i>							
Acetone, µg/L	1	34	20.0	<10.0	<20.0	b	a
Cadmium, total, mg/L	3	34	0.016	<0.0030	<0.0080	0.01	1
Chromium, total, mg/L	9	34	0.32	<0.010	<0.062	0.05	2
Copper, total, mg/L	15	34	11.0	<0.0040	<1.3	1	3
Gross alpha, pCi/L	a	34	330.0	–13.0	11.0	15	3
Gross beta, pCi/L	a	34	860.0	–50.0	50.0	50	5
Iron, total, mg/L	34	34	300.0	0.034	18.0	0.3	25
Lead, total, mg/L	27	34	3.4	<0.0040	<0.18	0.05	5
Manganese, total, mg/L	34	34	5.0	0.0033	0.40	0.05	20
Mercury, total, mg/L	5	34	0.015	<0.00020	<0.0050	0.002	2
pH, units	a	136	8.1	5.1	a	6.5–8.5	18
Radium, pCi/L	11	34	24.0	<2.7	7.6	5	4
Tetrachloroethene, µg/L	2	34	21.0	<5.0	20.0	b	a
Trans-1,2-dichloroethene, µg/L	1	24	8.0	<5.0	8.0	b	a
Trichloroethene, µg/L	2	34	16.0	<5.0	10.0	5	2
2-Butanone, µg/L	2	34	29.0	<10.0	28.0	b	a

Table 2.3.1 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
<i>East Chestnut Ridge Waste Pile</i>							
Gross beta, pCi/L	<i>a</i>	16	2.0 E2	-7.0	26.0	50	2
Iron, total, mg/L	14	16	4.4	<0.0040	<0.80	0.3	7
Manganese, total, mg/L	14	16	0.10	<0.0010	<0.023	0.05	3
pH, units	<i>a</i>	64	7.90	6.1	7.1	6.5-8.5	16
<i>Filled Coal Ash Pond</i>							
pH, units	<i>a</i>	28	9.3	6.5	<i>a</i>	6.5-8.5	8
<i>Industrial Landfill III</i>							
Coliform, col./100 mL	3	24	1,050.0	<1.0	<357.0	1	3
Gross alpha, pCi/L	<i>a</i>	24	18.0	-2.0	2.0	15	1
Gross beta, pCi/L	<i>a</i>	24	380.0	-1.0	43.0	50	5
Iron, total, mg/L	24	24	12.0	0.011	1.6	0.3	14
Manganese, total, mg/L	19	24	0.16	<0.0010	<0.039	0.05	4
<i>Industrial Landfill IV</i>							
Gross beta, pCi/L	<i>a</i>	14	66.0	0.62	11.0	50	1
Iron, total, mg/L	14	14	6.5	0.016	1.4	0.3	7
Manganese, total, mg/L	13	14	0.16	<0.0010	<0.034	0.05	3
<i>Kerr Hollow Quarry</i>							
Iron, total, mg/L	7	7	35.0	0.033	7.6	0.3	5
Manganese, total, mg/L	6	7	0.49	<0.0010	<0.16	0.05	4
<i>New Hope Pond</i>							
Acetone, µg/L	1	47	210.0	<10.0	<210.0	<i>b</i>	<i>a</i>
Carbon tetrachloride, µg/L	28	47	4,400.0	<5.0	<300.0	5	26
Chloroform, µg/L	20	47	620.0	<5.0	<50.0	<i>b</i>	<i>a</i>
Chromium, total, mg/L	12	48	0.054	<0.010	<0.021	0.05	1
Dissolved solids, mg/L	48	48	818.0	222.0	424.0	500	12
Gross alpha, pCi/L	<i>a</i>	48	190.0	-34.0	9.3	15	7
Gross beta, pCi/L	<i>a</i>	48	110.0	-31.0	13.0	50	4
Lead, total, mg/L	27	48	0.082	<0.0040	<0.017	0.05	2
Methylene chloride, µg/L	1	47	6.0	<5.0	<6.0	<i>b</i>	<i>a</i>
pH, units	<i>a</i>	192	9.0	6.4	<i>a</i>	6.5-8.5	12
Radium, pCi/L	2	48	5.7	<2.7	<4.2	5	1
Tetrachloroethene, µg/L	16	47	510.0	<5.0	<200.0	<i>b</i>	<i>a</i>
Trans-1,2-dichloroethene, µg/L	9	32	74.0	<5.0	<30.0	<i>b</i>	<i>a</i>
Trichloroethene, µg/L	11	47	110.0	<5.0	<60.0	5	11
Vinyl chloride, µg/L	2	47	11.0	<10.0	<11.0	2	2
1,2-Dichloroethene, total, µg/L	1	15	18.0	<5.0	<20.0	<i>b</i>	<i>a</i>

Table 2.3.1 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
<i>Oil Landfarm</i>							
Acetone, µg/L	3	81	24.0	<10.0	<16.0	<i>b</i>	<i>a</i>
Barium, total, mg/L	72	81	150.0	<0.10	<4.1	1	4
Benzene, µg/L	3	81	39.0	<5.0	<30.0	5	3
Cadmium, total, mg/L	7	81	0.020	<0.0020	<0.0070	0.01	1
Carbon tetrachloride, µg/L	9	81	12.0	<5.0	<8.0	5	8
Chloroethane, µg/L	1	81	20.0	<10.0	<20.0	<i>b</i>	<i>a</i>
Chloroform, µg/L	3	81	67.0	<5.0	<30.0	<i>b</i>	<i>a</i>
Chromium, total, mg/L	28	81	0.40	<0.010	<0.064	0.05	8
Dissolved solids, mg/L	81	81	942.0	138.0	493.0	500	41
Gross alpha, pCi/L	<i>a</i>	81	130.0	-360.0	-9.5	15	7
Gross beta, pCi/L	<i>a</i>	81	1,200.0	-5.0	31.0	50	16
Lead, total, mg/L	59	81	120.0	<0.0040	<2.1	0.05	8
Methylene chloride, µg/L	6	81	54.0	<5.0	<20.0	<i>b</i>	<i>a</i>
Nitrate-N, mg/L	50	81	120.0	<0.6	<20.0	10	24
pH, units	<i>a</i>	321	12.4	4.9	<i>a</i>	6.5-8.5	43
Sulfate, mg/L	80	81	530.0	<10.0	<40.0	250	2
Tetrachloroethene, µ/L	11	81	430.0	<5.0	<90.0	<i>b</i>	<i>a</i>
Trans-1,2-dichloroethene, µg/L	25	58	170.0	<5.0	<30.0	<i>b</i>	<i>a</i>
Trichloroethene, µg/L	48	81	460.0	<5.0	<90.0	5	46
Vinyl chloride, µg/L	4	81	25.0	<10.0	<18.0	2	4
1,1-Dichloroethane, µg/L	23	81	2,000.0	<5.0	<200.0	<i>b</i>	<i>a</i>
1,1-Dichloroethene, µg/L	12	81	620.0	<5.0	<100.0	7	7
1,1,1-Trichloroethane, µg/L	10	81	510.0	<5.0	<80.0	200	2
1,2-Dichloroethane, µg/L	2	81	27.0	<5.0	<20.0	5	2
1,2-Dichloroethene, total, µg/L	8	23	25.0	<5.0	<10.0	<i>b</i>	<i>a</i>
2-Butanone, µg/L	2	81	24.0	<10.0	<24.0	<i>b</i>	<i>a</i>
<i>Ravine Disposal Site</i>							
Barium, total, mg/L	5	5	2.3	0.15	0.66	1	1
Chromium, total, mg/L	3	5	0.36	<0.010	<0.14	0.05	1
Iron, total, mg/L	5	5	330.0	0.29	76.0	0.3	4
Lead, total, mg/L	1	5	0.38	<0.050	<0.38	0.05	1
Manganese, total, mg/L	5	5	24.0	0.091	5.7	0.05	5
pH, units	<i>a</i>	40	7.6	6.4	<i>a</i>	6.5-8.5	5

Table 2.3.1 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
<i>Rogers Quarry</i>							
Arsenic, total, mg/L	8	8	0.22	0.0067	0.097	0.05	4
Chloride, mg/L	14	14	510.0	4.0	40.0	250	1
Coliform, col./100 mL	2	8	2.0	<1.0	<2.0	1	2
Dissolved solids, mg/L	20	20	1,760.0	256.0	524.0	500	7
Fluoride, mg/L	8	8	5.0	0.3	2.0	4	1
Iron, total, mg/L	12	14	9.0	<0.0040	<1.3	0.3	4
Manganese, total, mg/L	13	14	0.24	<0.0010	<0.056	0.05	3
Selenium, total, mg/L	4	8	0.018	<0.0050	<0.014	0.01	3
<i>Rust Spoil Area</i>							
Coliform, col./100 mL	2	22	93.0	<1.0	<47.0	1	1
Dissolved solids, mg/L	22	22	1,160.0	268.0	744.0	500	18
Gross alpha, pCi/L	a	22	30.0	-17.0	3.9	15	3
Gross beta, pCi/L	a	22	2,100.0	-0.43	170.0	50	12
Iron, total, mg/L	22	22	8.0	0.022	1.6	0.3	12
Lead, total, mg/L	15	22	0.066	<0.0040	<0.017	0.05	1
Manganese, total, mg/L	20	22	1.3	<0.0010	<0.25	0.05	11
Nitrate-N, mg/L	22	22	61.0	0.3	20.0	10	17
pH, units	a	88	12.5	6.4	a	6.5-8.5	14
Radium, pCi/L	3	22	8.6	<2.7	<5.2	5	1
<i>S-2 Pond Site</i>							
Acetone, µg/L	2	6	22.0	<10.0	<18.0	b	a
Benzoic acid, µg/L	1	6	29.0	<25.0	<29.0	b	a
Bis(2-ethylhexyl)phthalate, µg/L	1	6	76.0	<5.0	<80.0	b	a
Cadmium, total, mg/L	6	6	6.5	0.22	3.0	0.01	6
Carbon tetrachloride, µg/L	6	6	58.0	12.0	34.0	5	6
Chloroform, µg/L	6	6	51.0	7.0	30.0	b	a
Copper, total, mg/L	6	6	150.0	0.61	69.0	1	3
Dissolved solids, mg/L	6	6	4,600.0	746.0	2,440.0	500	6
Gross alpha, pCi/L	a	6	95.0	-2.0	26.0	15	2
Gross beta, pCi/L	a	6	160.0	-250.0	-9.4	50	1
Iron, total, mg/L	6	6	0.38	0.027	0.15	0.3	1
Lead, total, mg/L	5	6	0.097	<0.0040	<0.052	0.05	3
Manganese, total, mg/L	6	6	47.0	5.4	25.0	0.05	6
Mercury, total, mg/L	5	6	0.0440	<0.00020	<0.018	0.002	3
Nitrate-N, mg/L	6	6	790.0	96.0	420.0	10	6
pH, units	a	24	6.3	5.0	a	6.5-8.5	24
Radium, pCi/L	5	6	38.0	<2.7	<22.0	5	5
Tetrachloroethene, µg/L	6	6	920.0	9.0	400.0	b	a
Trans-1,2-dichloroethene, µg/L	2	4	70.0	<5.0	70.0	b	a
Trichloroethene, µg/L	6	6	710.0	88.0	360.0	5	6
Zinc, total, mg/L	6	6	9.0	0.10	3.8	5	3
2,4-Dinitrophenol, µg/L	1	6	43.0	<25.0	<43.0	b	a

Table 2.3.1 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
<i>S-3 Ponds Site</i>							
Acetone, µg/L	17	104	310.0	<10.0	<88.0	<i>b</i>	<i>a</i>
Barium, total, mg/L	83	104	230.0	<0.10	<24.0	1	56
Bromoform, µg/L	4	104	11.0	<5.0	<10.0	<i>b</i>	<i>a</i>
Cadmium, total, mg/L	53	104	7.6	<0.0030	<0.49	0.01	41
Carbon disulfide, µg/L	1	104	9.0	<5.0	<9.0	<i>b</i>	<i>a</i>
Chloride, mg/L	97	103	1,340.0	<1.0	<100.0	250	19
Chloroform, µg/L	30	104	27.0	<5.0	<10.0	<i>b</i>	<i>a</i>
Chromium, total, mg/L	26	104	0.38	<0.010	<0.045	0.05	3
Dissolved solids, mg/L	103	103	82,400.0	46.0	10,600.0	500	75
Fluoride, mg/L	71	103	9.0	<0.1	<2.0	4	17
Gross alpha, pCi/L	<i>a</i>	103	15,200.0	-240.0	410.0	15	43
Gross beta, pCi/L	<i>a</i>	103	78,900.0	-720.0	3,800.0	50	55
Iron, total, mg/L	6	6	4.9	0.066	2.6	0.3	5
Lead, total, mg/L	63	104	0.13	<0.0040	<0.016	0.05	2
Manganese, total, mg/L	6	6	0.18	0.017	0.11	0.05	5
Mercury, total, mg/L	22	104	0.13	<0.00020	<0.026	0.002	8
Methylene chloride, µg/L	27	104	61.0	<5.0	<20.0	<i>b</i>	<i>a</i>
Nitrate-N, mg/L	85	103	100,000.0	<0.1	<4,000.0	10	68
pH, units	<i>a</i>	400	10.0	3.4	<i>a</i>	6.5-8.5	223
Radium, pCi/L	52	102	59.0	<24.0	<12.0	5	32
Sulfate, mg/L	63	103	820.0	<200.0	<90.0	250	6
Tetrachloroethene, µg/L	25	104	1,700.0	<5.0	<200.0	<i>b</i>	<i>a</i>
Toluene, µg/L	3	104	11.0	<5.0	<8.0	<i>b</i>	<i>a</i>
Trans-1,2-dichloroethene, µg/L	2	77	8.0	<5.0	<7.0	<i>b</i>	<i>a</i>
Trichloroethene, µg/L	9	104	10.0	<5.0	<8.0	5	9
1,1-Dichloroethane, µg/L	1	104	5.0	<5.0	<5.0	<i>b</i>	<i>a</i>
1,1-Dichloroethene, µg/L	1	104	8.0	<5.0	<8.0	7	1
1,2-Dichloroethene, total, µg/L	1	27	7.0	<5.0	<7.0	<i>b</i>	<i>a</i>
2-Butanone, µg/L	5	104	84.0	<10.0	<35.0	<i>b</i>	<i>a</i>
<i>S-3 Ponds Site Salvage Yard</i>							
Acetone, µg/L	4	22	57.0	<10.0	<35.0	<i>b</i>	<i>a</i>
Barium, total, mg/L	22	22	160.0	0.19	30.0	1	8
Benzene, µg/L	2	22	170.0	<5.0	<100.0	5	2
Cadmium, total, mg/L	7	22	0.21	<0.0020	<0.073	0.01	4
Chloroform, µg/L	5	22	18.0	<5.0	<10.0	<i>b</i>	<i>a</i>
Chromium, total, mg/L	7	22	0.062	<0.010	<0.024	0.05	1
Dissolved solids, mg/L	22	22	75,000.0	278.0	2.20 E4	500	14
Gross alpha, pCi/L	<i>a</i>	22	1,500.0	-0.97	170.0	15	14
Gross beta, pCi/L	<i>a</i>	22	2,000.0	-380.0	410.0	50	14
Iron, total, mg/L	1	1	0.97	0.97	0.97	0.3	1
Manganese, total, mg/L	1	1	1.2	1.2	1.2	0.05	1
Methylene chloride, µg/L	6	22	45.0	<5.0	<20.0	<i>b</i>	<i>a</i>
Nitrate-N, mg/L	21	22	26,000.0	<4.0	<4,000.0	10	13
pH, units	<i>a</i>	79	8.4	5.1	<i>a</i>	6.5-8.5	37
Radium, pCi/L	12	21	73.0	<2.7	<36.0	5	8
Sulfate, mg/L	13	22	250.0	200.0	40.0	250	1
Tetrachloroethene, µg/L	2	22	36.0	<5.0	<30.0	<i>b</i>	<i>a</i>
Xylenes, µg/L	1	22	6.0	<5.0	<6.0	<i>b</i>	<i>a</i>

Table 2.3.1 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
<i>S-3 Ponds Site Salvage Yard/OSDS</i>							
Bis(2-ethylhexyl)phthalate, µg/L	2	12	46.0	<5.0	<40.0	<i>b</i>	<i>a</i>
Dissolved solids, mg/L	12	12	690.0	110.0	288.0	500	2
Gross beta, pCi/L	<i>a</i>	12	148.0	-57.0	19.0	50	1
Iron, total, mg/L	12	12	36.0	0.16	4.1	0.3	9
Lead, total, mg/L	6	12	0.055	<0.0040	<0.017	0.05	1
Manganese, total, mg/L	12	12	3.0	0.011	0.35	0.05	8
Methylene chloride, µg/L	1	12	6.0	<5.0	<6.0	<i>b</i>	<i>a</i>
pH, units	<i>a</i>	48	8.1	6.3	<i>a</i>	6.5-8.5	5
Radium, pCi/L	4	12	5.4	<2.7	<4.1	5	1
Tetrachloroethene, µg/L	1	11	320.0	<5.0	<300.0	<i>b</i>	<i>a</i>
Trans-1,2-dichloroethene, µg/L	2	12	30.0	<5.0	<30.0	<i>b</i>	<i>a</i>
Trichloroethene, µg/L	2	12	33.0	<5.0	<30.0	5	2
1,1-Dichloroethene, µg/L	2	12	10.0	<5.0	<9.0	7	1
<i>Spoil Area 1</i>							
Coliform, col./100 mL	2	23	3.0	<1.0	<2.0	1	1
Dissolved solids, mg/L	23	23	564.0	210.0	328.0	500	1
Gross beta, pCi/L	<i>a</i>	23	103.0	-17.0	34.0	50	7
Iron, total, mg/L	21	23	24.0	<0.0040	<1.3	0.3	5
Lead, total, mg/L	9	23	0.52	<0.0040	<0.069	0.05	1
Manganese, total, mg/L	18	23	0.20	<0.0010	<0.049	0.05	5
Nitrate-N, mg/L	16	23	26.0	<0.1	<7.0	10	5
<i>United Nuclear Site</i>							
Chromium, total, mg/L	5	20	0.80	<0.010	<0.42	0.05	4
Iron, total, mg/L	20	20	3.0	0.037	0.60	0.3	7
Manganese, total, mg/L	15	20	0.068	<0.0010	<0.021	0.05	3
Radium, pCi/L	2	15	12.0	<2.7	<7.4	5	1

^aNot applicable.^bNo reference.

The following references are referred to in Tables 2.3.2-2.3.12.

REFERENCES

1. RCRA 40 CFR Pt. 265 Appendix 3.
2. Safe Drinking Water Act—National Primary Drinking Water Regulations, 40 CFR Pt. 141, as amended.
3. Safe Drinking Water Act—National Secondary Drinking Water Regulations, 40 CFR Pt. 143, as amended.
4. State of Tennessee Hazardous Waste Regulations TN 1200-1-11-05, Appendix 05/B.
5. DOE Order 5400.xx. Derived Concentration Guides (DCGs) for Air and Water.
6. National Primary Drinking Water Regulations; Synthetic Organic Chemicals, US EPA, Federal Register, July 8, 1987, pp. 25690-25717.

Table 2.3.2. Primary drinking water parameters monitored in groundwater during 1988

Parameter	Reference ^a	Applicable standards ^b (mg/L)
As	1, 2, 4	0.05
Ba	1, 2, 4	1.0
Cd	1, 2, 4	0.010
Cr	1, 2, 4	0.05
F	1, 2, 3, 4	4.0, 2.0 ^c , 1.4-2.4 ^d
Pb	1, 2, 4	0.05
Nitrate	1, 2, 4	10
Hg	1, 2, 4	0.002
Se	1, 2, 4	0.01
Ag	1, 2, 4	0.05
Endrin	1, 2, 4	0.0002
Lindane	1, 2, 4	0.004
Methoxychlor	1, 2, 4	0.1
Toxaphene	1, 2, 4	0.005
2,4-D	1, 2, 4	0.1
2,4,5-TP Silvex	1, 2, 4	0.01
²²⁶ Ra and ²²⁸ Ra (pCi/L)	1, 2, 4	5
Gross alpha (pCi/L)	1, 2, 4	15
Gross beta (mrem/year)	1, 2, 4	4
Coliform bacteria (col./100 mL)	1, 2, 4	1 ^b

^aReferences for applicable standards are listed on page 2.3-8.

^bMaximum contaminant level.

^cSecondary maximum contaminant level.

^dRCRA 40 CFR Pt. 265 Appendix B and State of Tennessee Hazardous Waste Regulations.

Handwritten notes and calculations:

- us .56
- 0.056
- 1.9
- 90
- 5r
- GD 30/c ?
- GB 30/c ?
- DCG ?
- 75
- Tray

Table 2.3.3. Parameters establishing groundwater quality monitored during 1988

Parameter	Reference	Applicable ^a standards (mg/L)
Chloride	3	250
Fe	3	0.3
Mn	3	0.05
Phenols		None
Na		None
Sulfate	3	250

^aSecondary maximum contaminant level.

Table 2.3.4. Indicator parameters monitored in groundwater semiannually in 1988

Parameter	Reference	Applicable standards
Total organic carbon (mg/L)		None
Total organic halogen (mg/L)		None
Specific conductance (mS/cm)		None
pH	3	6.5–8.5 ^a

^aSecondary maximum contaminant level.

Table 2.3.5. Typical inductively coupled argon plasma (ICAP) metals scan of groundwater (results used for metals analysis and site characterization studies)

Parameter	Reference	Applicable standards (mg/L)
Al		None
Sb		None
Ba	1, 2, 4	1.0 ^a
Be		None
B		None
Cd	1, 2, 4	0.01 ^a
Ca		None
Cr	1, 2, 4	0.05 ^a
Co		None
Cu	3	1.0 ^b
Pb	3	0.3 ^b
Li		None
Mg		None
Mn	3	0.05 ^b
Mo		None
Ni		None
Nb		None
P		None
K		None
Si		None
Ag	1, 2, 4	0.05 ^a
Na		None
Sr		None
Th		None
Ti		None
V		None
Zn	3	5.0 ^b
Zr		None

^aMaximum contaminant level.

^bSecondary maximum contaminant level.

Table 2.3.6. Typical metals sought in groundwater by atomic absorption (AA) spectroscopy (results used to fulfill required monitoring and in characterization studies)

Parameter	Reference	Applicable ^a standards (mg/L)
Sb		None
As	1, 2, 4,	0.05
Ba	1, 2, 4	1.00
Be		None
Cd	1, 2, 4	0.010
Cr	1, 2, 4	0.05
Cu	3	1
Pb	1, 2, 4	0.05
Hg	1, 2, 4	0.002
Ni		None
Se	1, 2, 4	0.01
Ag	1, 2, 4	0.05
Tl		None
Zn	3	5.0 ^b

^aMaximum contaminant level.

^bSecondary maximum contaminant level.

Table 2.3.7. Typical anions sought in groundwater
Results used for required monitoring and in
characterization studies

Parameter	Reference	Applicable standards (mg/L)
Chloride	3	250 ^a
Fluoride	2, 3	4.0 ^a , 2.0 ^b , 1.4–2.4 ^c
Nitrate	1, 2, 4	10 ^b
Nitrite		1 ^d
Phosphate		None
Sulfate	3	250 ^b

^aMaximum contaminant level.

^bSecondary maximum contaminant level.

^cState of Tennessee Hazardous Waste Regulations, TN 1200-1-11.05, Appendix 0.05/B.

^dProposed by Y-12 Environmental Management Department for required monitoring and compliance limit.

Table 2.3.8. Volatile organics (hazardous substance list) sought in groundwater

Parameter	Reference	Chemical Abstracts Service No.	Applicable ^a standards (mg/L)
Chloromethane		74-87-3	None
Bromomethane		74-83-9	None
Vinyl chloride	6	75-01-4	0.002
Chloroethane		75-00-3	None
Methylene chloride		75-09-2	None
Acetone		67-64-1	None
Carbon disulfide		75-15-0	None
1,1-dichloroethene	6	75-35-4	0.007
1,1-dichloroethane		75-35-3	None
1,2-dichloroethene (total)		540-59-0	None
Chloroform		67-66-3	None
1,2-dichloroethane	6	107-06-2	0.005
2-butanone		78-93-3	None
1,1,1-trichloroethane	6	71-55-6	0.20
Carbon tetrachloride	6	56-23-5	0.005
Vinyl acetate		108-05-4	None
Bromodichloromethane		75-27-4	None
1,1,2,2-tetrachloroethane		79-34-5	None
1,2-dichloropropane		78-87-5	None
Cis-1,3,-dichloropropene		10061-01-5	None
Trichloroethene	6	79-01-6	0.005
Dibromochloromethane		124-48-1	None
1,1,2-trichloroethane		79-00-5	None
Benzene	6	71-43-2	0.005
trans-1,3-dichloropropene		10061-02-6	None
Bromoform		75-25-2	None
2-hexanone		591-78-6	None
4-methyl-2-pentanone		108-10-1	None
Tetrachloroethene		127-18-4	None
Toluene		108-88-3	None
Chlorobenzene		108-90-7	None
Ethyl benzene		100-41-4	None
Styrene		100-42-5	None
Xylenes (total)		133-02-7	None

^aMaximum contaminant level effective 1/9/87.

**Table 2.3.9. Pesticides and polychlorinated biphenyls
(hazardous substance list) sought in groundwater**

Parameter	References	Chemical Abstracts Service No.	Applicable standards ($\mu\text{g/L}$)
Alpha-BHC		319-84-6	None
Beta-BHC		319-85-7	None
Delta-BHC		319-86-8	None
Gamma-BHC (Lindane)		58-89-9	None
Heptachlor		76-44-8	None
Aldrin		309-00-2	None
Heptachlor epoxide		1024-57-3	None
Endrin		72-20-8	None
Dieldrin		60-57-1	None
4,4'-DDE		72-55-9	None
Endosulfan I		959-98-8	0.0002
Endosulfan II		33213-65-9	None
4,4'-DDD		72-54-8	None
Endosulfan sulfate		1031-07-8	None
4,4'-DDT		50-29-3	None
Endrin ketone		53494-70-5	None
Methoxychlor		72-43-5	0.1
Alpha-chlordane		5103-71-9	None
Gamma-chlordane		5103-74-2	None
Toxaphene		8001-35-2	0.005
Aroclor-1016		12674-11-2	None
Aroclor-1221		11104-28-2	None
Aroclor-1232		11141-16-5	None
Aroclor-1242		53469-21-9	None
Aroclor-1248		12672-29-6	None
Aroclor-1254		11097-69-1	None
Aroclor-1260		11096-82-5	None

**Table 2.3.10. Base/neutral/acid extractable organics
(hazardous substance list) sought in groundwater**

Parameter	Reference	Chemical Abstracts Service No.	Applicable ^a standards (mg/L)
Phenol		108-95-2	None
bis(2-chloroethyl) ether		111-44-4	None
2-chlorophenol		95-57-8	None
1,3-dichlorobenzene		541-73-1	None
1,4-dichlorobenzene	6	106-46-7	0.075
Benzyl alcohol		100-51-6	None
1,2-dichlorobenzene		95-50-1	None
2-methylphenol		95-48-7	None
bis(2-chloroisopropyl)ether		39638-32-9	None
4-methylphenol		106-44-5	None
N-Nitroso-dipropylamine		621-64-7	None
Hexachloroethane		67-72-1	None
Nitrobenzene		98-95-3	None
Isophorone		78-59-1	None
2-nitrophenol		88-75-5	None
2,4-dimethylphenol		105-67-9	None
Benzoic acid		65-85-0	None
bis(2-chloroethoxy) methane		111-91-1	None
2,4-dichlorophenol		120-83-2	None
1,2,4-trichlorobenzene		120-82-1	None
Naphthalene		91-20-3	None
4-chloroaniline		106-47-8	None
Hexachlorobutadiene		87-68-3	None
4-chloro-3-methylphenol (para-chloro-meta-cresol)		59-50-7	None
2-methylnaphthalene		91-57-6	None
Hexachlorocyclopentadiene		77-47-4	None
2,4,6-trichlorophenol		88-06-2	None
2,4,5-trichlorophenol		95-95-4	None
2-chloronaphthalene		91-58-7	None
2-nitroaniline		88-74-4	None
Dimethyl phthalate		131-11-3	None
Acenaphthylene		208-96-8	None
2,6-dinitrotoluene		606-20-2	None
3-nitroaniline		99-09-2	None
Acenaphthene		83-32-9	None
2,4-dinitrophenol		51-28-5	None
4-nitrophenol		100-02-7	None
Dibenzofuran		132-64-9	None
2,4-dinitrotoluene		121-14-2	None
Diethylphthalate		84-66-2	None
4-chlorophenyl phenyl ether		7005-72-3	None
Fluorene		86-73-7	None
4-nitroaniline		100-01-6	None
4,6-dinitro-2-methylphenol		534-52-1	None
N-nitrosodiphenylamine		86-30-6	None
4-bromophenyl phenyl ether		101-55-3	None
Hexachlorobenzene		118-74-1	None
Pentachlorophenol		87-86-5	None
Phenanthrene		85-01-8	None

Table 2.3.10 (continued)

Parameter	Reference	Chemical Abstracts Service No.	Applicable ^a standards (mg/L)
Anthracene		120-12-7	None
Di- <i>n</i> -butylphthalate		84-74-2	None
Fluoranthene		206-44-0	None
Pyrene		129-00-0	None
Butyl benzyl phthalate		85-68-7	None
3,3'-dichlorobenzidine		91-94-1	None
Benzo[<i>a</i>]anthracene		56-55-3	None
Chrysene		218-01-9	None
bis(2-ethylhexyl)phthalate		117-81-7	None
Di- <i>n</i> -octyl phthalate		117-84-0	None
Benzo[<i>b</i>]fluoranthene		205-99-2	None
Benzo[<i>k</i>]fluoranthene		207-08-9	None
Benzo[<i>a</i>]pyrene		50-32-8	None
Indeno(1,2,3- <i>cd</i>)pyrene		193-39-5	None
Dibenz[<i>a,h</i>]anthracene		53-70-3	None
Benzo[<i>g,h,i</i>]perylene		191-24-2	None

^aMaximum contaminant level effective 1/9/89.

Table 2.3.11. Radionuclides and radioactive metals sought in groundwater

Parameter	Reference	Applicable standards ^a (pCi/L)
Gross alpha radiation	1, 2, 4	15
Gross beta radiation (mrem/yr)	1, 2, 4	4 ^b
Gross gamma radiation		None
²²⁶ Ra and ²²⁸ Ra	1, 2, 4	5
¹³⁷ Cs	5	3,000
⁹⁰ Sr	5, 2	1,000; 8.0
⁶⁰ Co	5	10,000
Tritium	5, 2	2,000,000; 20,000
⁹⁹ Tc	5	100,000
²³⁹ Pu	5	30
²³⁵ U	5	600
Total uranium (mg/L)		None

^aMaximum contaminant level.

^bMaximum contaminant level in the absence of ⁹⁰Sr and alpha emitters = 1,000 pCi/L.

Table 2.3.12. Other typical parameters that may be included in groundwater studies

Parameter	Reference	Applicable standards (mg/L)
Alkalinity (CO ₃)		None
Alkalinity (HCO ₃)		None
Total phosphorus		None
Solids:		
Total		None
Suspended		None
Dissolved	3	500
Turbidity (JTU)	2	5
Total Kjeldahl nitrogen		None
Ammonia (N)		None
Chemical oxygen demand		None
MBAS		None

Table 2.3.13. Constituents in the WAG 1 groundwater at ORNL,^a June–December 1988

Parameter	No. detected/ No. of samples	Concentration ^b		Average of values above the detection limit	Reference value ^c	No. of values exceeding reference
		Max	Min			
<i>Perimeter wells</i>						
Anions (mg/L)						
Fluoride	6/17	3.8	<1.0	1.6	1.4	2
Field measurements						
Conductivity (mS/cm)	119/119	1.1	0.24	0.63	<i>d</i>	<i>e</i>
Temperature (°C)	119/119	32	10	15	<i>d</i>	<i>e</i>
pH (standard units)	119/119	9.2	6.7	<i>e</i>	6.5 8.5	8
Metals (mg/L)						
Aluminum, total	17/17	2.1	0.095	0.53	<i>d</i>	<i>e</i>
Arsenic, total	1/17	0.050	<0.010	0.050	0.050	1
Beryllium, total	9/17	0.0030	<0.00030	0.0014	<i>d</i>	<i>e</i>
Boron, total	4/17	0.77	<0.080	0.50	<i>d</i>	<i>e</i>
Calcium, total	17/17	200	1.2	98	<i>d</i>	<i>e</i>
Cobalt, total	2/17	0.0034	<0.0030	0.0032	<i>d</i>	<i>e</i>
Iron, total	17/17	15	0.050	2.3	0.30	12
Magnesium, total	17/17	26	0.43	16	<i>d</i>	<i>e</i>
Manganese, total	16/17	6.5	<0.010	1.3	0.050	11
Nickel, total	3/17	0.026	<0.0050	0.015	<i>d</i>	<i>e</i>
Silicon, total	17/17	6.9	3.4	5.1	<i>d</i>	<i>e</i>
Sodium, total	17/17	260	3.5	42	<i>d</i>	<i>e</i>
Strontium, total	17/17	2.5	0.056	0.64	<i>d</i>	<i>e</i>
Titanium, total	3/17	0.045	<0.020	0.029	<i>d</i>	<i>e</i>
Vanadium, total	16/17	0.014	<0.0040	0.011	<i>d</i>	<i>e</i>
Miscellaneous						
Fecal coliform (col./100 mL)	2/17	3.0	<1.0	3.0	1.0	2
Turbidity (NTU)	17/17	55	0.18	9.1	<i>d</i>	<i>e</i>
Radioactivity measurements (pCi/L)						
⁶⁰ Co	17/17	6.5	−5.9	0.57	5,000	<i>e</i>
¹³⁷ Cs	17/17	5.9	−3.8	1.0	3,000	<i>e</i>
Gross alpha	17/17	230	0	16	15	1
Gross beta	17/17	18,000	0	1,100	<i>d</i>	<i>e</i>
Radioactive strontium, total	17/17	7,600	0.54	450	8.1	4
Radium, total	17/17	2.4	0	0.86	5.1	<i>e</i>
Tritium	17/17	54,000	−430	5,100	20,000	1
Extractable organics (mg/L)						
Organic carbon, total	68/68	4.4	0.60	1.7	<i>d</i>	<i>e</i>
Organic halides, total	43/75	0.16	0.00090	0.037	<i>d</i>	<i>e</i>

Table 2.3.13 (continued)

Parameter	No. detected/ No. of samples	Concentration ^b		Average of values above the detection limit	Reference value ^c	No. of values exceeding reference
		Max	Min			
<i>Upgradient wells</i>						
Field measurements						
Conductivity (mS/cm)	42/42	0.59	0.33	0.47	<i>d</i>	<i>e</i>
Temperature (°C)	42/42	17	10	14	<i>d</i>	<i>e</i>
pH (standard units)	42/42	8.2	7.0	<i>e</i>	6.5–8.5	<i>e</i>
Metals (mg/L)						
Aluminum, total	6/6	2.1	0.26	0.85	<i>d</i>	<i>e</i>
Beryllium, total	5/6	0.0028	<0.00030	0.0020	<i>d</i>	<i>e</i>
Boron, total	3/6	0.31	<0.080	0.20	<i>d</i>	<i>e</i>
Calcium, total	6/6	130	44	82	<i>d</i>	<i>e</i>
Iron, total	6/6	1.4	0.080	0.57	0.30	3
Magnesium, total	6/6	29	10	25	<i>d</i>	<i>e</i>
Manganese, total	6/6	0.060	0.010	0.040	0.050	3
Nickel, total	4/6	0.0091	<0.0050	0.0068	<i>d</i>	<i>e</i>
Silicon, total	6/6	6.8	3.6	5.7	<i>d</i>	<i>e</i>
Sodium, total	6/6	26	4.0	13	<i>d</i>	<i>e</i>
Strontium, total	6/6	1.7	0.13	0.70	<i>d</i>	<i>e</i>
Titanium, total	5/6	0.056	<0.020	0.030	<i>d</i>	<i>e</i>
Vanadium, total	6/6	0.016	0.0084	0.013	<i>d</i>	<i>e</i>
Miscellaneous						
Turbidity (NTU)	6/6	9.3	0.33	3.6	<i>d</i>	<i>e</i>
Radioactivity measurements (pCi/L)						
⁶⁰ Co	6/6	4.1	–4.9	0.18	5,000	<i>e</i>
¹³⁷ Cs	6/6	1.6	–2.2	–0.14	3,000	<i>e</i>
Gross alpha	6/6	4.6	0	1.4	15	<i>e</i>
Gross beta	6/6	4.9	0	1.8	<i>d</i>	<i>e</i>
Radioactive strontium, total	6/6	6.8	–1.4	2.7	8.1	<i>e</i>
Radium, total	6/6	2.2	0.27	1.0	5.1	<i>e</i>
Tritium	6/6	2,200	–650	440	20,000	<i>e</i>
Extractable organics (mg/L)						
Organic carbon, total	24/24	1.3	0.80	1.1	<i>d</i>	<i>e</i>
Organic halides, total	4/24	0.094	<0.0050	0.065	<i>d</i>	<i>e</i>

^aSee Fig. 2.3.5 in Vol. 1.

^bData qualifiers (organics): U = undetected; B = present in blank; J = below detection limit, but estimated; E = concentration exceeds the calibration range of the instrument. Data qualifiers (inorganics): U = undetected; B = value < contract-required detection limit > instrument detection limit; E = value is estimated because of the presence of interference.

^cSee Table 2.3.2 in Vol. 2 for more information.

^dNo reference.

^eNot applicable.

Table 2.3.14. Constituents in the WAG 6 groundwater at ORNL,^a June–December 1988

Parameter	No. detected/ No. of samples	Concentration ^b		Average of values above the detection limit	Reference value ^c	No. of values exceeding reference
		Max	Min			
<i>Site characterization wells</i>						
Field measurements						
Conductivity (mS/cm)	112/112	0.91	0.050	0.41	<i>d</i>	<i>e</i>
Temperature (°C)	112/112	17	14	16	<i>d</i>	<i>e</i>
pH (standard units)	112/112	7.4	6.4	<i>e</i>	6.5–8.5	1
Metals (mg/L)						
Aluminum, total	16/16	0.69	0.097	0.45	<i>d</i>	<i>e</i>
Barium, dissolved	4/16	3.4	<1.0	2.2	1.0	4
Barium, total	4/16	3.3	<1.0	2.1	1.0	4
Beryllium, total	16/16	0.0045	0.0020	0.0030	<i>d</i>	<i>e</i>
Boron, total	2/16	0.20	<0.080	0.16	<i>d</i>	<i>e</i>
Calcium, total	16/16	200	55	130	<i>d</i>	<i>e</i>
Cobalt, total	3/16	0.013	<0.0020	0.0078	<i>d</i>	<i>e</i>
Iron, dissolved	10/16	35	<0.050	7.5	0.30	8
Iron, total	16/16	38	0.10	5.3	0.30	10
Magnesium, total	16/16	31	8.3	16	<i>d</i>	<i>e</i>
Manganese, dissolved	16/16	11	0.010	1.6	0.050	13
Manganese, total	16/16	11	0.020	1.7	0.050	15
Nickel, total	4/16	0.020	<0.0060	0.012	<i>d</i>	<i>e</i>
Silicon, total	16/16	12	5.8	9.5	<i>d</i>	<i>e</i>
Sodium, dissolved	16/16	12	4.7	7.1	<i>d</i>	<i>e</i>
Sodium, total	16/16	12	4.4	7.3	<i>d</i>	<i>e</i>
Strontium, total	16/16	0.41	0.13	0.22	<i>d</i>	<i>e</i>
Vanadium, total	16/16	0.015	0.0063	0.010	<i>d</i>	<i>e</i>
Miscellaneous						
Alkalinity, as CaCO ₃	16/16	550	140	340	<i>d</i>	<i>e</i>
Fecal coliform (col./100 mL)	1/16	25	<1.0	25	1.0	1
Turbidity (NTU)	16/16	36	0.18	7.7	<i>d</i>	<i>e</i>
Radioactivity measurements (pCi/L)						
⁶⁰ Co	15/16	7.0	–19	0.20	5,000	<i>e</i>
¹³⁷ Cs	15/16	5.9	–2.7	1.0	3,000	<i>e</i>
Gross alpha	16/16	15	0	3.0	15	<i>e</i>
Gross beta	16/16	160	1.1	20	<i>d</i>	<i>e</i>
Radioactive strontium, total	16/16	51	–1.6	5.8	8.1	3
Radium, total	16/16	1.6	0	0.53	5.1	<i>e</i>
Tritium	16/16	4,300,000	–380	930,000	20,000	12
Extractable organics (mg/L)						
Bis(2-ethylhexyl)phthalate	4/16	<0.011	0.00080(J)	0.0065	<i>d</i>	<i>e</i>
Di-n-butylphthalate	4/16	<0.011	0.00060(J)	0.0013	<i>d</i>	<i>e</i>
Naphthalene	2/16	0.35	0.0010(J)	0.19	<i>d</i>	<i>e</i>
Organic carbon, total	60/64	10	<0.50	3.4	<i>d</i>	<i>e</i>
Organic halides, total	32/64	1.2	0.0033	0.30	<i>d</i>	<i>e</i>
Recoverable phenolics, total	4/16	0.017	<0.0010	0.0080	<i>d</i>	<i>e</i>
Volatile organics (mg/L)						
1,1-Dichloroethane	4/16	0.013	<0.0050	0.0090	<i>d</i>	<i>e</i>
1,2-Dichloroethene	4/16	0.18	0.0040(J)	0.094	<i>d</i>	<i>e</i>
Acetone	1/16	0.016(B)	0.0020(J)	0.016	<i>d</i>	<i>e</i>
Benzene	5/16	0.11	<0.0050	0.048	0.0050	4
Chloroform	1/16	0.012	0.0010(J)	0.012	<i>d</i>	<i>e</i>
Ethylbenzene	2/16	0.22	0.0020(J)	0.16	<i>d</i>	<i>e</i>
Methylene chloride	1/16	0.0070(B)	0.0010(J)	0.0070	<i>d</i>	<i>e</i>

Table 2.3.14 (continued)

Parameter	No. detected/ No. of samples	Concentration ^b		Average of values above the detection limit	Reference value ^c	No. of values exceeding reference
		Max	Min			
Toluene	2/16	1.2	0.0010(J)	0.81	<i>d</i>	<i>e</i>
Trichloroethene	2/16	1.3(E)	<0.0050	1.2	0.0050	2
Vinyl chloride	2/16	0.060	<0.010	0.053	0.0020	16
Xylene, total	2/16	1.7	0.0030(J)	1.2	<i>d</i>	<i>e</i>
<i>Perimeter wells</i>						
Field measurements						
Conductivity (mS/cm)	186/186	0.91	0.010	0.29	<i>d</i>	<i>e</i>
Temperature (°C)	186/186	17	13	15	<i>d</i>	<i>e</i>
pH (standard units)	186/186	7.6	4.9	<i>e</i>	6.5-8.5	32
Metals (mg/L)						
Aluminum, total	23/26	0.61	<0.050	0.31	<i>d</i>	<i>e</i>
Beryllium, total	26/26	0.0040	0.00033	0.0024	<i>d</i>	<i>e</i>
Calcium, total	26/26	170	2.8	81	<i>d</i>	<i>e</i>
Iron, total	26/26	3.2	0.090	0.47	0.30	11
Magnesium, total	26/26	31	0.51	13	<i>d</i>	<i>e</i>
Manganese, dissolved	23/26	0.16	<0.010	0.048	0.050	8
Manganese, total	25/26	0.24	<0.010	0.061	0.050	15
Nickel, total	6/26	0.018	<0.0060	0.011	<i>d</i>	<i>e</i>
Silicon, total	26/26	12	3.9	8.1	<i>d</i>	<i>e</i>
Sodium, dissolved	26/26	83	1.2	12	<i>d</i>	<i>e</i>
Sodium, total	26/26	86	1.2	12	<i>d</i>	<i>e</i>
Strontium, total	25/26	1.1	0.0094	0.36	<i>d</i>	<i>e</i>
Vanadium, total	22/26	0.013	<0.0040	0.0089	<i>d</i>	<i>e</i>
Miscellaneous						
Alkalinity, as CaCO ₃	26/26	440	7.0	230	<i>d</i>	<i>e</i>
Fecal coliform (col./100 mL)	4/28	290	<1.0	120	1.0	4
Turbidity (NTU)	26/26	21	0.040	3.3	<i>d</i>	<i>e</i>
Pesticides (mg/L)						
2,4,5-T	1/26	0.00030	<0.00010	0.00030	<i>d</i>	<i>e</i>
Radioactivity measurements (pCi/L)						
⁶⁰ Co	25/26	350	-3.8	28	5,000	<i>e</i>
¹³⁷ Cs	25/26	12	-3.5	1.1	3,000	<i>e</i>
Gross alpha	26/26	11	0	4.4	15	<i>e</i>
Gross beta	26/26	250	0	25	<i>d</i>	<i>e</i>
Radioactive strontium, total	26/26	6.8	-2.7	2.0	8.1	<i>e</i>
Radium, total	26/26	2.7	0	1.1	5.1	23
Tritium	26/26	920,000	-410	160,000	20,000	16
Extractable organics (mg/L)						
Bis(2-ethylhexyl)phthalate	6/26	0.016(B)	0.00070(J)	0.0083	<i>d</i>	<i>e</i>
Di-n-butylphthalate	6/26	<0.011	0.00050(J)	0.0025	<i>d</i>	<i>e</i>
Diethyl phthalate	1/26	<0.011	0.0010(J)	0.0080	<i>d</i>	<i>e</i>
Organic carbon, total	71/104	7.3	<0.50	1.8	<i>d</i>	<i>e</i>
Organic halides, total	32/104	0.59	0	0.13	<i>d</i>	<i>e</i>
Recoverable phenolics, total	1/26	0.0010	<0.0010	0.0010	<i>d</i>	<i>e</i>
Volatile organics (mg/L)						
1,1-Dichloroethane	2/26	0.0080	<0.0050	0.0070	<i>d</i>	<i>e</i>
1,2-Dichloroethane	2/26	0.038	<0.0050	0.031	0.0050	2
1,2-Dichloroethene	4/26	0.027	0.0040(J)	0.016	<i>d</i>	<i>e</i>
Acetone	1/26	0.046(B)	0.0010(J)	0.046	<i>d</i>	<i>e</i>
Carbon tetrachloride	2/26	0.092	<0.0050	0.072	0.0050	2
Chloroform	4/26	0.097	0.0010(J)	0.046	<i>d</i>	<i>e</i>
Methylene chloride	4/26	0.0080(B)	0.0010(J)	0.0073	<i>d</i>	<i>e</i>

Table 2.3.14 (continued)

Parameter	No. detected/ No. of samples	Concentration ^b		Average of values above the detection limit	Reference value ^c	No. of values exceeding reference
		Max	Min			
Tetrachloroethene	2/26	0.016	0.0020(J)	0.015	<i>d</i>	<i>e</i>
Trichloroethene	4/26	0.51(E)	<0.0050	0.23	0.0050	4
<i>Upgradient wells</i>						
Anions (mg/L)						
Sulfate (as SO ₄)	9/13	310	<5.0	93	250	1
Field measurements						
Conductivity (mS/cm)	91/91	0.89	0.010	0.33	<i>d</i>	<i>e</i>
Temperature (°C)	91/91	18	13	15	<i>d</i>	<i>e</i>
pH (standard units)	91/91	8.4	5.1	<i>e</i>	6.5 8.5	11
Metals (mg/L)						
Aluminum, total	13/13	0.72	0.064	0.37	<i>d</i>	<i>e</i>
Beryllium, total	13/13	0.0030	0.00037	0.0021	<i>d</i>	<i>e</i>
Calcium, total	13/13	180	0.40	77	<i>d</i>	<i>e</i>
Iron, dissolved	2/13	0.44	<0.050	0.26	0.30	1
Iron, total	11/13	3.3	<0.050	0.82	0.30	9
Lead, total	1/13	0.060	<0.020	0.060	0.050	1
Magnesium, total	13/13	48	0.99	17	<i>d</i>	<i>e</i>
Manganese, dissolved	11/13	0.050	<0.010	0.023	0.050	1
Manganese, total	11/13	0.19	<0.010	0.085	0.050	8
Nickel, total	3/13	0.012	<0.0036	0.0090	<i>d</i>	<i>e</i>
Silicon, total	13/13	13	1.6	7.8	<i>d</i>	<i>e</i>
Sodium, dissolved	13/13	19	0.72	7.6	<i>d</i>	<i>e</i>
Sodium, total	13/13	19	0.69	7.5	<i>d</i>	<i>e</i>
Strontium, total	12/13	0.37	<0.0050	0.17	<i>d</i>	<i>e</i>
Titanium, total	1/13	<0.020	0.014	0.014	<i>d</i>	<i>e</i>
Vanadium, total	10/13	0.011	<0.0040	0.0070	<i>d</i>	<i>e</i>
Miscellaneous						
Alkalinity, as CaCO ₃	13/13	430	6.0	190	<i>d</i>	<i>e</i>
Turbidity (NTU)	13/13	140	0.070	12	<i>d</i>	<i>e</i>
Radioactivity measurements (pCi/L)						
⁶⁰ Co	6/13	<5.4	-1.4	0.36	5,000	<i>e</i>
¹³⁷ Cs	8/13	18	-4.6	2.2	3,000	<i>e</i>
Gross alpha	13/13	22	0	6.5	15	2
Gross beta	13/13	51	1.4	15	<i>d</i>	<i>e</i>
Radioactive strontium, total	13/13	15	-0.27	4.0	8.1	2
Radium, total	13/13	1.9	0.046	0.88	5.1	<i>e</i>
Tritium	13/13	1,200	-220	360	20,000	<i>e</i>
Extractable organics (mg/L)						
Bis(2-ethylhexyl)phthalate	2/13	0.019(B)	0.0050(J)	0.019	<i>d</i>	<i>e</i>
Organic carbon, total	40/52	1.8	<0.50	0.84	<i>d</i>	<i>e</i>
Organic halides, total	20/52	<0.0050	0	0	<i>d</i>	<i>e</i>
Recoverable phenolics, total	1/13	<1.0	<0.0010	0.0010	<i>d</i>	<i>e</i>
Volatile organics (mg/L)						
Acetone	5/13	4.7(B)	0.0010(J)	1.1	<i>d</i>	<i>e</i>

^aSee Fig. 2.3.5 in Vol. 1.

^bData qualifiers (organics): U = undetected; B = present in blank; J = below detection limit, but estimated; E = concentration exceeds the calibration range of the instrument. Data qualifiers (inorganics): U = undetected; B = value < contract-required detection limit > instrument detection limit; E = value is estimated because of the presence of interference.

^cSee Table 2.3.2 in Vol. 2 for more information.

^dNo reference.

^eNot applicable.

Table 2.3.15. ORGDP groundwater monitoring for 1988

Parameter	Total number of samples	Number of samples > standard	Concentration		Average of samples > detection limit
			Minimum	Maximum	
<i>K-1407-B pond</i>					
1,1,1-Trichloroethane, µg/L	1	1	210	210	210
1,1-Dichloroethane, µg/L	1	1	370	370	370
1,1-Dichloroethene, µg/L	1	1	180	180	180
1,2-Dichloroethane, µg/L	1	1	10	10	10
Butylbenzylphthalate, µg/L	1	1	23	23	23
Chloride, mg/L	5	2	22	308	180
Di-n-butylphthalate, µg/L	1	1	20	20	20
Iron, mg/L	17	17	0.84	43	10.9
Manganese, mg/L	17	17	0.16	21	8.9
pH	85	14	6.2	7.3	a
Sulfate, mg/L	5	1	28	471	182
Trans-1,2-dichloroethene, µg/L	1	1	410	410	410
Trichloroethene, µg/L	1	1	2,100	2,100	2,100
TOX, µg/L	66	66	57	4,520	1,010
Vinyl chloride, µg/L	1	1	48	48	48
<i>K-1407-C pond</i>					
Cadmium, mg/L	12	1	<0.003	0.017	0.007
Chromium, mg/L	12	1	<0.01	0.35	0.088
Iron, mg/L	19	19	0.91	220	39
Lead, mg/L	12	1	<0.05	0.086	0.086
Manganese, mg/L	19	18	0.017	27	7.1
pH (<6.5)	95	33	5.8	7.2	a
Sulfate, mg/L	7	1	4	300	78
TOX, µg/L	76	61	<10	221	<48.5

Table 2.3.15 (continued)

Parameter	Total number of samples	Number of samples > standard	Concentration		Average of samples > detection limit
			Minimum	Maximum	
<i>K-1407 WAG</i>					
1,1-Dichloroethane, µg/L	11	4	2	2,300	1,200
1,1-Dichloroethene, µg/L	11	3	3	890	446
1,2-Dichloroethane, µg/L	11	2	<5	23	22.5
Bis(2-ethylhexyl)phthalate, µg/L	11	3	2	15	15
Cadmium, mg/L	11	1	<0.003	0.013	0.01
Chromium, mg/L	11	2	<0.01	0.14	0.051
Diacetone alcohol, ^b µg/L	8	8	3	15	7.9
Hexamethylcyclotrisiloxane, µg/L	6	6	2	3	2.5
Iron, mg/L	11	10	0.23	78	16
Manganese, mg/L	11	9	0.0083	13	2.5
Methyl benzene, µg/L	6	6	3	7	4.3
Methylene chloride, µg/L	11	1	3	120	120
pH (<6.5)	100	18	5.9	8.1	<i>a</i>
Sulfate, mg/L	11	1	4.2	350	94
Tetrachlorobenzene, µg/L	1	1	35	35	35
Tetrachloroethene, µg/L	11	3	2	2,000	1,380
Toluene, µg/L	11	2	<5	8	8
TOX, µg/L	80	80	20	39,110	6,300
Trans-1,2-dichloroethene, µg/L	10	5	3	1,100	25.6
Trichloroethene, µg/L	11	8	4	8,500	2,200
Vinyl chloride, µg/L	11	8	10	350	198
<i>K-1407-C upgradient area</i>					
Alkyl substituted phenol, µg/L	1	1	9	9	9
Alpha activity, pCi/L	3	1	0.189	20	7.06
Bis(2-ethylhexyl)phthalate, µg/L	3	1	<5	19	19
Chromium, mg/L	3	1	<0.01	0.054	<0.054
Diacetone alcohol, ^b µg/L	2	2	4	6	5
Hexamethylcyclotrisiloxane, µg/L	2	2	2	3	2.5
Iron, mg/L	3	2	0.099	5.8	2.7
Manganese, mg/L	3	3	0.18	2.1	0.84
Methyl benzene, µg/L	2	2	3	19	11
Methylene chloride, µg/L	3	1	<5	5	5
Total coliform bacteria, col./100 mL	3	1	<1	2	1.5
TOX, µg/L	24	21	<10	132	28.8
Trichloroethene, µg/L	3	1	<5	32	32

Table 2.3.15 (continued)

Parameter	Total number of samples	Number of samples > standard	Concentration		Average of samples > detection limit
			Minimum	Maximum	
<i>K-1413 WAG</i>					
Acetone, ^b µg/L	5	1	<8	10	8
Cyclohexanol, ^b µg/L	3	3	5	8	6.667
Cyclohexanone, ^b µg/L	3	3	4	4	4
Diacetone alcohol, ^b µg/L	5	5	81	550	210
Iron, mg/L	5	3	0.24	15	7.7
Lead, mg/L	5	1	0.004	0.058	0.019
Manganese, mg/L	5	3	0.017	0.97	0.407
pH (>8.5)	49	1	5.1	9.8	<i>a</i>
(<6.5)	49	22	5.1	9.8	<i>a</i>
Trichloroethene, µg/L	5	1	3	1,700	1,700
TOX, µg/L	40	35	<10	3,420	449
<i>K-1070 C/D classified burial ground</i>					
1,1,Trichloroethane, µg/L	4	2	7	360	170
1,1,2,2-Tetrachloroethane, µg/L	27	1	<5	6	<6
1,1-Dichloroethane, µg/L	27	4	3	400	190
1,1-Dichloroethene, µg/L	27	2	2	200	130
2-Butanone, ^b µg/L	27	1	<10	33	33
4-Tert-butylphenol, µg/L	1	1	3	3	3
Acetone, ^b µg/L	27	2	3	25	18.5
Alpha activity, pCi/L	27	2	<1	82	11
Aryl hydrocarbon, µg/L	8	8	2	3	2.1
Barium, mg/L	27	1	<0.001	1.2	0.25
Beta activity, pCi/L	27	3	<3	189	31
Bis(2-ethylhexyl)phthalate, µg/L	27	6	1	70	22
Chloride, mg/L	27	2	<1	611	52.6
Chlorinated hydrocarbon, µg/L	3	3	2	61	25
Chromium, mg/L	27	6	<0.01	0.14	0.046
Diacetone alcohol, ^b µg/L	6	6	11	260	119
Diocetyl adipate, µg/L	2	2	8	18	13
Ethane,1,1,2-trichloro-1,2,2-t, µg/L	2	2	5	71	38
Ethane,1,2,-dichloro-1,1,2-tri, µg/L	2	2	17	29	23
Freon 113, µg/L	4	4	2	10	7.2
Iron, mg/L	27	22	0.032	120	22
Lead, mg/L	27	1	<0.004	0.17	0.022
Manganese, mg/L	27	20	0.001	15	1.8
Methylene chloride, µg/L	27	3	1	38	19
pH (>8.5)	200	60	5.4	10.4	<i>a</i>
(<6.5)	200	40	5.4	10.4	<i>a</i>
Phenol, µg/L	27	1	3	14	14
Phthalate ester, µg/L	1	1	5	5	5
Tetrachloroethene, µg/L	27	8	0.4	260	68.375
Toluene, µg/L	27	1	0.5	22	22
Total xylenes, µg/L	25	1	1	19	19
TOX, µg/L	160	128	<10	15,400	1,180
Trans-1,2-dichloroethene, µg/L	26	3	1	310	250
Trichloroethene, µg/L	27	8	3	2,900	860

Table 2.3.15 (continued)

Parameter	Total number of samples	Number of samples > standard	Concentration		Average of samples > detection limit
			Minimum	Maximum	
<i>K-770 scrap yard</i>					
2-Butanone, ^b µg/L	8	1	<10	69	69
Beta activity, pCi/L	8	4	0.31	1,540	458
Bis(2-ethylhexyl)phthalate, µg/L	8	3	2	100	46
Chlorodifluoromethane, µg/L	1	1	7	7	7
Diacetone alcohol, ^b µg/L	4	4	2	67	19
Diocetyl adipate, µg/L	1	1	31	31	31
Hexamethylcyclotrisiloxane, µg/L	1	1	2	2	2
Iron, mg/L	8	5	0.03	29	5.7
Manganese, mg/L	8	8	0.054	1.7	0.68
pH (<6.5)	80	57	5.3	7.1	<i>b</i>
Total coliform bacteria, col./100 mL	8	2	<1	10	4.7
TOX, µg/L	64	61	<10	375	43.7
<i>K-1064-G burn area/peninsula storage</i>					
1,1,2-Trichloroethane, µg/L	7	1	4	16	16
1,1-Dichloroethane, µg/L	7	4	<5	22	18
1,1-Dichloroethene, µg/L	7	3	<5	18	9.4
Alpha activity, pCi/L	7	4	4	220	57
Barium, mg/L	7	1	0.017	1.4	0.24
Beta activity, pCi/L	7	4	12	298	110
Bis(2-ethylhexyl)phthalate, µg/L	7	1	2	75	75
Copper, mg/L	7	1	<0.004	1.9	0.66
Diacetone alcohol, ^b µg/L	3	3	4	120	44
Fluoride, mg/L	7	1	0.2	6.4	1.1
Freon 113, µg/L	3	3	13	42	24
Hexamethylcyclotrisiloxane, µg/L	5	5	2	3	2.6
Iron, mg/L	7	1	0.0056	300	43
Lead, mg/L	7	1	<0.004	0.084	0.019
Manganese, mg/L	7	3	<0.001	5.7	1.1
pH (>8.5)	70	5	5	8.9	<i>b</i>
(<6.5)	70	2	5	8.9	<i>b</i>
Sulfate, mg/L	7	1	45	256	109
Total coliform bacteria, col./100 mL	7	4	<1	55	18
TOX, µg/L	56	56	10	182	76.2
Trans-1,2-dichloroethene, µg/L	7	2	3	10	10
Trichloroethane, µg/L	2	2	2	9	5.5
Trichloroethene, µg/L	7	2	4	18	17

Table 2.3.15 (continued)

Parameter	Total number of samples	Number of samples > standard	Concentration		Average of samples > detection limit
			Minimum	Maximum	
<i>K-1085 firehouse burn area</i>					
Diacetone alcohol, ^b µg/L	2	2	2	5	3.5
Hexamethylcyclotrisiloxane, µg/L	2	2	2	3	2.5
Iron, mg/L	5	5	0.51	12	4.2
Manganese, mg/L	5	3	0.022	0.76	0.21
Methyl benzene, µg/L	3	3	2	4	3
Methylene chloride, µg/L	5	1	4	8	8
pH (<6.5)	55	2	5.6	7.5	<i>a</i>
TOX, µg/L	44	33	<10	98	31
<i>K-1070-A contaminated burial ground</i>					
1,1,1-Trichloroethane, µg/L	9	2	5	3,100	770
1,1,2-Trichloroethane, µg/L	9	3	2	10	7.3
1,1-Dichloroethane, µg/L	9	2	2	57	34
1,1-Dichloroethene, µg/L	9	5	3	1,100	310
2-Butanone, ^b µg/L	9	1	4	12	12
Beta activity, pCi/L	9	6	2	818	354
Carbon tetrachloride, µg/L	9	5	2	110	53
Chromium, mg/L	9	2	<0.01	0.086	0.052
Freon 113, µg/L	1	1	64	64	64
Iron, mg/L	9	5	0.11	93	16
Lead, mg/L	9	2	<0.004	0.14	0.048
Manganese, mg/L	9	4	0.002	3.2	0.49
pH (>8.5)	90	2	5.4	8.7	<i>a</i>
pH (<6.5)	90	12	5.4	8.7	<i>a</i>
Phthalate ester, µg/L	1	1	9	9	9
Tetrachloroethene, µg/L	10	3	2	14	10
TOX, µg/L	72	71	<10	7,250	1,470
Trans-1,2-Dichloroethene, µg/L	9	1	1	6	6
Trichloroethane, µg/L	1	1	5	5	5
Trichloroethene, µg/L	9	7	5	1,600	698

Table 2.3.15 (continued)

Parameter	Total number of samples	Number of samples > standard	Concentration		Average of samples > detection limit
			Minimum	Maximum	
<i>K-1070-F old contractors' burial ground</i>					
Benzo(a)anthracene, µg/L	8	1	<5	9	9
Chrysene, µg/L	8	1	<5	11	11
Diacetone alcohol, ^a µg/L	4	4	2	4	2.8
Hexamethylcyclotrisiloxane, µg/L	5	5	2	3	2.4
Iron, mg/L	8	5	0.071	10	2.8
Manganese, mg/L	8	3	0.0043	0.19	0.071
Methyl benzene, µg/L	3	3	2	9	4.3
Methylene chloride, µg/L	8	2	4	12	9.5
pH (>8.5)	64	10	6.6	9.6	<i>a</i>
Total coliform bacteria, col./100 mL	8	4	<1	14	11
TOX, µg/L	52	33	<10	96	29
<i>K-1232 treatment unit</i>					
2-Tert-butylphenol, µg/L	1	1	0.7	0.7	0.7
4-Tert-butylphenol, µg/L	1	1	79	79	79
Aryl hydrocarbon, µg/L	5	5	2	4	3.4
Beta activity, pCi/L	12	6	<5	152	73
Bis(2-ethylhexyl)phthalate, µg/L	12	1	2	7	7
Carbon tetrachloride, µg/L	12	2	<5	13	10
Chromium, mg/L	12	1	<0.01	0.14	0.035
Diacetone alcohol, ^a µg/L	4	4	3	77	24
Fluoride, mg/L	12	4	<0.1	11	3.3
Freon 113, µg/L	2	2	6	10	8
Iron, mg/L	12	9	0.0041	120	18
Lead, mg/L	12	2	<0.004	0.23	0.038
Manganese, mg/L	12	10	0.019	3.5	0.74
pH (>8.5)	80	15	5.2	11.8	<i>a</i>
(<6.5)	80	25	5.2	11.8	<i>a</i>
TOX, µg/L	63	58	<10	2,560	239
Trichloroethene, µg/L	12	8	1	1,900	450
<i>K-1099 Blair Road Quarry</i>					
Hexamethylcyclotrisiloxane, µg/L	1	1	2	2	2
Methyl benzene, µg/L	1	1	22	22	22
Sulfate, mg/L	1	1	266	266	266
Total coliform bacteria, col./100 mL	1	1	4	4	4
TOX, µg/L	8	5	<10	16	14

^aNot applicable.^bAlso detected in laboratory blanks.

2.4 BIOLOGICAL

Table 2.4.1. 1988 ¹³¹I concentrations in milk^a

Location ^b	Number of samples	Concentration (pCi/L)				Standard error ^c	Percent of guideline ^d
		Max	Min	Av			
<i>Immediate environs</i>							
1	13	<5.4	-7.0	-0.91	0.89	9.1	
2	25	<5.4	-1.6	<2.0	0.45	20	
3	21	<5.4	-9.5	-1.1	0.66	11	
4	25	<8.1	-1.1	<2.1	0.43	21	
8	25	<5.4	-3.8	<2.0	0.45	20	
Network summary	109	<8.1	-9.5	-1.7	0.24	17	
<i>Remote environs</i>							
51	2	0.54	-0.22	0.16	0.38	1.6	
53	2	0.27	-0.81	-0.27	0.54	-2.7	
56	1	-1.1	-1.1	-1.1		-11	
Network summary	5	0.54	-1.1	-0.26	0.31	-2.6	

^aRaw milk samples.

^bSee Fig. 2.4.1 in Vol. 1.

^cStandard deviation about the average.

^dAverage value as a percent of applicable FRC standard assuming 1 L/d intake: Range I, 0-10 pCi/L, adequate surveillance required to confirm calculated intakes.

Table 2.4.2. 1988 total radioactive strontium concentrations in milk^d

Location ^b	Number of samples	Concentration (pCi/L)				Standard error ^c	Percent of guideline ^d
		Max	Min	Av			
<i>Immediate environs</i>							
1	13	7.6	1.3	3.6	0.49	18	
2	25	10	0.27	3.2	0.44	16	
3	21	24	1.1	4.3	1.0	21	
4	25	12	-0.59	5.1	0.58	26	
8	25	9.5	-0.81	5.4	0.54	27	
Network summary	109	24	-0.81	4.4	0.30	22	
<i>Remote environs</i>							
51	2	7.3	2.3	4.8	2.5	24	
53	2	10	5.1	7.6	2.4	38	
56	1	3.8	3.8	3.8		19	
Network summary	5	10	2.3	5.7	1.3	29	

^aRaw milk samples.

^bSee Fig. 2.4.1 in Vol. 1.

^cStandard deviation about the average.

^dAverage value as an applicable FRC standard assuming 1 L/d intake: Range I, 0-20 pCi/L, adequate surveillance required to confirm calculated intakes.

Table 2.4.3. 1988 mercury concentrations in Clinch River bluegill

Location ^a	Number of samples	Concentration ($\mu\text{g/g}$ wet wt)				Standard error ^b	Percent of guideline ^c
		Max	Min	Av			
CRK 8.0	12	0.21	0.051	0.10	0.013	10	
CRK 33.3	12	0.14	0.027	0.067	0.011	6.7	
CRK 40.0	12	0.089	0.019	0.038	0.0067	3.8	

^aSee Fig. 2.4.2 in Vol. 1.

^bStandard deviation about the average.

^cAverage value as a percent of Food and Drug Administration action level of mercury in fish (1.0 $\mu\text{g/g}$) for the average concentration.

Table 2.4.4. 1988 PCB concentrations in Clinch River bluegill

Location ^a	Determination	Number of samples	Concentration ($\mu\text{g/g}$ wet wt)				Percent of guideline ^c
			Max	Min	Av	Standard error ^b	
CRK 8.0	1254	12	0.05	<0.01	<0.03	0.004	1.5
	1260	12	0.09	<0.01	<0.03	0.007	1.5
CRK 33.3	1254	12	0.05	<0.01	<0.02	0.004	1.0
	1260	12	0.07	0.01	0.03	0.006	1.5
CRK 40.0	1254	12	0.02	<0.01	<0.01	0.0008	0.50
	1260	12	0.10	0.01	0.03	0.007	1.5

^aSee Fig. 2.4.2 in Vol. 1.

^bStandard deviation about the average.

^cAverage value as a percent of Food and Drug Administration action level of mercury in fish ($2.0 \mu\text{g/g}$) for the average concentration.

Table 2.4.5. 1988 radionuclide concentrations in Clinch River bluegill

Location ^a	Determination	Number of samples ^b	Concentration (pCi/g ash wt)			
			Max	Min	Av	Standard error
CRK 8.0	⁶⁰ Co	6	0.46	-0.027	0.25	0.064
	¹³⁷ Cs	6	4.3	3.4	3.9	0.16
	Total Sr ^c	6	0.43	0.068	0.20	0.052
CRK 33.3	⁶⁰ Co	6	0.24	-0.14	0.14	0.058
	¹³⁷ Cs	6	18	3.2	9.8	2.4
	Total Sr ^c	6	1.2	0.21	0.68	0.17
CRK 40.0	⁶⁰ Co	6	0.30	-0.11	0.15	0.071
	¹³⁷ Cs	6	0.78	0.24	0.45	0.10
	Total Sr ^c	6	0.32	-1.2	-0.16	0.22

^aSee Fig. 2.4.2 in Vol. 1.

^bA sample is a composite of 6 to 10 fish.

^cTotal radioactive Sr (⁸⁹Sr and ⁹⁰Sr).

Table 2.4.6. 1988 grass sampling and pine needle data at ORGDP^a

Station	F ⁻ concentration ($\mu\text{g/g}$ dry wt)			U (total) concentration						⁹⁹ Tc concentration (pCi/g dry wt)		
	Mar	July	Av	$\mu\text{g/g}$ dry wt			pCi/g dry wt			Mar	July	Av
				Mar	July	Av	Mar	July	Av			
<i>Grass sampling data</i>												
V1	3	5.2	4.1	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.0	0.6	0.3
V2	<3	<3	<3	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.0	0.4	0.2
V3	5	<3	<4	<0.5	1.5	<1.0	<0.39	1.18	<0.78	0.4	0.7	0.6
V4	<3	<3	<3	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.3	0.3	0.3
V5	<3	<3	<3	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.0	0.2	0.1
V6	<3	6.0	<4.5	<0.5	0.6	<0.6	<0.39	0.47	<0.43	2.4	1.7	2.1
V7	5	5.4	5.3	<0.5	1.1	<0.8	<0.39	0.86	<0.63	0.8	1.1	1.0
V8	<3	17.8	<10.4	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.3	0.3	0.3
V9	<3	5.8	<8.8	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	1.4	0.2	0.8
V10	<3	9.5	<6.3	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.5	2.7	1.6
V11	<3	9.5	<6.3	<0.5	3.1	<1.8	<0.39	2.43	<1.41	70.0	62.6	66.3
V12	<3	11.8	<7.4	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	2.9	3.9	3.4
V13	<3	5.5	<4.3	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	-0.1	0.2	0.1
<i>Pine needle sampling data</i>												
PN1	4	<3	<4	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.1	0.3	0.2
PN2	<3	<3	<3	<0.5	1.8	<1.2	<0.39	<0.39	1.41	0.4	0.2	0.3
PN3	<3	<3	<3	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.9	0.3	0.6
PN4	4	<3	<4	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.4	0.8	0.6
PN5	4	<3	<4	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.4	0.4	0.4
PN6	<3	<3	<3	<0.5	<0.5	<0.5	<0.39	<0.39	<0.39	0.2	0.1	0.2

^aSee Fig. 2.4.6 (grass and pine needle sampling locations) in Vol. 1.

Table 2.4.7. 1988 ⁶⁰Co concentrations in grass

Location	Number of samples	Concentration (pCi/g ash wt)			Standard error ^a
		Max	Min	Av	
<i>ORNL perimeter stations^b</i>					
3	4	0.0073	-0.027	-0.0092	0.0083
4	4	0.063	0.019	0.040	0.011
7	4	0.041	-0.031	-0.0044	0.016
9	4	0.11	0.0090	0.042	0.022
20	4	0.021	-0.021	-0.00044	0.010
21	4	0.025	0.0021	0.011	0.0050
22	4	0.030	-0.016	0.0063	0.011
Network summary	28	0.11	-0.031	0.012	0.0057
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.028	-0.074	-0.0062	0.023
23	4	0.019	-0.0051	0.0084	0.0057
31	4	0.084	-0.0012	0.038	0.021
33	4	0.011	-0.026	-0.00061	0.0087
34	4	0.082	-0.0073	0.023	0.020
36	4	0.087	0.0092	0.046	0.016
40	4	0.049	-0.020	0.0092	0.015
41	4	0.023	0.0010	0.017	0.0053
42	4	0.024	0.0066	0.014	0.0040
43	4	0.0047	-0.032	-0.013	0.0076
44	4	0.027	0.0011	0.0097	0.0058
45	4	0.031	-0.057	-0.0038	0.019
46	4	0.0040	-0.018	-0.0035	0.0050
Network summary	52	0.087	-0.074	0.011	0.0041
<i>Remote stations^c</i>					
51	4	0.018	-0.018	0.0037	0.0077
52	4	0.031	-0.10	-0.0073	0.031
53	4	0.043	-0.019	0.0077	0.013
55	4	0.045	-0.058	-0.0078	0.021
56	4	<0.044	<0.023	<0.036	0.0047
57	4	<0.050	<0.034	<0.041	0.0040
58	4	0.018	-0.0011	0.0085	0.0045
Network summary	28	0.045	-0.10	0.012	0.0063

^aStandard deviation about the average.

^bSee Fig. 2.4.4 in Vol. 1.

^cSee Fig. 2.4.5 in Vol. 1.

Table 2.4.8. 1988 ¹³⁷Cs concentrations in grass

Location	Number of samples	Concentration (pCi/g ash wt)			Standard error ^a
		Max	Min	Av	
<i>ORNL perimeter stations^b</i>					
3	4	0.064	0.022	0.044	0.0093
4	4	2.2	1.2	1.8	0.24
7	4	0.069	-0.0017	0.037	0.015
9	4	0.077	-0.090	0.021	0.038
20	4	0.043	-0.0036	0.013	0.010
21	4	0.013	-0.012	0.0024	0.0056
22	4	0.046	-0.0055	0.011	0.012
Network summary	28	2.2	-0.090	0.28	0.13
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.096	-0.0019	0.032	0.022
23	4	0.021	-0.0068	0.0046	0.0059
31	4	0.097	-0.0096	0.022	0.025
33	4	0.11	-0.0081	0.030	0.028
34	4	0.013	-0.040	-0.0051	0.012
36	4	0.077	0.0095	0.031	0.015
40	4	0.088	-0.0045	0.038	0.020
41	4	0.044	-0.023	0.014	0.014
42	4	0.0046	-0.0057	-0.00058	0.0028
43	4	0.021	0.0073	0.014	0.0033
44	4	0.019	-0.021	-0.0035	0.0097
45	4	0.051	-0.014	0.025	0.014
46	4	0.0019	-0.030	-0.0098	0.0072
Network summary	52	0.11	-0.040	0.015	0.0044
<i>Remote stations^c</i>					
51	4	0.035	0.0034	0.018	0.0075
52	4	0.035	0.0011	0.017	0.0072
53	4	0.019	-0.015	0.0040	0.0079
55	4	0.043	-0.011	0.0088	0.012
56	4	<0.044	<0.023	<0.033	0.0045
57	4	<0.040	<0.026	<0.034	0.0029
58	4	0.0091	-0.040	-0.011	0.012
Network summary	28	0.043	-0.040	0.015	0.0040

^aStandard deviation about the average.

^bSee Fig. 2.4.4 in Vol. 1.

^cSee Fig. 2.4.5 in Vol. 1.

Table 2.4.9. 1988 ²³⁸Pu concentrations in grass

Location	Number of samples	Concentration (pCi/g ash wt)			Standard error ^a
		Max	Min	Av	
<i>ORNL perimeter stations^b</i>					
3	4	0.0011	-0.0030	-0.0011	0.00087
4	4	0.0030	0.00027	0.0018	0.00059
7	4	-0.000076	-0.0019	-0.00061	0.00043
9	4	0.0012	-0.0011	-0.00020	0.00053
20	4	0.0014	-0.0010	-0.00016	0.00055
21	4	0.00043	-0.00015	0.000099	0.00013
22	4	0.00081	-0.0018	-0.00058	0.00054
Network summary	28	0.0030	-0.0030	-0.00010	0.00025
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.0011	-0.0011	0.00018	0.00052
23	4	0.00038	-0.0018	-0.0011	0.00051
31	4	-0.00014	-0.0016	-0.00055	0.00035
33	4	0.00054	-0.0011	-0.000068	0.00036
34	4	0.0014	-0.00073	0.00027	0.00047
36	4	0.00081	0.00043	0.00072	0.000095
40	4	0.0018	-0.0024	-0.00030	0.00087
41	4	0.0027	-0.00035	0.0011	0.00076
42	4	0.00081	0.00054	0.00070	0.000068
43	4	0.0035	-0.00027	0.00068	0.00095
44	4	0.00016	-0.0014	-0.00042	0.00035
45	4	0.0024	0.00027	0.0015	0.00050
46	4	0.0019	-0.0014	0.00045	0.00069
Network summary	52	0.0035	-0.0024	0.00024	0.00017
<i>Remote stations^c</i>					
51	4	0.0013	-0.00059	0.00039	0.00042
52	4	0.0016	0	0.00088	0.00037
53	4	0.00049	-0.00014	0.00021	0.00014
55	4	0.0014	0	0.00074	0.00030
56	4	0.0024	-0.0022	0.00045	0.00096
57	4	0.00016	-0.014	-0.0037	0.0034
58	4	0.00022	-0.0032	-0.0011	0.00078
Network summary	28	0.0024	-0.014	-0.00030	0.00054

^aStandard deviation about the average.^bSee Fig. 2.4.4 in Vol. 1.^cSee Fig. 2.4.5 in Vol. 1.

Table 2.4.10. 1988 ²³⁹Pu concentrations in grass

Location	Number of samples	Concentration (pCi/g ash wt)			Standard error ^a
		Max	Min	Av	
<i>ORNL perimeter stations^b</i>					
3	4	0.00027	-0.00089	-0.00042	0.00025
4	4	0.022	0.0016	0.011	0.0043
7	4	0.00062	-0.0043	-0.0017	0.0011
9	4	0.0054	-0.0021	0.00019	0.0018
20	4	0.00024	-0.00078	-0.00018	0.00022
21	4	-0.00014	-0.0026	-0.0014	0.00068
22	4	0.0025	-0.0021	-0.00037	0.00098
Network summary	28	0.022	-0.0043	0.0010	0.0010
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.00051	-0.0049	-0.0013	0.0012
23	4	-0.00024	-0.0035	-0.0019	0.00071
31	4	-0.00032	-0.0051	-0.0020	0.0011
33	4	-0.00027	-0.0041	-0.0014	0.00089
34	4	-0.00059	-0.0023	-0.0013	0.00038
36	4	0.00051	-0.0051	-0.0023	0.0013
40	4	0.00014	-0.0054	-0.0017	0.0013
41	4	0.00054	-0.0032	-0.0012	0.00095
42	4	-0.00097	-0.0030	-0.0018	0.00044
43	4	-0.00081	-0.010	-0.0039	0.0021
44	4	0.00014	-0.0018	-0.00093	0.00044
45	4	0.0014	-0.0041	-0.0016	0.0015
46	4	0.0022	-0.0076	-0.0016	0.0021
Network summary	52	0.0022	-0.010	-0.0018	0.00032
<i>Remote stations^c</i>					
51	4	-0.00043	-0.0027	-0.0015	0.00055
52	4	0.00027	-0.0032	-0.0011	0.00074
53	4	0.00043	-0.0019	-0.00049	0.00050
55	4	-0.0016	-0.0046	-0.0033	0.00076
56	4	-0.0011	-0.0046	-0.0028	0.00087
57	4	0.00051	-0.0014	-0.00037	0.00038
58	4	-0.00065	-0.0015	-0.0011	0.00022
Network summary	28	0.00051	-0.0046	-0.0015	0.00029

^aStandard deviation about the average.

^bSee Fig. 2.4.4 in Vol. 1.

^cSee Fig. 2.4.5 in Vol. 1.

Table 2.4.11. 1988 total radioactive strontium concentrations in grass

Location	Number of samples	Concentration (pCi/g ash wt)			Standard error ^a
		Max	Min	Av	
<i>ORNL perimeter stations^b</i>					
3	4	0.32	0.089	0.17	0.053
4	4	22	8.9	14	3.2
7	4	0.22	0.092	0.13	0.031
9	4	0.35	0.019	0.22	0.076
20	4	0.12	0.046	0.084	0.016
21	4	0.25	0.14	0.20	0.024
22	4	0.23	0.095	0.15	0.029
Network summary	28	22	0.019	2.2	1.0
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.10	0.041	0.080	0.014
23	4	0.51	0.073	0.24	0.099
31	4	0.27	0.10	0.20	0.044
33	4	0.17	0.078	0.11	0.020
34	4	0.12	-0.0027	0.052	0.030
36	4	0.49	0.38	0.45	0.023
40	4	0.32	0.26	0.29	0.014
41	4	0.24	0.046	0.12	0.043
42	4	0.32	-0.0081	0.099	0.076
43	4	0.12	0.054	0.086	0.013
44	4	0.13	-0.11	0.014	0.055
45	4	0.17	0.11	0.15	0.015
46	4	0.26	0.13	0.20	0.028
Network summary	52	0.51	-0.11	0.16	0.019
<i>Remote stations^c</i>					
51	4	0.12	0.11	0.12	0.0039
52	4	0.32	0.22	0.30	0.027
53	4	0.30	0.089	0.19	0.043
55	4	0.26	0.11	0.17	0.034
56	4	0.59	0.35	0.45	0.052
57	4	0.10	0.032	0.068	0.015
58	4	0.11	0.070	0.082	0.0080
Network summary	28	0.59	0.032	0.20	0.027

^aStandard deviation about the average.^bSee Fig. 2.4.4 in Vol. 1.^cSee Fig. 2.4.5 in Vol. 1.

Table 2.4.12. 1988 ²³⁴U concentrations in grass

Location	Number of samples	Concentration (pCi/g ash wt)			
		Max	Min	Av	Standard error ^a
<i>ORNL perimeter stations^b</i>					
3	4	0.059	0.010	0.024	0.012
4	4	0.051	0.019	0.037	0.0067
7	4	0.10	0.025	0.055	0.017
9	4	0.030	0.0073	0.016	0.0050
20	4	0.068	0.030	0.050	0.0095
21	4	0.035	0.0097	0.020	0.0058
22	4	0.015	0.0078	0.011	0.0015
Network summary	28	0.10	0.0073	0.030	0.0044
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.014	0.0068	0.010	0.0017
23	4	0.025	0.011	0.019	0.0029
31	4	0.043	0.0089	0.022	0.0081
33	4	0.024	0.011	0.016	0.0029
34	4	0.023	0.015	0.018	0.0018
36	4	0.026	0.012	0.021	0.0032
40	4	0.14	0.076	0.098	0.015
41	4	0.057	0.016	0.027	0.0098
42	4	0.035	0.0095	0.018	0.0059
43	4	0.021	0.010	0.015	0.0024
44	4	0.041	0.0097	0.020	0.0072
45	4	0.15	0.068	0.097	0.019
46	4	0.065	0.041	0.051	0.0056
Network summary	52	0.15	0.0068	0.033	0.0045
<i>Remote stations^c</i>					
51	4	0.012	0.0065	0.0082	0.0012
52	4	0.032	0.011	0.021	0.0053
53	4	0.019	0.0092	0.015	0.0020
55	4	0.046	0.012	0.025	0.0072
56	4	0.059	0.0068	0.021	0.013
57	4	0.049	0.015	0.030	0.0081
58	4	0.013	0.0068	0.0099	0.0015
Network summary	28	0.059	0.0065	0.018	0.0027

^aStandard deviation about the average.^bSee Fig. 2.4.4 in Vol. 1.^cSee Fig. 2.4.5 in Vol. 1.

Table 2.4.13. 1988 ^{235}U concentrations in grass

Location	Number of samples	Concentration (pCi/g ash wt)			Standard error ^a
		Max	Min	Av	
<i>ORNL perimeter stations^b</i>					
3	4	0.011	0.00041	0.0034	0.0025
4	4	0.0049	-0.00011	0.0024	0.0012
7	4	0.0070	0.0041	0.0057	0.00067
9	4	0.0022	-0.00027	0.0010	0.00051
20	4	0.0070	0.0035	0.0057	0.00085
21	4	0.0030	0.00070	0.0014	0.00052
22	4	0.0012	-0.0015	0.000041	0.00056
Network summary	28	0.011	-0.0015	0.0028	0.00056
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.0023	0.000027	0.00082	0.00051
23	4	0.0021	0.00014	0.0016	0.00048
31	4	0.0024	0.00073	0.0015	0.00041
33	4	0.0022	0.0011	0.0016	0.00022
34	4	0.0027	0.00032	0.0015	0.00049
36	4	0.0032	0.00084	0.0023	0.00054
40	4	0.013	0.0041	0.0085	0.0018
41	4	0.0057	0.0025	0.0035	0.00073
42	4	0.0095	0.00070	0.0031	0.0021
43	4	0.0041	-0.00054	0.0016	0.00094
44	4	0.0051	0.0014	0.0030	0.00092
45	4	0.011	0.0046	0.0087	0.0016
46	4	0.0030	0.0023	0.0026	0.00014
Network summary	52	0.013	-0.00054	0.0031	0.00043
<i>Remote stations^c</i>					
51	4	0.00043	-0.00030	0.00020	0.00017
52	4	0.011	0.00027	0.0050	0.0025
53	4	0.0018	0.0011	0.0015	0.00016
55	4	0.0022	-0.00054	0.0014	0.00066
56	4	0.013	-0.00065	0.0036	0.0031
57	4	0.0023	0.00062	0.0013	0.00035
58	4	0.0013	0.00032	0.00084	0.00022
Network summary	28	0.013	-0.00065	0.0020	0.00060

^aStandard deviation about the average.

^bSee Fig. 2.4.4 in Vol. 1.

^cSee Fig. 2.4.5 in Vol. 1.

Table 2.4.14. 1988 ²³⁸U concentrations in grass

Location	Number of samples	Concentration (pCi/g ash wt)			
		Max	Min	Av	Standard error ^a
<i>ORNL perimeter stations^b</i>					
3	4	0.032	0.0051	0.013	0.0064
4	4	0.041	0.013	0.021	0.0066
7	4	0.089	0.010	0.041	0.017
9	4	0.025	0.0041	0.014	0.0045
20	4	0.046	0.013	0.029	0.0091
21	4	0.020	0.0054	0.011	0.0033
22	4	0.0076	0.0027	0.0051	0.0010
Network summary	28	0.089	0.0027	0.019	0.0035
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.0097	0.0054	0.0069	0.00099
23	4	0.020	0.0086	0.014	0.0024
31	4	0.022	0.0065	0.014	0.0043
33	4	0.010	0.0035	0.0061	0.0014
34	4	0.017	0.0084	0.011	0.0021
36	4	0.013	0.0049	0.0093	0.0016
40	4	0.024	0.020	0.022	0.0010
41	4	0.016	0.0043	0.0080	0.0027
42	4	0.012	0.0020	0.0066	0.0023
43	4	0.0073	0.0041	0.0058	0.00087
44	4	0.024	0.0025	0.0089	0.0051
45	4	0.14	0.081	0.12	0.014
46	4	0.013	0.0092	0.011	0.00079
Network summary	52	0.14	0.0020	0.019	0.0043
<i>Remote stations^c</i>					
51	4	0.0076	0.0030	0.0048	0.0010
52	4	0.010	0.0032	0.0067	0.0016
53	4	0.0097	0.0051	0.0070	0.00097
55	4	0.0073	0.0027	0.0043	0.0011
56	4	0.0095	0.0021	0.0045	0.0017
57	4	0.030	0.0043	0.017	0.0052
58	4	0.0057	0.0032	0.0047	0.00052
Network summary	28	0.030	0.0021	0.0070	0.0011

^aStandard deviation about the average.

^bSee Fig. 2.4.4 in Vol. 1.

^cSee Fig. 2.4.5 in Vol. 1.

2.5 SOIL AND SEDIMENT

Table 2.5.1. 1988 ⁶⁰Co concentrations in soil

Location	Number of samples	Concentration (pCi/g dry wt)			
		Max	Min	Av	Standard error ^a
<i>ORNL perimeter stations^b</i>					
3	4	0.019	-0.0027	0.0095	0.0050
4	4	0.41	0.076	0.18	0.077
7	4	0.046	0.0054	0.022	0.0088
9	4	0.032	-0.0027	0.0088	0.0080
20	4	0.062	-0.035	0.032	0.023
21	4	0.11	-0.030	0.019	0.033
22	4	0.076	0.0027	0.039	0.015
Network summary	28	0.41	-0.035	0.044	0.015
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.030	-0.038	-0.00068	0.015
23	4	-0.0054	-0.030	-0.015	0.0055
31	4	0.038	0.011	0.028	0.0065
33	4	0.078	-0.0054	0.042	0.020
34	4	0.11	0.035	0.066	0.017
36	4	0.0081	-0.024	-0.0027	0.0073
40	4	0.041	0.0081	0.021	0.0071
41	4	0.12	-0.030	0.030	0.035
42	4	0.076	-0.022	0.027	0.021
43	4	0.059	-0.014	0.030	0.016
44	4	0.022	-0.024	0.00068	0.010
45	4	0.032	-0.041	0.010	0.017
46	4	0.035	-0.014	0.015	0.010
Network summary	52	0.12	-0.041	0.019	0.0049
<i>Remote stations^c</i>					
51	4	0.035	-0.024	0.012	0.013
52	4	0.046	-0.0081	0.026	0.012
53	4	0.068	0.016	0.042	0.013
55	4	0.086	-0.024	0.032	0.025
56	4	<0.054	<0.027	<0.047	0.0068
57	4	<0.054	<0.054	<0.054	0
58	4	0.011	-0.043	-0.017	0.013
Network summary	28	0.086	-0.043	0.028	0.0063

^aStandard deviation about the average.

^bSee Fig. 2.4.4 in Vol. 1.

^cSee Fig. 2.4.5 in Vol. 1.

Table 2.5.2. 1988 ¹³⁷Cs concentrations in soil

Location	Number of samples	Concentration (pCi/g dry wt)			Standard error ^a
		Max	Min	Av	
<i>ORNL perimeter stations^b</i>					
3	4	1.6	1.0	1.3	0.16
4	4	30	1.1	10	6.6
7	4	2.4	0.027	1.2	0.52
9	4	1.6	0.13	0.75	0.33
20	4	0.41	0.035	0.19	0.083
21	4	0.32	0.073	0.21	0.069
22	4	0.95	0.68	0.81	0.078
Network summary	28	30	0.027	2.1	1.1
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.57	0.41	0.49	0.037
23	4	0.97	0.30	0.64	0.18
31	4	1.3	0.57	0.93	0.16
33	4	1.9	0.30	1.0	0.33
34	4	1.1	0.038	0.56	0.24
36	4	1.2	0.14	0.56	0.25
40	4	1.2	0.73	0.95	0.11
41	4	2.1	0.70	1.2	0.31
42	4	0.17	0.12	0.15	0.0096
43	4	0.95	0.15	0.56	0.21
44	4	0.70	0.062	0.37	0.14
45	4	1.5	0.095	0.68	0.33
46	4	0.43	0.20	0.32	0.048
Network summary	52	2.1	0.038	0.64	0.065
<i>Remote stations^c</i>					
51	4	0.46	0.30	0.41	0.037
52	4	1.3	0.68	1.0	0.14
53	4	2.2	0.54	1.3	0.40
55	4	1.4	0.68	0.97	0.17
56	4	0.73	0.35	0.55	0.079
57	4	2.3	1.4	1.7	0.21
58	4	0.14	0.032	0.068	0.024
Network summary	28	2.3	0.032	0.86	0.12

^aStandard deviation about the average.^bSee Fig. 2.4.4 in Vol. 1.^cSee Fig. 2.4.5 in Vol. 1.

Table 2.5.3. 1988 ²³⁸Pu concentrations in soil

Location	Number of samples	Concentration (pCi/g dry wt)			
		Max	Min	Av	Standard error ^a
<i>ORNL perimeter stations^b</i>					
3	4	0.012	-0.0018	0.0032	0.0032
4	4	0.012	-0.0019	0.0037	0.0029
7	4	0.0038	-0.0011	0.0014	0.0010
9	4	0.0015	-0.0017	0.000088	0.00067
20	4	0.00041	-0.0016	-0.00044	0.00050
21	4	0.0011	-0.0016	0.00022	0.00062
22	4	0.0017	-0.00073	0.00030	0.00056
Network summary	28	0.012	-0.0019	0.0012	0.00065
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.0015	-0.00016	0.00070	0.00039
23	4	0.0011	-0.00086	0.00011	0.00039
31	4	0.015	-0.0014	0.0041	0.0038
33	4	0.0030	0.00022	0.0012	0.00062
34	4	-0.00027	-0.0011	-0.00068	0.00017
36	4	0.0015	0.00011	0.00082	0.00028
40	4	0.0023	-0.0032	-0.00051	0.0013
41	4	0.0030	-0.00059	0.0011	0.00074
42	4	0.00027	-0.00038	0.000027	0.00016
43	4	0.0014	-0.0011	0.00024	0.00050
44	4	0.0054	-0.0020	0.00088	0.0016
45	4	0.0043	-0.0012	0.0016	0.0011
46	4	0.00073	-0.0027	-0.00076	0.00079
Network summary	52	0.015	-0.0032	0.00068	0.00036
<i>Remote stations^c</i>					
51	4	0.0022	-0.00035	0.00043	0.00059
52	4	0.0027	-0.0022	-0.000068	0.0011
53	4	0.0022	-0.0011	0.00081	0.00068
55	4	0.0041	-0.00019	0.0021	0.0011
56	4	0.0022	0.00057	0.0013	0.00035
57	4	0.0012	-0.023	-0.0050	0.0061
58	4	0.0046	0.00027	0.0019	0.0010
Network summary	28	0.0046	-0.023	0.00021	0.00092

^aStandard deviation about the average.

^bSee Fig. 2.4.4 in Vol. 1.

^cSee Fig. 2.4.5 in Vol. 1.

Table 2.5.4. 1988 ²³⁹Pu concentrations in soil

Location	Number of samples	Concentration (pCi/g dry wt)			Standard error ^a
		Max	Min	Av	
<i>ORNL perimeter stations^b</i>					
3	4	0.049	0.027	0.036	0.0050
4	4	0.73	0.049	0.25	0.16
7	4	0.035	0.0016	0.015	0.0077
9	4	0.035	0.0019	0.020	0.0081
20	4	0.0041	-0.0027	0.00042	0.0016
21	4	0.0038	-0.0015	0.0011	0.0011
22	4	0.021	0.011	0.015	0.0021
Network summary	28	0.73	-0.0027	0.048	0.026
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.012	0.0046	0.0091	0.0016
23	4	0.021	0.0049	0.013	0.0039
31	4	0.024	0.011	0.018	0.0029
33	4	0.042	0.0065	0.023	0.0073
34	4	0.010	0.0019	0.0060	0.0019
36	4	0.026	0.00086	0.010	0.0059
40	4	0.041	0.011	0.026	0.0072
41	4	0.035	0.014	0.024	0.0044
42	4	0.0035	0.0016	0.0023	0.00041
43	4	0.023	-0.00043	0.012	0.0055
44	4	0.010	-0.0065	0.0041	0.0037
45	4	0.039	0.0030	0.016	0.0083
46	4	0.0062	0.0019	0.0040	0.00090
Network summary	52	0.042	-0.0065	0.013	0.0016
<i>Remote stations^c</i>					
51	4	0.011	0.0041	0.0090	0.0017
52	4	0.032	0.013	0.020	0.0044
53	4	0.041	0.012	0.027	0.0079
55	4	0.026	0.0065	0.019	0.0043
56	4	0.014	0.0092	0.012	0.0011
57	4	0.054	0.025	0.037	0.0060
58	4	0.0016	-0.0054	-0.0013	0.0015
Network summary	28	0.054	-0.0054	0.018	0.0027

^aStandard deviation about the average.^bSee Fig. 2.4.4 in Vol. 1.^cSee Fig. 2.4.5 in Vol. 1.

Table 2.5.5. 1988 total radioactive strontium concentrations in soil

Location	Number of samples	Concentration (pCi/g dry wt)			
		Max	Min	Av	Standard error ^a
<i>ORNL perimeter stations^b</i>					
3	4	0.46	0.17	0.31	0.068
4	4	10	3.0	5.5	1.6
7	4	0.27	-0.024	0.13	0.061
9	4	0.41	0.14	0.23	0.060
20	4	0.076	0.022	0.043	0.012
21	4	0.21	0.065	0.12	0.035
22	4	1.5	0.043	0.68	0.35
Network summary	28	10	-0.024	1.0	0.42
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.038	0.0043	0.021	0.0069
23	4	0.025	0.0059	0.019	0.0046
31	4	0.65	0.038	0.26	0.13
33	4	0.26	0.054	0.12	0.047
34	4	0.15	-0.019	0.067	0.036
36	4	0.22	0.021	0.091	0.046
40	4	0.19	0.070	0.13	0.025
41	4	0.26	0.030	0.11	0.051
42	4	0.11	0.0081	0.058	0.028
43	4	0.10	0.041	0.072	0.016
44	4	0.20	0.038	0.097	0.036
45	4	0.18	0.059	0.11	0.028
46	4	0.16	0.081	0.14	0.019
Network summary	52	0.65	-0.019	0.10	0.014
<i>Remote stations^c</i>					
51	4	0.22	0.076	0.13	0.031
52	4	0.30	0.22	0.25	0.020
53	4	0.20	0.17	0.19	0.0058
55	4	0.32	0.13	0.21	0.041
56	4	0.46	0.13	0.30	0.077
57	4	0.27	0.076	0.17	0.040
58	4	0.62	-0.019	0.16	0.16
Network summary	28	0.62	-0.019	0.20	0.026

^aStandard deviation about the average.^bSee Fig. 2.4.4 in Vol. 1.^cSee Fig. 2.4.5 in Vol. 1.

Table 2.5.6. 1988 ^{234}U concentrations in soil

Location	Number of samples	Concentration (pCi/g dry wt)			
		Max	Min	Av	Standard error ^a
<i>ORNL perimeter stations^b</i>					
3	4	0.35	0.21	0.28	0.030
4	4	0.32	0.27	0.30	0.013
7	4	0.41	0.27	0.33	0.030
9	4	0.38	0.27	0.32	0.022
20	4	0.43	0.23	0.31	0.049
21	4	0.95	0.38	0.70	0.12
22	4	0.32	0.27	0.30	0.011
Network summary	28	0.95	0.21	0.36	0.032
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.46	0.30	0.36	0.036
23	4	0.84	0.46	0.66	0.098
31	4	0.73	0.32	0.51	0.088
33	4	0.46	0.20	0.36	0.056
34	4	0.41	0.21	0.33	0.041
36	4	0.32	0.20	0.26	0.028
40	4	1.1	0.76	0.92	0.077
41	4	0.86	0.41	0.65	0.094
42	4	0.32	0.27	0.28	0.014
43	4	0.46	0.25	0.32	0.048
44	4	0.32	0.17	0.24	0.033
45	4	5.1	0.73	2.5	0.94
46	4	0.76	0.59	0.68	0.033
Network summary	52	5.1	0.17	0.62	0.10
<i>Remote stations^c</i>					
51	4	0.30	0.19	0.25	0.022
52	4	0.59	0.41	0.51	0.043
53	4	0.76	0.62	0.70	0.029
55	4	0.73	0.35	0.49	0.086
56	4	0.30	0.20	0.25	0.021
57	4	0.73	0.38	0.60	0.078
58	4	0.46	0.38	0.41	0.020
Network summary	28	0.76	0.19	0.46	0.034

^aStandard deviation about the average.^bSee Fig. 2.4.4 in Vol. 1.^cSee Fig. 2.4.5 in Vol. 1.

Table 2.5.7. 1988 ²³⁵U concentrations in soil

Location	Number of samples	Concentration (pCi/g dry wt)			Standard error ^a
		Max	Min	Av	
<i>ORNL perimeter stations^b</i>					
3	4	0.014	0.010	0.012	0.00078
4	4	0.017	0.011	0.014	0.0014
7	4	0.030	0.012	0.021	0.0037
9	4	0.024	0.010	0.016	0.0032
20	4	0.023	0.011	0.016	0.0027
21	4	0.035	0.030	0.032	0.0011
22	4	0.014	0.012	0.013	0.00057
Network summary	28	0.035	0.010	0.018	0.0015
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.043	0.012	0.022	0.0074
23	4	0.035	0.021	0.030	0.0034
31	4	0.032	0.016	0.023	0.0041
33	4	0.026	0.0092	0.021	0.0040
34	4	0.023	0.0097	0.016	0.0029
36	4	0.020	0.011	0.015	0.0020
40	4	0.068	0.046	0.055	0.0046
41	4	0.041	0.032	0.034	0.0020
42	4	0.021	0.013	0.016	0.0019
43	4	0.046	0.011	0.025	0.0079
44	4	0.022	0.0081	0.013	0.0031
45	4	0.49	0.032	0.22	0.096
46	4	0.070	0.049	0.061	0.0046
Network summary	52	0.49	0.0081	0.043	0.010
<i>Remote stations^c</i>					
51	4	0.010	0.0073	0.0091	0.00072
52	4	0.062	0.025	0.045	0.0079
53	4	0.046	0.032	0.039	0.0030
55	4	0.046	0.027	0.037	0.0045
56	4	0.021	0.0068	0.012	0.0032
57	4	0.070	0.024	0.044	0.010
58	4	0.025	0.015	0.020	0.0023
Network summary	28	0.070	0.0068	0.029	0.0033

^aStandard deviation about the average.^bSee Fig. 2.4.4 in Vol. 1.^cSee Fig. 2.4.5 in Vol. 1.

Table 2.5.8. 1988 ²³⁸U concentrations in soil

Location	Number of samples	Concentration (pCi/g dry wt)			
		Max	Min	Av	Standard error ^a
<i>ORNL perimeter stations^b</i>					
3	4	0.27	0.15	0.20	0.026
4	4	0.23	0.20	0.21	0.0066
7	4	0.32	0.23	0.26	0.022
9	4	0.30	0.20	0.25	0.023
20	4	0.38	0.14	0.23	0.057
21	4	0.57	0.27	0.41	0.063
22	4	0.26	0.19	0.23	0.021
Network summary	28	0.57	0.14	0.25	0.017
<i>Oak Ridge Reservation stations^b</i>					
8	4	0.26	0.19	0.22	0.015
23	4	0.95	0.49	0.72	0.11
31	4	0.41	0.19	0.29	0.045
33	4	0.32	0.14	0.26	0.040
34	4	0.30	0.15	0.25	0.035
36	4	0.26	0.16	0.22	0.024
40	4	0.62	0.46	0.53	0.036
41	4	0.54	0.22	0.41	0.067
42	4	0.24	0.20	0.21	0.0093
43	4	0.32	0.20	0.24	0.029
44	4	0.22	0.12	0.17	0.020
45	4	8.6	0.68	3.5	1.7
46	4	0.38	0.32	0.36	0.013
Network summary	52	8.6	0.12	0.57	0.17
<i>Remote stations^c</i>					
51	4	0.27	0.16	0.21	0.023
52	4	0.54	0.35	0.45	0.047
53	4	0.59	0.43	0.53	0.039
55	4	0.54	0.30	0.40	0.052
56	4	0.24	0.17	0.21	0.016
57	4	0.57	0.32	0.50	0.059
58	4	0.32	0.25	0.28	0.016
Network summary	28	0.59	0.16	0.37	0.028

^aStandard deviation about the average.^bSee Fig. 2.4.4 in Vol. 1.^cSee Fig. 2.4.5 in Vol. 1.

Table 2.5.9. 1988 fluoride and uranium in soil from ORGDP perimeter^a

New station ID	Number of samples	Concentration ($\mu\text{g/g}$ dry wt)						U (pCi/g dry wt)		
		F			U (total)			March	July	Av
		March	July	Av	March	July	Av			
S18	2	425	554	490	2.2	5	3.6	1.7	3.9	2.8
S19	2	530	534	532	2.6	4	3.3	2.0	3.1	2.6
S20	2	227	240	233	5.6	6	5.8	4.4	4.7	4.5
S21	2	290	1460	875	2.0	7	4.5	1.6	5.5	3.5
S22	2	163	750	457	4.5	3	3.8	3.5	2.4	2.9
S23	2	261	192	227	2.0	5	3.5	1.6	3.9	2.7
S24	2	335	203	269	1.2	4	2.6	0.9	3.1	2.0
S25	2	377	444	411	95.2	6	50.6	74.6	4.7	36.7
S26	2	675	286	481	5.0	3	4	3.9	2.4	3.1
S27	2	420	368	394	8.3	3	5.7	6.5	2.4	4.4
S28	2	295	390	343	7.3	34	20.7	5.7	26.7	16.2
S29	2	580	910	745	27.1	7	17.1	21.2	5.5	13.4
S30	2	363	295	329	1.8	4	2.9	1.4	3.1	2.3

^aSee Fig. 2.5.1 in Vol. 1.

Table 2.5.10. 1988 concentrations of various elements in stream sediment samples near ORGDP^a

Element		Concentration ($\mu\text{g/g}$ dry wt)							
		SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8
Aluminum	Jul	9,200	6,200	8,900	13,000	13,000	7,900	10,000	4,300
	Dec	12,000	7,800	11,000	10,000	11,000	7,100	7,100	2,700
	Av	6,460	7,000	9,950	11,500	12,000	7,500	8,550	3,500
Cadmium	Jul	0.36	<0.30	0.64	<0.30	<0.30	<0.30	<0.30	<0.30
	Dec	1.1	3.0	2.2	2.5	2.3	1.1	0.97	<0.30
	Av	0.73	<1.65	1.42	<1.40	<1.30	<0.70	<0.64	<0.30
Chromium	Jul	23	39	22	46	15	31	24	6.9
	Dec	17	43	24	39	24	30	13	5.1
	Av	20	41	23	43	20	31	19	6.0
Copper	Jul	19	14	27	130	8.1	15	14	<0.40
	Dec	13	49	43	110	40	22	16	4.0
	Av	16	32	35	120	24	19	15	<2.20
Lead	Jul	20.3	16.3	26.4	49.6	17.6	18.2	26.0	7.29
	Dec	11	19	25	33	29	15	18	4.1
	Av	15.7	17.7	25.7	41.3	23.3	16.6	22	5.7
Manganese	Jul	500	260	680	580	320	540	1,600	500
	Dec	610	390	580	600	780	520	1,200	210
	Av	555	325	630	590	550	530	1,400	355
Mercury	Jul	6.4	7.1	7.7	5.5	17.2	7.8	1.2	<1.0
	Dec	4.0	88.1	9.8	7.9	10.4	8.4	<1.0	<1.0
	Av	5.2	47.6	8.8	6.7	13.8	8.1	<1.1	<1.0
Nickel	Jul	29	34	44	320	13	33	20	8.5
	Dec	17	120	51	290	21	30	12	4.8
	Av	23	77	47.5	305	17	32	16	6.7
Thorium	Jul	<20	<20	<20	<20	<20	<20	<20	<20
	Dec	<20	<20	<20	<20	<20	<20	<20	<20
	Av	<20	<20	<20	<20	<20	<20	<20	<20
Uranium	Jul	14	14	9	179	8	9	4	3
	Dec	4	14	27	104	11	5	6	2
	Av	9	14	18	142	10	7	5	3
Zinc	Jul	98	70	110	140	41	68	61	24
	Dec	51	120	120	150	120	68	46	17
	Av	75	95	115	145	81	68	54	21

^aSee Fig. 2.5.2 in Vol. 1.

Table 2.5.11. PCB concentrations in sediment, May through October 1988^a

Location	Analysis	No. of samples	Concentration (µg/kg)			
			Max	Min	Av	Standard error ^b
WOC 6	PCB-1016	4	<910	<400	<560	120
	PCB-1221	4	<910	<400	<560	120
	PCB-1232	4	<910	<400	<560	120
	PCB-1242	4	<910	<400	<560	120
	PCB-1248	4	3000	<400	<1700	722
	PCB-1254	4	7800 ^c	~200 ^c	~3300	1856
	PCB-1260	4	2500	<800	<1600	440
WOC 10	PCB-1016	4	<200	<80	<140	33
	PCB-1221	4	<200	<80	<140	33
	PCB-1232	4	<200	<80	<140	33
	PCB-1242	4	<780	<80	<280	167
	PCB-1248	4	<780	<80	<280	167
	PCB-1254	4	1800	~50	~910	487
	PCB-1260	4	1300	<160	<680	302
WOC 14	PCB-1016	4	<330	<80	<210	55
	PCB-1221	4	<330	<80	<210	55
	PCB-1232	4	<330	<80	<210	55
	PCB-1242	4	<330	<80	<210	55
	PCB-1248	4	<330	<80	<210	55
	PCB-1254	4	<670	<160	<420	112
	PCB-1260	4	<670	<160	<420	112
WOD 13	PCB-1016	4	<180	<80	<130	27
	PCB-1221	4	<180	<80	<130	27
	PCB-1232	4	<180	<80	<130	27
	PCB-1242	4	<180	<80	<130	27
	PCB-1248	4	<180	<80	<130	27
	PCB-1254	4	<360	~19	~190	96
	PCB-1260	4	~360	<160	~260	56
MB 7	PCB-1016	4	<400	<80	<200	68
	PCB-1221	4	<400	<80	<200	68
	PCB-1232	4	<400	<80	<200	68
	PCB-1242	4	<400	<80	<200	68
	PCB-1248	4	<400	<80	<200	68
	PCB-1254	4	<800	<160	<410	136
	PCB-1260	4	<800	<160	<410	136
CR 8	PCB-1016	4	<400	<80	<180	73
	PCB-1221	4	<400	<80	<180	73
	PCB-1232	4	<400	<80	<180	73
	PCB-1242	4	<400	<80	<180	73
	PCB-1248	4	<400	<80	<180	73
	PCB-1254	4	<800	<160	<370	146
	PCB-1260	4	<800	<160	<370	146
CR 9	PCB-1016	4	<220	<80	<140	34
	PCB-1221	4	<220	<80	<140	34
	PCB-1232	4	<220	<80	<140	34
	PCB-1242	4	<220	<80	<140	34
	PCB-1248	4	<220	<80	<140	34
	PCB-1254	4	<440	<160	<280	70
	PCB-1260	4	<440	<160	<280	70

Table 2.5.11 (continued)

Location	Analysis	No. of samples	Concentration ($\mu\text{g}/\text{kg}$)			Standard error ^b
			Max	Min	Av	
CR 11	PCB-1016	4	<120	<80	<100	11
	PCB-1221	4	<120	<80	<100	11
	PCB-1232	4	<120	<80	<100	11
	PCB-1242	4	<120	<80	<100	11
	PCB-1248	4	<120	<80	<100	11
	PCB-1254	4	<240	<160	<200	23
	PCB-1260	4	<240	<160	<200	23
CR 12	PCB-1016	4	<110	<80	<95	8.6
	PCB-1221	4	<110	<80	<95	8.6
	PCB-1232	4	<110	<80	<95	8.6
	PCB-1242	4	<110	<80	<95	8.6
	PCB-1248	4	<110	<80	<95	8.6
	PCB-1254	4	<220	<160	<190	17
	PCB-1260	4	<220	<160	<190	17

^aSee Fig. 2.2.8 in Vol. 1.

^bStandard error about the mean.

2.6 EXTERNAL GAMMA

Table 2.6.1. 1988 external gamma radiation measurements

Location	Number of samples	Concentration ($\mu\text{R}/\text{h}$)			
		Max	Min	Av	Standard error ^a
<i>ORNL PAM stations^b</i>					
3	40	7.4	6.5	6.9	0.040
4	32	330	110	200	8.7
7	44	10	4.2	7.6	0.24
20	50	9.3	8.3	8.7	0.026
Network summary	166	330	4.2	44	6.0
<i>Oak Ridge Reservation stations^b</i>					
08	39	13	7.0	7.6	0.17
31	47	8.3	7.7	8.0	0.019
33	44	8.8	7.8	8.2	0.034
34	40	10	8.4	9.1	0.080
36	49	8.2	7.0	7.6	0.030
40	28	8.8	7.8	8.2	0.048
41	46	13	6.1	7.6	0.28
42	48	8.0	6.8	7.4	0.041
43	43	8.0	6.5	7.0	0.062
44	35	7.5	6.8	7.1	0.031
45	36	7.7	6.8	7.1	0.035
46	22	52	9.4	16	2.3
Network summary	477	52	6.1	8.1	0.14

^aStandard deviation of the average.

^bSee Fig. 2.4.4 in Vol. 1.

3. RADIATION AND CHEMICAL DOSE

All data for this section are presented in Vol. 1.

4. REMEDIAL ACTION

All data for this section are presented in Vol. 1.

5. SOLID WASTE MANAGEMENT

Table 5.2.1. Y-12 Plant remedial action waste data for 1988

Waste	Quantity (kg)
Nonhazardous	1,178,200
Hazardous	0 ^a
Mixed	432,000 ^b

^aNo hazardous waste was generated as the result of Y-12 Plant remedial action activities.

^bDoes not include treated water discharged from Oil Ponds 1 and 2.

Table 5.3.1. Y-12 Plant on-site waste treatment data for FY 1988

Waste	Quantity treated (kg) ^a	Treatment method	Residue type	Residue quantity (kg) ^a
<i>Liquids</i>				
Nonhazardous	5,279,300 ^b	<i>c</i>	Sludge	
Hazardous	1,345,500	<i>d</i>	Sludge	
Low-level aqueous	300,000	<i>c, e</i>	Sludge	
Mixed	4,729,800	<i>c</i>	Sludge	
<i>Solids^f</i>				
Low-level solids (ft ³) ^g	308,600	Compaction	Solid	38,200

^aUnits are kilograms except as noted.

^bDoes not include wastewater treated at the Steam Plant Wastewater Treatment Facility.

^cBatch reactors, settling, filtration, chrome reduction, hydrated lime treatment, dewatering, effluent polishing, biodegradation, and biological degradation.

^dBatch reactors, settling, filtration, chrome reduction, hydrated lime treatment, dewatering, effluent polishing, biodegradation, biological degradation, pH control, and metal precipitation.

^eBatch reactors, settling, filtration, chrome reduction, hydrated lime treatment, dewatering, effluent polishing, and biodegradation.

^fTotal; cannot be broken down.

^gData provided are for FY 1988.

Table 5.3.2. 1988 ORNL waste treatment data

Type	Quantity (kg)	Treatment	Residue type	Quantity (kg/year)
Hazardous	105	Detonation	None	
Hazardous	47	Evaporation	Nonhazardous glass	5

Table 5.3.3. Y-12 Plant on-site waste disposal during 1988

Waste	Method	Quantity (kg)
Sanitary/industrial	Landfill	5,217,800 ^a
Solid/low level	Landfill	1,513,400
Classified	Landfill	130,200

^aThis category does not include construction/demolition spoils (dirt, concrete, wood, etc.) disposed at the Y-12 Centralized Sanitary Landfill II.

Table 5.3.4. 1988 ORNL on-site waste disposal

Waste	Disposal method	Quantity
Hazardous (kg)	Release to air	24
Sanitary		
Nonrad (kg)	X-10 landfill	8,700
Rad (m ³)	Buried X-10 SWSA 6	110
Asbestos		
Rad (kg)	Buried X-10 SWSA 6	1,400
Scrap metal		
Rad (kg)	Buried X-10 SWSA 6	29,000

Table 5.3.5. ORGDP waste disposal at DOE Oak Ridge Facilities during 1988

Waste	Quantity	Disposal method
Industrial nonradiological (kg)	29	Gases trapped/vented to atmosphere
Asbestos nonradiological (kg)	32,682	Sent to landfill at Y-12 Plant
Miscellaneous nonradiological (m ³)	536	Buried at ORGDP-classified solids
nonhazardous (m ³)	80,524	Sent to landfill at Y-12 Plant-sanitary demo

Table 5.3.6. Y-12 Plant 1988 off-site waste disposal

Waste	Method	Quantity (kg)
Oil and solvents	Fuels program; incineration; recycle/recovery	90,900
PCB liquid	Incineration	23,800
PCB solids	Landfill	0
RCRA	Shipped off-site	33,200
Scrap metal (clean)	Public sale	2,462,700

Table 5.3.7. 1988 ORNL off-site waste disposal activities

Waste	Quantity (kg)	Disposal method	Location
Hazardous	1,300	Incineration	Ensco, El Dorado, Ark.
Hazardous	7,500	Landfilling	Chem Waste, Emelle, Ala.
Hazardous	800	Fuel recycle	Chem Waste, Emelle, Ala.
Hazardous	23,000	Landfilling	Rollins, Baton Rouge, La.
Hazardous	55,000	Metal reclamation	Demco, Coalfield, Tenn.
PCB nonrad	11,000	Incineration	Rollins, Deer Park, Tex.
Asbestos nonrad	23,000	Landfilling	Y-12 Plant Central Sanitary Landfill, Oak Ridge, Tenn.
Hazardous	1,500	Reacted with water	Y-12 Plant quarry, Oak Ridge, Tenn.
Mixed	23,000	Fuel recycle	Quadrex, Gainesville, Fla.
Miscellaneous nonhazardous	2,500	Landfilling	Y-12 Plant Central Sanitary Landfill, Oak Ridge, Tenn.

Table 5.3.8. ORGDP off-site disposal activities during 1988

Waste description	Quantity (kg)	Ultimate disposal
Scrap metal—nonradiological	682,362	Sold to public
Batteries (solid)	12,840	Sold to public (for recycle)
Film (solid)	96	Sold to public (for recovery)
Chemicals	382	Sold to public
Office furniture, tires, etc.	2,727	Sold to public
Laboratory chemicals, janitorial supplies, etc.	24,715	Commercial disposal facility
Fire extinguishers	3,864	Sold to public
Scrap lumber	7,272	Sold to public
Lead	448	Sold to public
Brass	1,886	Sold to public

Table 5.3.9. Waste placed in storage on-site at the Y-12 Plant in 1988

Waste	Quantity (kg)
Low level	734,900
Mixed	827,000
PCB	66,900
PCB/uranium	15,100
RCRA	175,300
Roofing materials	0
Scrap metal (contaminated)	867,700
Other ^a	1,209,600

^aConsists primarily of mercury-contaminated waste material.

Table 5.3.11. 1988 waste placed in storage at ORNL

Waste	Quantity	
	Long-term (kg)	Short-term (kg)
Hazardous		74,000
Mixed	1,800	10,500
PCB		
Nonrad		14,000
Rad	3,020	
Transuranic		
Contact handled	6,800	
Remote handled	3,900	
Low-level ^a (m ³)	21	
Asbestos		
Nonrad		23,000
Rad		1,400
Scrap metal		
Nonrad		740,000
Rad		29,000
Miscellaneous rad (m ³)	3	

^aLow-level concentrated sludge.

Table 5.3.10. Y-12 Plant total waste in storage at the end of 1988^a

Waste	Quantity (kg)
Low-level	1,039,400
Mixed	4,808,300
Hazardous	222,000
PCB	56,100
PCB/uranium	261,900
Noncontaminated oils/ solvents	45,000
Roofing materials	3,109,000
Scrap metal	
Clean	0
Uranium-contaminated	3,585,500
Mercury-contaminated soil	3,436,400
Other ^b	1,209,600

^aTotals do not include United Nuclear Corporation wastes.

^bMercury-contaminated waste materials.

Table 5.3.12. Waste remaining in storage at ORNL at year's end for 1988

Waste	Quantity (kg)
Hazardous	46,000
Mixed	64,000
PCB	
Nonrad	690
Rad	5,000
Transuranic	
Contact handled	103,000
Remote handled	470,000
Low-level ^a (m ³)	21
Scrap metal rad	890

^aAn additional 280 m³ of ORNL's low-level concentrated sludge is in storage at ORGDP.

Table 5.3.13. 1988 ORGDP waste placed in on-site storage

Waste description	Quantity	Type storage ^a		Ultimate disposal
		Short-term	Long-term	
Scrap metal (kg)	82,727		X	Under review
PCB liquids (L)	2,000	X		TSCA incinerator
PCB solids (kg)	9,737	X		TSCA incinerator
Centrifuge sludge (kg)	2,000		X	Under review
Plating solutions (kg)	450		X	Shipped off-site from storage
Solvents (L)	2,950	X		TSCA incinerator
Oils (L)	79,000	X		TSCA incinerator
Sludge from K-1232 treatment of Y-12 Plant wastewaters (kg)	7,524		X	Under review
Laboratory waste (kg) BMP	32,015	X		Analyses and treatment plan under review
Sludge from close-out of K-1407-B/C ponds (L × 10 ⁶)	3.38		X	Delisting effort under way
Spill cleanup debris (kg)	272	X		TSCA incinerator
Photographic solutions (L)	2,708	X		ORNL for silver recovery
Aerosol contents (L)	752	X		TSCA incinerator
TSCA ash (kg) ^b	97,041		X	Under review
Gas cylinders (kg)	30		X	Under review

^aShort-term storage = <5 years; long-term storage = >5 years.

^bTSCA and RCRA test burns; includes caustic sludges from scrubbing system.

Table 5.3.14. Waste placed in storage at ORGDP from other DOE facilities during 1988

Waste description	Quantity ^a	Type storage ^b		Ultimate disposal
		Short-term	Long-term	
Toluene	5,800	X		Blended, TSCA incinerated
Perchloroethylene	5,600	X		Blended, TSCA incinerated
Trichloroethane	2,000	X		Blended, TSCA incinerated
Ethyl acetate	400	X		Blended, TSCA incinerated
Tetrachloroethylene	2,600	X		Blended, TSCA incinerated
Metal sludges	7,524 (kg)			Under review
Trichloroethylene	28,460	X		TSCA incinerated
Waste oils/solvents	20,100	X		TSCA incinerated
Waste oils/solvents (mixed)	2,600			TSCA incinerated
Waste oils/solvents (PCB)	13,820			TSCA incinerated
Nonhazardous waste	2,600			Under review
Portsmouth PCBs contaminated soils	909,000 (kg)			Under review; TSCA incinerated

^aNumbers are liters unless otherwise noted.

^bShort-term storage == <5 years; long-term storage == >5 years.

Table 5.3.15. Total waste in storage at ORGDP—end of 1988

Waste description	Quantity ^a	Ultimate disposal
Waste oils (low-level waste)	12,400	Incineration
K-1407-B/C pond sludge (mixed)	52,577 (drums)	Under review
K-1420 nickel electroplating solution (mixed)	1,900	Under review
K-1420 hydrochloric acid (mixed)	760	Under review
K-1420 nitric acid (mixed)	12,500	Under review
K-1420 electroless nickel solution (mixed)	18,900	Under review
K-1407-B/C pond sludge (mixed in surface impoundment)	7,331,420	To be fixed in concrete
Spent solvents, oils, & PCB liquids (mixed)	617,600	Incineration
Paint waste	11,433	Incineration
K-1232 spent carbon filter agent (mixed)	41,600	Under review
Sludges from treatment of wastewaters	82,000	Under review
PCB solids and liquids (PCB radiological)	965 (drums)	Incineration
Decontamination solutions (mixed)	229 (drums)	Under review
Waste oils from WMCO (mixed)	814 (drums)	Incineration
Y-12 metal sludges	7,524 (kg)	Under review
Waste treatment	82,000	Treatment
Portsmouth PCB contaminated soil	909,000 (kg)	Under review
Incineration ash/sludge	97,041 (kg)	Under review

^aUnits are liters except where noted otherwise.

6. SPECIAL STUDIES



All data for this section are presented in Vol. 1.

7. QUALITY ASSURANCE

**Table 7.1.1. Example of inorganic QC results for sampling
GW-253—Y-12 Plant, 1988**

Parameter	GW-253	Field replicate	Field blank
Concentration (mg/L)			
As	<0.005	<0.005	<0.005
Ba	0.47	0.53	0.054
Cd	5.5	8.3	5.4
Cr	0.012	0.013	0.011
Pb	0.097	0.094	0.098
Se	<0.005	<0.005	<0.005
Ag	<0.01	<0.01	<0.01
Hg	0.017	0.015	0.015
TOC ^a	35	35	
pH (units)	5.0	4.9	
Activity (pCi/L)			
Alpha	95	73	
Beta	157	119	
Suspended solids (mg/L)	4	3	
U (mg/L)	0.007	0.007	0.005
Conductivity (μ mho/cm)	5806	5801	
Alkalinity (mg/L)			
CO ₃	<1	<1	
HCO ₃	46	46	

^aTotal organic carbon.

**Table 7.1.2 Example of organic QC data at
GW-253—Y-12 Plant, 1988**

Parameter	GW-253	Field duplicate	Field blank
<i>Volatile organic compounds (µg/L)</i>			
Chloromethane	10U	10U	10U
Bromomethane	10U	10U	10U
Vinyl chloride	10U	10U	10U
Chloroethane	10U	10U	10U
Methylene chloride	2JB	2JB	2JB
Acetone	10U	10U	10U
Carbon disulfide	5U	5U	5U
1,1-dichloroethene	5U	5U	5U
1,1-dichloroethane	5U	5U	5U
<i>Trans</i> -1,2-dichloroethene	5U	5U	5U
Chloroform	49B	49B	0.4JB
1,2-dichloroethane	5U	5U	5U
2-butanone	10U	10U	10U
1,1,1-trichloroethane	1J	1J	5U
Carbon tetrachloride	58	56	5U
Vinyl acetate	10U	10U	1JB
Bromodichloromethane	0.8J	0.8J	5U
1,1,2,2-tetrachloroethane	5U	5U	0.8J
1,2-dichloropropane	5U	5U	5U
<i>Trans</i> -1,3-dichloropropene	5U	5U	5U
Trichloroethene	590E	600E	5U
Chlorodibromomethane	0.8J	0.8J	5U
1,1,2-trichloroethane	5U	5U	5U
Benzene	0.7J	0.6J	5U
<i>Cis</i> -1,3-dichloropropene	5U	5U	5U
2-chloroethylvinyl ether	5U	5U	5U
Bromoform	5U	5U	5U
2-hexanone	10U	10U	10U
4-methyl-2-pentanone	10U	10U	10U
Tetrachloroethene	920E	940E	5U
Toluene	2JB	2JB	0.8J
Chlorobenzene	2J	5U	5U
Ethylbenzene	5U	5U	5U
Styrene	5U	5U	5U
Xylenes	5U	5U	5U
<i>Surrogate Recovery (%)</i>			
Toluene-D8	102	94	96
Bromofluorobenzene	106	92	100
1,2-dichloroethane D-4	110	100	98

^aND = not detected.

^bCompound found in lab blank.

^cEstimated value.

U = compound analyzed for but not detected.

J = indicates an estimated value.

B = analyte found in blank as well as sample.

E = exceeds calibration range.

Table 7.2.1. Energy Systems environmental analysis procedures for water

Parameter	Energy Systems procedure	EPA method	Lowest concentration reported ^a
Alkalinity, CaCO ₃ (mg/L)	EC-1005	310.1	5
Gross alpha activity (pCi/L)	EC-1010		1.0
Gross beta activity (pCi/L)	EC-1010		4.0
²⁴¹ Am and ²⁴⁴ Cm (pCi/L)			
²⁴¹ Am	EC-1020		3.0 (ORNL) 0.05
²⁴⁴ Cm	EC-1020		3.0 (ORNL) 0.05
As and Se, gaseous hydride-AA (mg/L)			
As	EC-1040	206.3	0.002
Se	EC-1040	270.3	0.002
Asbestos (fibers/L)	EC-1050		0.3 × 10 ⁶
Biochemical oxygen demand, 5-d (mg/L)	EC-1060	405.1	5
Bromide, spectrophotometric (mg/L)	EC-1070	ASTM D 1216-77	0.1
Chemical oxygen demand (low level) titration method (mg/L)	EC-1090	410.2	5
Chloride, titration, HgNO ₃ (mg/L)	EC-1120	325.3	2
Anions, ion chromatograph ^b (mg/L)			
Chloride	EC-1130	300.0	2
Nitrate (N)	EC-1130	300.0	1
Sulfate	EC-1130	300.0	5
Phosphate (P)	EC-1130	300.0	2
TRCl ₂ , amperometric (mg/L)	EC-1150	330.1	0.05 (PGDP) 0.01
Cr (VI), spectrophotometric (mg/L)	EC-1180	USGS ^c	0.01
Coliform bacteria, fecal (colonies/100 mL)	EC-1190	909C Std Mth ^d	1
Coliform bacteria, total (colonies/100 mL)	EC-1200	909A Std Mth	1
Color (color unit)	EC-1220	110.2	1
Conductance, specific (μmho/cm)	EC-1240	120.1	0.5
Cyanide, total (5-cm cell)	EC-1270	335.2	0.004
Dissolved oxygen, membrane electrode method (mg/L)	EC-1300	360.1	0.1
Fluoride (mg/L)	EC-1330	340.2	0.1
Gamma-ray emitters (pCi/L)	EC-1340		2.5
Herbicides (chlorinated phenoxy acid), GC method (μg/L)			
2,4-D	EC-1370	509B Std Mth	0.1
Silvex	EC-1370	509B Std Mth	0.02
¹³¹ I (pCi/L)	EC-1380		4.0
Hg, total (mg/L)	EC-1390	245.1	0.0002
Methylene-blue-active substances (mg/L)	EC-1450	425.1	0.05
²³⁷ Np (pCi/L)	EC-1460		1.0 (ORNL) 4 × 10 ⁻²
N (mg/L)			
Ammonia, spectrophotometric	EC-1470	350.2	0.2
Ammonia, SIE	EC-1480	350.3	0.2
Kjeldahl (total), spectrophotometric	EC-1500	351.3	0.2
Kjeldahl (total), volumetric	EC-1510	351.3	0.2
Kjeldahl (total), SIE	EC-1520	351.4	0.2
Nitrate, brucine method	EC-1530	352.1	0.1
Nitrate-nitrite, Cd-Redn.	EC-1540	353.3	0.1
N-nitrosomorpholine, spectrophotometric (mg/L)	EC-1550		1.0
O&G, gravimetric (mg/L)	EC-1560	413.1	5
O&G, infrared (mg/L)	EC-1570	413.2	2.0
Pentachlorophenol, HPLC (μg/L)	EC-1583		50

Table 7.2.1 (continued)

Parameter	Energy Systems procedure	EPA method	Lowest concentration reported ^a
Pesticides (organochlorine), GC method ($\mu\text{g/L}$)			
Lindane	EC-1586	608 ^e	0.01
Endrin	EC-1586	608	0.05
Toxaphene	EC-1586	608	1.0
Methoxychlor	EC-1586	509A Std Mth	0.2
Phenols ($\mu\text{g/L}$)			
Without conc.	EC-1590	420.1	50
With conc.	EC-1590	420.1	5
pH, electrometric (units)	EC-1600	150.1	Nearest 0.1
P (all forms), spectrophotometric (mg/L)	EC-1610	365.2	0.1
Pu isotopes (pCi/L)	EC-1615		1.0 (ORNL) 5×10^{-2}
PCBs, each ($\mu\text{g/L}$)	EC-1620	608	0.5
Priority pollutants, organic (base/neutral/acid), each ($\mu\text{g/L}$)	EC-1701	625	Mostly 10–50 ^f
Priority pollutants, organic (volatile, purgeable), each ($\mu\text{g/L}$)	EC-1704	624	Mostly 10–30 ^g
Solids			
Dissolved (mg/L)	EC-1760	160.1	10
Settleable [mL/(L·h)]	EC-1770	160.5	1.0
Total (mg/L)	EC-1790	160.3	10
Undissolved (mg/L)	EC-1800	160.2	4
Volatile (mg/L)	EC-1820	160.4	5
⁹⁰ Sr (pCi/L)	EC-1840		4.0 (ORNL) 2.0
Sulfate, turbidimetric method (mg/L)	EC-1850	375.4	5
⁹⁹ Tc (pCi/L)	EC-1860		300
Th isotopes (pCi/L)	EC-1870		0.4 (ORNL) 5×10^{-2} 2×10^{-3}
Th, spectrophotometric (mg/L)	EC-1871		
Total organic carbon, combustion or oxidation (mg/L)	EC-1873	415.1	1
Tritium (pCi/L)	EC-1879		5000 (ORNL) 1500
Turbidity (NTU)	EC-1880	180.1	0.05
U (total), fluorometric (mg/L)	EC-1910		1×10^{-3}
U isotopes (pCi/L)	EC-1920		1 (ORNL) 5×10^{-2}
U isotopic abundances (wt %)	EC-1960		0.001

^aThe lowest concentration reported (LCR) may vary among specific samples, depending on interferences in the sample matrix. However, these LCRs have been assigned to accommodate most minor interferences. Some of the Energy Systems LCRs are higher than the method detection limits (MDLs) listed by EPA. This is consistent with guidance from EPA. However, any data reported below the MDLs must be supported by sound documentation. The LCRs applied by the Energy Systems laboratories meet the needs of the programs they support.

^bApproved for drinking water only (reagent water).

^c*Methods for Analysis of Inorganic Substances in Water and Fluvial Sediment*, U.S. Department of the Interior, U.S. Geological Survey, Open-File Report 78-679; or "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," N. W. Skougstad et al., *Techniques of Water-Resources Investigation*, Book 5, Chapter A1, U.S. Geological Survey, 1979.

^dAll references to *Standard Methods* for the 15th Edition, 1980.

^e*Federal Register* 49 (209), 43, 261, October 26, 1984.

^fFor 81 compounds.

^gFor 31 compounds.

Table 7.2.2. Energy Systems atomic absorption and ICP environmental analysis procedures for waters

Element	Lowest concentration reported ^a (mg/L)		
	MMES EC-1400 EPA 200 series flame AA	MMES EC-1400 EPA 200 series graphite furnace AA	MMES EC-1410 EPA 200.7 ICP
Ag	0.05	0.01	0.03
Al	0.3	0.01	0.01
As	<i>b</i>	0.005	0.1
Ba	0.2	0.01	0.005
Ca	0.05	<i>b</i>	0.01
Cd	0.02	0.002	0.01
Cr	0.2	0.01	0.05
Cu	0.05	0.004	0.01
Fe	0.05	<i>b</i>	0.01
K	0.2	<i>b</i>	2.0
Li	0.01	<i>b</i>	0.02
			(ORNL) 0.2
Mg	0.02	<i>b</i>	0.002
Mn	0.03	0.01	0.005
Mo	0.2	0.01	0.05
Na	0.05	<i>b</i>	0.04
			(ORNL) 0.5
Ni	0.1	0.01	0.05
Pb	0.2	0.004	0.2
Se	<i>b</i>	0.005	0.2
Zn	0.02	<i>b</i>	0.005

^aThe lowest concentration reported (LCR) may vary among specific samples, depending on interferences in the sample matrix. However, these LCRs have been assigned to accommodate most minor interferences. Some of the Energy Systems LCRs are higher than the method detection limits (MDLs) listed by EPA. This is consistent with guidance from EPA. However, any data reported below the MDLs must be supported by sound documentation. The LCRs applied by Energy Systems laboratories meet the needs of the programs they support.

^bElement not normally determined using this technique.

Table 7.2.3. Energy Systems environmental analysis procedures for air

Parameter	Energy Systems procedure	NIOSH ^a or EPA method	Lowest concentration reported ^b
Gross alpha, beta, air filters, radiochemistry (pCi/m ³)	EC-2100	APHA 601, 602 ^c	
Alpha			0.005
Beta			0.025
Dustfall, gravimetric	EC-2270		<i>d</i>
Fluoride, air, SIE (μg/sample)	EC-2360		5
Fluoride, stacks, SIE (μg/m ³)	EC-2370		30
Gamma-ray spec., air filters	EC-2400		<i>d</i>
¹³¹ I, gamma-ray spec., air filter (pCi/filter)	EC-2420		2.5
Metals in air particulates, emission spec. (μg/sample)	EC-2440		For 48 metals, mostly 1-10
Air filters, radiochemistry (pCi/filter)			
Pu	EC-2500	EPA-680/4-75-001	0.04
⁹⁰ Sr	EC-2580		2
⁹⁹ Tc	EC-2600		300
Th alpha isotopes, radiochemistry (pCi/filter)	EC-2640		0.04
U, air filters, fluorometric (μg/sample)	EC-2850		0.05
U isotopes, air filters, radiochemistry (pCi/filter)	EC-2870	EPA-680/4-75-001	0.04
U, stack gases, spec./fluoro. (μg/m ³)	EC-2890		1.7
Dichlorotetrafluoroethane, GC method (mg/m ³)	IHA-230	NIOSH S108	3500
Diocetyl phthalate, air, GC method (mg/m ³)	IHA-235	NIOSH S40	2
Formaldehyde, air (mg/m ³)	IHA-237	NIOSH 125	0.1
Isopropanol, air (mg/m ³)	IHA-240	NIOSH S64	180
Oil mist, air, infrared (mg/m ³)	IHA-247		0.5
Organic solvents, air, GC method (mg/sample)	IHA-250	NIOSH 127	18 cpds; 0.01 to 1.0
Pentachlorophenol, air, HPLC (mg/m ³)	IHA-260	NIOSH S297	0.27
PCBs, air, GC (μg/m ³)	IHA-270	NIOSH 244	10
Quinoline, air	IHA-273		<i>d</i>
Toluene diisocyanate, air (μg/m ³)	IHA-239	NIOSH 141	7
Tributyl phos. air, GC method (mg/m ³)	IHA-285	NIOSH S208	2.7
Vinyl chloride, air, GC method (μg/m ³)	IHA-294	NIOSH 178	8

^aNIOSH Manual of Analytical Methods, 2nd ed., U.S. Dept. of Health, Education, and Welfare, 1977.

^bThe lowest concentration reported (LCR) may vary among specific samples, depending on interferences in the sample matrix. However, these LCRs have been assigned to accommodate most minor interferences. Some of the Energy Systems LCRs are higher than the method detection limit (MDLs) listed by EPA. This is consistent with guidance from EPA. However, any data reported below the MDLs must be supported by sound documentation. The LCRs applied by Energy Systems laboratories meet the needs of the programs they support.

^cAPHA Methods, American Public Health Assoc., 1977.

^dProcedure in preparation.

Table 7.2.4. Energy Systems environmental analysis procedures for soil and sediment

Parameter	Energy Systems procedure	EPA method	Lowest concentration reported ^a
Fluoride	EC-3050		<i>b</i>
Gamma-ray spectrum analysis	EC-3070		<i>b</i>
Hg (total), flameless atomic absorption (mg/kg)	EC-3100	245.5	0.2
Metals, atomic absorption	EC-3200	200 Series	<i>c</i>
Metals, inductively coupled plasma-optical emission spectrometric (ICP-OES)	EC-3250	200.7	<i>c</i>
Np, direct gamma spectrum	EC-3300		<i>b</i>
²³⁷ Np, radiochemical (pCi/kg)	EC-3305		20
Pu, radiochemical (pCi/kg)	EC-3360		20
PCBs, gas chromatographic (mg/kg)	EC-3400		0.1
⁹⁰ Sr, radiochemical (pCi/kg)	EC-3500	704 Std Mth ^d	200
⁹⁹ Tc, radiochemical (pCi/kg)	EC-3550		2 × 10 ⁴
Th, spectrophotometric (mg/kg)	EC-3600		3
Th (alpha-emitting) isotopes, radiochemical (pCi/kg)	EC-3650		4
U (total), fluorometric (mg/kg)	EC-3700		0.5
U (total and isotopic), isotope dilution mass spectrometric (ng)	EC-3740		10
U isotopes, radiochemical (pCi/kg)	EC-3780		4

^aThe lowest concentration reported (LCR) may vary among specific samples, depending on interferences in the sample matrix. However, these LCRs have been assigned to accommodate most minor interferences. Some of the Energy Systems LCRs are higher than the method detection limits (MDLs) listed by EPA. This is consistent with guidance from EPA. However, any data reported below the MDLs must be supported by sound documentation. The LCRs applied by Energy Systems laboratories meet the needs of the programs they support.

^bProcedure in preparation.

^cSee Table 7.2.2.

^dReferences to Standard Methods are from the 14th Edition, 1975.

Table 7.2.5. Energy Systems environmental analysis procedures for biota

Parameter	Energy Systems procedure	EPA method	Lowest concentration reported ^a
Fluoride in vegetation (mg/kg)	EC-4100		3
Gamma-ray spectrometry of deer muscle	EC-4130		<i>b</i>
Gamma-ray spectrometry of fish	EC-4150		<i>b</i>
Gamma-ray spectrometry of vegetation	EC-4170		<i>b</i>
¹³¹ I and ⁹⁰ Sr in raw milk (pCi/L)	EC-4180		
¹³¹ I			1
⁹⁰ Sr			1
Metals in fish, atomic absorption, furnace AA (mg/kg)	EC-4250	600/4-81-055 ^c	
Cd			0.01
Cr			0.05
Cu			0.10
Ni			0.50
Pb			0.05
Metals in vegetation, atomic absorption, flame AA (mg/kg)	EC-4300		
Cd			0.5
Cr			3.0
Cu			2.0
Ni			3.5
Zn			0.5
Pu isotopes in fish (pCi/kg)	EC-4360		20 (ORNL) 4
Pu isotopes in vegetation (pCi/kg)	EC-4380		40 (ORNL) 4
PCBs in fish and animal tissue	EC-4400	600/4-81-055 ^c	0.1
⁹⁰ Sr in fish (pCi/kg)	EC-4600		1000 (ORNL) 200
⁹⁰ Sr in vegetation (pCi/kg)	EC-4620		1000 (ORNL) 200
⁹⁹ Tc in fish	EC-4630		<i>b</i>
⁹⁹ Tc in vegetation	EC-4635		<i>b</i>
Th isotopes in vegetation (pCi/kg)	EC-4640		40 (ORNL) 4
U (total) in vegetation (mg/kg)	EC-4700		0.5
U (total and isotopic) in vegetation (ng/sample)	EC-4720		10
U isotopes in animal tissue	EC-4800		<i>b</i>
U isotopes in vegetation (pCi/kg)	EC-4840		40 (ORNL) 4

^aThe lowest concentration reported (LCR) may vary among specific samples, depending on interferences in the sample matrix. However, these LCRs have been assigned to accommodate most minor interferences. Some of the Energy Systems LCRs are higher than the method detection limit (MDLs) listed by EPA. This is consistent with guidance from EPA. However, any data reported below the MDLs must be supported by sound documentation. The LCRs applied by Energy Systems laboratories meet the needs of the programs they support.

^bProcedure in preparation.

^c*Interim Methods for the Sampling and Analysis of Priority Pollutants in Sediments and Fish Tissue*, EPA, October 1980.

Table 7.2.6. EPA EMSL-LV Intercomparison Studies Y-12 Radiochemical Laboratory—Y-12, 1988

Analysis and sample date	Values		Ratio Y-12/EPA	Performance evaluation
	EPA	Y-12		
<i>Water (pCi/L)</i>				
Gross alpha				
1/88	4.0 ± 5	4.0	1.00	Acceptable
4/88	46.0 ± 11	37.3	0.81	Acceptable
5/88	11.0 ± 5	9.0	0.82	Acceptable
9/88	8.0 ± 5	10.7	1.34	Acceptable
11/88	9.0 ± 5	14.7	1.63	Acceptable
Gross beta				
1/88	8.0 ± 5	9.7	1.21	Acceptable
4/88	57.0 ± 5	69.3	1.22	Acceptable
5/88	11.0 ± 5	13.3	1.21	Acceptable
9/88	10.0 ± 5	11.0	1.10	Acceptable
11/88	9.0 ± 5	13.7	1.52	Acceptable
⁶⁰ Co				
2/88	69.0 ± 5	70.7	1.02	Acceptable
4/88	50.0 ± 5	54.0	1.08	Acceptable
6/88	15.0 ± 5	18.3	1.22	Acceptable
10/88	25 ± 5	15.3	0.61	Unacceptable ^a
⁶⁵ Zn				
2/88	94.0 ± 9.4	101	1.07	Acceptable
6/88	101 ± 10	110	1.09	Acceptable
10/88	151 ± 15	84.3	0.56	Unacceptable ^a
¹⁰⁶ Ru				
2/88	105 ± 10.5	117	1.11	Acceptable
6/88	195 ± 20	207	1.06	Acceptable
10/88	152 ± 15	92.7	0.61	Unacceptable ^a
¹³⁴ Cs				
2/88	64.0 ± 5.0	66.7	1.04	Acceptable
4/88	7.0 ± 5	9.0	1.29	Acceptable
6/88	20.0 ± 5	23.3	1.16	Acceptable
10/88	25.0 ± 5	14.3	0.57	Unacceptable ^a
¹³⁷ Cs				
2/88	94.0 ± 5.0	95.3	1.01	Acceptable
4/88	7.0 ± 5	12.0	1.71	Acceptable
6/88	25.0 ± 5	28.3	1.13	Acceptable
10/88	15.0 ± 5	8.3	0.55	Acceptable
³ H				
2/88	3327 ± 362	3700	1.11	Acceptable
6/88	5565 ± 557	5900	1.06	Acceptable
10/88	2316 ± 350	2767	1.19	Acceptable
U				
2/88	3.0 ± 6.0	2.7	0.90	Acceptable
4/88	6.0 ± 6.0	7.3	1.22	Acceptable
²²⁶ Ra				
3/88	7.60 ± 1.14	7.9	1.04	Acceptable
4/88	6.40 ± 0.96	6.9	1.08	Acceptable

Table 7.2.6 (continued)

Analysis and sample date	Values		Ratio Y-12/EPA	Performance evaluation
	EPA	Y-12		
²²⁸ Ra				
3/88	7.70 ± 1.16	7.1	0.92	Acceptable
4/88	5.60 ± 0.84	4.2	0.75	Acceptable
⁵¹ Cr				
6/88	302 ± 30	370	1.22	Unacceptable
10/88	251 ± 25	139	0.55	Unacceptable ^a
²³⁹ Pu				
8/88	10.2 ± 1.0	10.1	0.99	Acceptable
<i>Air filter (pCi/filter)</i>				
Alpha				
3/88	20.0 ± 5	3.0	0.15	Unacceptable
8/88	8.0 ± 5	7.7	0.96	Acceptable
Beta				
3/88	50.0 ± 5	63.0	1.26	Acceptable
8/88	29.0 ± 5	29.7	1.02	Acceptable
⁹⁰ Sr				
3/88	17.0 ± 1.5	20.3	1.19	Acceptable
8/88	8.0 ± 1.5	8.7	1.09	Acceptable
¹³⁷ Cs				
3/88	16.0 ± 5	15.7	0.98	Acceptable
8/88	12.0 ± 5	12.7	1.06	Acceptable

^aInvestigation of these unacceptable gamma results indicated that an inappropriate background correction had been used in the calculation. When calculations were made using the correct background, all results were within acceptable limits.

Table 7.2.7. EPA EMSL-LV Intercomparison Radionuclide Control Program—ORNL, 1988

Analysis and sample date	Values (pCi/unit) ^a		Ratio (ORNL/EPA)	Performance evaluation
	EPA	ORNL		
<i>Water</i>				
³ H				
2/88	3327 ± 362	2802	0.84	Acceptable
10/88	2316 ± 350	2133	0.92	Acceptable
⁵¹ Cr				
10/88	251 ± 25	238	0.95	Acceptable
⁶⁰ Co				
2/88	69 ± 5	62.7	0.91	Acceptable
10/88	25 ± 5	25.3	1.01	Acceptable
⁶⁵ Zn				
2/88	94.0 ± 9.4	89.0	0.95	Acceptable
10/88	151 ± 15	154	1.02	Acceptable
⁸⁹ Sr				
1/88	30 ± 5	26	0.87	Acceptable
10/88	11 ± 5	5.33	0.48	Unacceptable
⁹⁰ Sr				
1/88	15.0 ± 1.5	13.7	0.91	Acceptable
10/88	10.0 ± 1.5	11.3	1.13	Acceptable
¹⁰⁶ Ru				
2/88	105 ± 10.5	88	0.84	Acceptable
10/88	152 ± 15	142	0.93	Acceptable
¹³⁴ Cs				
2/88	64 ± 5	54	0.84	Acceptable
10/88	25 ± 5	23.3	0.93	Acceptable
10/88	15 ± 5	14	0.93	Acceptable
¹³⁷ Cs				
2/88	94 ± 5	86.7	0.92	Acceptable
10/88	15 ± 5	15.7	1.05	Acceptable
10/88	15 ± 5	15	1.00	Acceptable
²²⁶ Ra				
3/88	7.60 ± 1.14	13.4	1.76	Unacceptable
²²⁸ Ra				
3/11	7.70 ± 1.16	8.33	1.08	Acceptable
²³⁹ Pu				
8/88	10.2 ± 1.0	9.3	0.91	Acceptable
U				
2/88	3.0 ± 6.0	3.41	1.14	Acceptable
8/88	6.0 ± 6.0	6.33	1.06	Acceptable
10/88	5.0 ± 6.0	5	1.00	Acceptable

Table 7.2.7 (continued)

Analysis and sample date	Values (pCi/unit) ^a		Ratio (ORNL/EPA)	Performance evaluation
	EPA	ORNL		
Gross alpha				
1/88	4.0 ± 5.0	4.6	1.15	Acceptable
3/88	6.0 ± 5.0	6.67	1.11	Acceptable
10/88	8.0 ± 5.0	4.7	0.59	Acceptable
10/88	41 ± 10	33.7	0.82	Acceptable
11/88	9.0 ± 5.0	6.67	0.74	Acceptable
Gross beta				
1/88	8.0 ± 5.0	6	0.75	Acceptable
3/88	13.0 ± 5.0	9	0.69	Acceptable
10/88	10.0 ± 5.0	11	1.10	Acceptable
10/88	54 ± 5	42.6	0.79	Acceptable
11/88	9.0 ± 5.0	9.67	1.07	Acceptable
<i>Air filters</i>				
¹³⁷ Cs				
8/88	12.0 ± 5.0	11.67	0.97	Acceptable
Gross alpha				
8/88	8.0 ± 5.0	8.33	1.04	Acceptable
Gross beta				
8/88	29.0 ± 5.0	26.33	0.91	Acceptable

^aUnit for water is "liter." Unit for air filter is "filter."

Table 7.2.8. EPA EMSL-LV Intercomparison Radionuclide Control Program—ORGDP, 1988

Analysis and sample date	Values (pCi/unit ^a)		Ratio (EPA/ORGDP)	Performance evaluation
	EPA	ORGDP		
<i>Water</i>				
²³⁹ Pu				
8/88	10.20 ± 1.00	9.33 ± 0.32	1.09	Acceptable
U				
2/88	3.00 ± 6.00	3.00 ± 0.00	1.00	Acceptable
4/88	6.00 ± 6.00	6.00 ± 0.00	1.00	Acceptable
8/88	6.00 ± 6.00	6.00 ± 0.00	1.00	Acceptable
10/88	5.00 ± 6.00	5.00 ± 0.00	1.00	Acceptable
Gross alpha				
1/88	4.00 ± 5.00	12.00 ± 2.77	0.33	Acceptable
3/88	6.00 ± 5.00	4.67 ± 3.00	1.28	Acceptable
4/88	46.00 ± 11.0	38.00 ± 0.00	1.21	Acceptable
5/88	11.0 ± 5.00	5.33 ± 1.15	2.06	Acceptable
7/88	15.00 ± 5.00	12.00 ± 0.00	1.25	Acceptable
10/88	41.00 ± 5.00	29.35 ± 0.18	1.4	Unacceptable
Gross beta				
1/88	8.00 ± 5.00	30.33 ± 6.03	0.26	Unacceptable
3/88	13.00 ± 5.00	13.67 ± 0.58	0.95	Acceptable
4/88	57.00 ± 5.00	66.67 ± 1.53	0.86	Unacceptable
5/88	11.00 ± 5.00	12.67 ± 1.15	0.87	Acceptable
7/88	4.00 ± 5.00	13.67 ± 2.31	0.30	Unacceptable
10/88	54.00 ± 5.00	44.00 ± 0.60	1.22	Unacceptable
<i>Water</i>				
¹³⁷ Cs				
4/88	7.00 ± 5.00	11.33 ± 1.4	0.61	Acceptable
10/88	15.00 ± 5.00	20.00 ± 0.0	0.75	Acceptable
¹³⁴ Cs				
4/88	7.00 ± 5.00	5.00 ± 0.237	1.40	Acceptable
10/88	15.00 ± 5.00	14.00 ± 0.0	1.07	Acceptable
⁶⁰ Co				
4/88	50.00 ± 5.00	52.7 ± 0.118	0.95	Acceptable
<i>Air filters</i>				
⁹⁰ Sr				
3/88	17.00 ± 1.5	14.33 ± 0.58	1.18	Unacceptable
8/88	8.00 ± 1.5	5.33 ± 0.58	1.50	Unacceptable
¹³⁷ Cs				
3/88	16.00 ± 5.55	17.33 ± 0.58	0.58	Acceptable
8/88	12.00 ± 5.00	12.00 ± 1.00	1.00	Acceptable
Gross alpha				
3/88	20.00 ± 5.00	15.33 ± 1.15	0.77	Acceptable
8/88	8.00 ± 5.00	7.00 ± 0.00	1.14	Acceptable
Gross beta				
3/88	50.00 ± 5.00	57.67 ± 2.08	1.15	Acceptable
8/88	29.00 ± 5.00	32.33 ± 0.58	0.90	Acceptable

^aUnit for water is "liter." Unit for air is "filter."

**Table 7.2.9. EML Intercomparison Study QAP-28 Y-12 Radiochemical Laboratory
May 1988**

Parameter	EML value	Y-12 value	Y-12 percent error ^a	Ratio Y-12/EML	Performance evaluation
<i>Air (pCi/filter)</i>					
⁷ Be	4730	3300	5	0.70	Acceptable
⁵⁴ Mn	363	230	6	0.63	Acceptable
⁵⁷ Co	162	96	4	0.59	Acceptable
⁶⁰ Co	282	210	4	0.74	Acceptable
⁹⁰ Sr	4.91	7.0	37	1.43	Acceptable
¹³⁴ Cs	381	120	6	0.31	Unacceptable
¹³⁷ Cs	211	79	11	0.37	Acceptable
²³⁹ Pu	2.52	1.8	13	0.71	Acceptable
²⁴¹ Am	3.02	3.1	12	1.03	Acceptable
U (μg/filter)	7.32	7.10	9	0.97	Acceptable
<i>Soil (pCi/g)</i>					
⁹⁰ Sr	0.146	0.30	30	2.05	Unacceptable
¹³⁷ Cs	0.400	0.45	15	1.13	Acceptable
²³⁹ Pu	0.041	0.06	11	1.46	Acceptable
²⁴¹ Am	0.0067	0.02	15	2.99	Unacceptable
U (μg/g)	1.97	0.534	9	0.27	Acceptable
<i>Vegetation (pCi/g)</i>					
⁹⁰ Sr	10.9	23	6	2.11	Unacceptable
¹³⁷ Cs	4.62	9.1	10	1.97	Unacceptable
²³⁹ Pu	0.045	0.07	14	1.56	Unacceptable
²⁴¹ Am	0.046	0.06	16	1.30	Acceptable
U (μg/g)	0.104	0.128	10	1.23	Acceptable
<i>Water (pCi/mL)</i>					
³ H	20.7	19	21	0.92	Acceptable
⁵⁴ Mn	6.80	6.80	3	1.00	Acceptable
⁵⁷ Co	2.05	1.8	2	0.88	Acceptable
⁶⁰ Co	2.03	1.9	3	0.94	Acceptable
⁹⁰ Sr	0.53	0.50	8	0.94	Acceptable
¹³⁴ Cs	3.56	2.7	3	0.76	Acceptable
¹³⁷ Cs	1.84	1.7	5	0.92	Acceptable
²³⁹ Pu	0.024	0.002	50	0.08	Unacceptable ^b
²⁴¹ Am	0.0041	0.0040	25	0.98	Acceptable
U (μg/mL)	0.0123	0.011	18	0.89	Acceptable

^aPercent error for the laboratory based on three replicate analyses.

^bThere was a calculation error in this determination. The correct value would be 0.02 pCi/L, which would produce an acceptable ratio of 0.83.

**Table 7.2.10. EML Intercomparison Study QAP-29 Y-12 Radiochemical Laboratory
November 1988**

Parameter	EML value	Y-12 value	Y-12 percent error ^a	Ratio Y-12/EML	Performance evaluation
<i>Air (pCi/filter)</i>					
⁷ Be	2160	2251	4	1.04	Acceptable
⁵⁴ Mn	185	187	5	1.01	Acceptable
⁵⁷ Co	394	356	1	0.90	Acceptable
⁶⁰ Co	374	283	1	0.76	Acceptable
⁹⁰ Sr	9.50	12.3	27	1.29	Acceptable
¹³⁴ Cs	191	160	2	0.84	Acceptable
¹³⁷ Cs	245	241	3	0.98	Acceptable
²³⁹ Pu	1.09	1.04	15	0.95	Acceptable
²⁴¹ Am	5.78	7.25	7	1.25	Acceptable
U (μ g/filter)	7.10	6.68	10	0.94	Acceptable
<i>Soil (pCi/g)</i>					
⁹⁰ Sr	1.39	2.27	11	1.63	Unacceptable
¹³⁷ Cs	0.910	1.25	27	1.37	Acceptable
²³⁹ Pu	0.380	0.35	5	0.92	Acceptable
U (μ g/g)	2.29	1.90	10	0.83	Acceptable
<i>Vegetation (pCi/g)</i>					
⁹⁰ Sr	3.80	6.01	7	1.58	Unacceptable
¹³⁷ Cs	1.52	2.07	19	1.36	Acceptable
²³⁹ Pu	0.021	0.005	60	0.24	Unacceptable
²⁴¹ Am	0.015	0.010	50	0.67	Acceptable
U (μ g/g)	0.059	0.042	9	0.71	Acceptable
<i>Water (pCi/mL)</i>					
³ H	10.6	9.95	15	0.94	Acceptable
⁵⁴ Mn	1.52	1.88	6	1.24	Acceptable
⁵⁷ Co	3.36	4.68	2	1.39	Acceptable
⁶⁰ Co	3.68	3.97	2	1.08	Acceptable
⁹⁰ Sr	0.930	0.93	5	1.00	Acceptable
¹³⁴ Cs	0.970	1.24	5	1.28	Acceptable
¹³⁷ Cs	1.95	2.52	5	1.29	Acceptable
²³⁹ Pu	0.0054	0.004	25	0.74	Acceptable
²⁴¹ Am	0.016	0.017	11	1.06	Acceptable
U (μ g/mL)	0.0123	0.012	8	0.98	Acceptable

^aPercent error for the laboratory based on three replicate analyses.

Table 7.2.11. 1988 EML intercomparison study results for ORNL in February 1988

Parameter	EML value	ORNL value	Ratio (ORNL/EML)	Performance evaluation
<i>Water (pCi/mL)</i>				
³ H	20.7	19.4	0.94	Acceptable
⁵⁴ Mn	6.8	6.9	1.01	Acceptable
⁵⁷ Co	2.05	1.9	0.93	Acceptable
⁶⁰ Co	2.03	1.9	0.94	Acceptable
⁹⁰ Sr	0.53	0.56	1.06	Acceptable
¹³⁴ Cs	3.56	2.9	0.81	Acceptable
¹³⁷ Cs	1.84	1.8	0.98	Acceptable
²³⁹ Pu	0.0243	0.018	0.74	Acceptable
²⁴¹ Am	0.0041	0.0052	1.27	Acceptable
U	0.0085	0.011	1.29	Acceptable
<i>Air (pCi/filter)</i>				
⁷ Be	4730	4400	0.93	Acceptable
⁵⁴ Mn	363	384	1.06	Acceptable
⁵⁷ Co	162	141	0.87	Acceptable
⁶⁰ Co	282	272	0.96	Acceptable
⁹⁰ Sr	4.91	5.55	1.13	Acceptable
¹³⁴ Cs	381	298	0.78	Acceptable
¹³⁷ Cs	211	220	1.04	Acceptable
²³⁹ Pu	2.52	2.5	0.99	Acceptable
²⁴¹ Am	3.02	3.4	1.13	Acceptable
U	5.05	5.4	1.07	Acceptable
<i>Soil (pCi/g)</i>				
⁴⁰ K	0.60	0.83	1.38	Acceptable
⁹⁰ Sr	0.146	0.14	0.96	Acceptable
¹³⁷ Cs	0.40	0.31	0.77	Acceptable
²³⁹ Pu	0.041	0.048	1.17	Acceptable
²⁴¹ Am	0.0067	0.0079	1.18	Acceptable
U	1.36	0.3	0.22	Acceptable
<i>Vegetation (pCi/g)</i>				
⁴⁰ K	36	39	1.08	Acceptable
⁹⁰ Sr	10.9	9.4	0.86	Acceptable
¹³⁷ Cs	4.62	4.7	1.02	Acceptable
²³⁹ Pu	0.045	0.061	1.36	Unacceptable
²⁴¹ Am	0.046	0.042	0.91	Acceptable
U	0.072	0.081	1.13	Acceptable

Table 7.2.12. 1988 EML intercomparison study results for ORNL in October 1988

Parameter	EML value	ORNL value	Ratio (ORNL/EML)	Performance evaluation
<i>Water (pCi/mL)</i>				
³ H	10.6	10.3	0.97	Acceptable
⁵⁴ Mn	1.52	1.63	1.07	Acceptable
⁵⁷ Co	3.36	3.67	1.09	Acceptable
⁶⁰ Co	3.68	3.9	1.06	Acceptable
⁹⁰ Sr	0.93	0.923	0.99	Acceptable
¹³⁴ Cs	0.97	1.03	1.06	Acceptable
¹³⁷ Cs	1.95	2.17	1.11	Acceptable
²³⁹ Pu	0.0054	0.0051	0.94	Acceptable
²⁴¹ Am	0.016	0.0168	1.05	Acceptable
U	0.0085	0.0084	0.99	Acceptable
<i>Air (pCi/filter)</i>				
⁷ Be	2160	2000	0.93	Acceptable
⁵⁴ Mn	185	181	0.98	Acceptable
⁵⁷ Co	394	357	0.91	Acceptable
⁶⁰ Co	374	322	0.86	Acceptable
⁹⁰ Sr	9.5	10.9	1.15	Acceptable
¹³⁴ Cs	191	154	0.81	Acceptable
¹³⁷ Cs	245	234	0.96	Acceptable
²³⁹ Pu	1.09	1.19	1.09	Acceptable
²⁴¹ Am	5.78	7.2	1.25	Acceptable
U	4.9	4.74	0.97	Acceptable
<i>Soil (pCi/g)</i>				
⁹⁰ Sr	1.39	1.09	0.78	Acceptable
¹³⁷ Cs	0.91	0.94	1.03	Acceptable
²³⁹ Pu	0.38	0.396	1.04	Acceptable
²⁴¹ Am	0.27	0.214	0.79	Acceptable
U	1.58	1.15	0.73	Acceptable
<i>Vegetation (pCi/g)</i>				
⁴⁰ K	10.5	10.6	1.01	Acceptable
⁹⁰ Sr	3.8	3.72	0.98	Acceptable
¹³⁷ Cs	1.52	1.73	1.14	Acceptable
²³⁹ Pu	0.021	0.0178	0.85	Acceptable
²⁴¹ Am	0.015	0.019	1.27	Acceptable
U	0.041	0.0452	1.10	Acceptable

**Table 7.2.13. 1988 EML intercomparison study results for
ORGDP in May 1988**

Parameter	EML value	ORGDP value	Error, ORGDP (%)	Ratio (ORGDP/EML)	Performance evaluation
<i>Water (pCi/mL)</i>					
³ H	0.207×10^2	0.169×10^2	8	0.82 ± 0.07	Acceptable
⁵⁴ Mn	0.680×10^1	0.758×10^1	0	1.11 ± 0.07	Acceptable
⁵⁷ Co	0.205×10^1	0.236×10^1	0	1.15 ± 0.11	Acceptable
⁶⁰ Co	0.203×10^1	0.209×10^1	0	1.03 ± 0.10	Acceptable
⁹⁰ Sr	0.530×10^0	0.548×10^0	2	1.03 ± 0.03	Acceptable
¹³⁴ Cs	0.356×10^1	0.308×10^1	0	0.87 ± 0.07	Acceptable
¹³⁷ Cs	0.184×10^1	0.182×10^1	0	0.99 ± 0.05	Acceptable
²³⁹ Pu	0.243×10^{-1}	0.200×10^{-1}	3	0.82 ± 0.09	Acceptable
²⁴¹ Am	0.410×10^{-2}	0.386×10^{-2}	8	0.94 ± 0.09	Acceptable
U (μ g)	0.123×10^{-1}	0.845×10^{-2}	5	0.69 ± 0.05	Acceptable
<i>Air (pCi/filter)</i>					
⁵⁴ Mn	0.363×10^3	0.436×10^3	1	1.20 ± 0.04	Acceptable
⁵⁷ Co	0.162×10^3	0.194×10^3	1	1.20 ± 0.04	Acceptable
⁶⁰ Co	0.282×10^3	0.327×10^3	1	1.16 ± 0.05	Acceptable
¹³⁴ Cs	0.381×10^3	0.354×10^3	1	0.93 ± 0.03	Acceptable
¹³⁷ Cs	0.211×10^3	0.234×10^3	1	1.11 ± 0.06	Acceptable
²³⁹ Pu	0.252×10^1	0.229×10^1	4	0.91 ± 0.06	Acceptable
U (μ g)	0.732×10^1	0.514×10^1	2	0.70 ± 0.04	Acceptable
<i>Soil (pCi/g)</i>					
⁹⁰ Sr	0.146×10^0	0.475×10^0	38	3.25 ± 1.25	Unacceptable
¹³⁷ Cs	0.400×10^0	0.452×10^0	16	1.13 ± 0.19	Acceptable
²³⁹ Pu	0.410×10^{-1}	0.310×10^{-1}	10	0.76 ± 1.66	Acceptable
²⁴¹ Am	0.670×10^{-2}	0.628×10^{-2}	118	0.94 ± 1.11	Acceptable
U (μ g)	0.197×10^1	0.227×10^0	7	0.12 ± 0.01	Acceptable

Table 7.2.14. 1988 EML intercomparison study results for ORGDP in September 1988

Parameter	EML value	ORGDP value	Error, ORGDP (%)	Ratio (ORGDP/EML)	Performance evaluation
<i>Water (pCi/mL)</i>					
³ H	0.106×10^2	0.897×10^1	14	0.85 ± 0.13	Acceptable
⁵⁴ Mn	0.152×10^1	0.159×10^1	0	1.05 ± 0.05	Acceptable
⁵⁷ Co	0.336×10^1	0.388×10^1	0	1.15 ± 0.02	Acceptable
⁶⁰ Co	0.368×10^1	0.404×10^1	0	1.10 ± 0.03	Acceptable
⁹⁰ Sr	0.930×10^0	0.871×10^0	2	0.94 ± 0.06	Acceptable
¹³⁴ Cs	0.970×10^0	0.109×10^1	0	1.12 ± 0.05	Acceptable
¹³⁷ Cs	0.195×10^1	0.212×10^1	0	1.09 ± 0.03	Acceptable
²³⁹ Pu	0.540×10^{-2}	0.443×10^{-2}	8	0.82 ± 0.10	Acceptable
²⁴¹ Am	0.160×10^{-1}	0.133×10^{-1}	4	0.83 ± 0.11	Acceptable
U (pCi)	0.850×10^{-2}	0.854×10^{-2}	5	1.00 ± 0.06	Acceptable
<i>Air (pCi/filter)</i>					
⁵⁴ Mn	0.185×10^3	0.183×10^3	2	0.99 ± 0.03	Acceptable
⁵⁷ Co	0.394×10^3	0.362×10^3	1	0.92 ± 0.02	Acceptable
⁶⁰ Co	0.374×10^3	0.327×10^3	1	0.87 ± 0.02	Acceptable
⁹⁰ Sr	0.950×10^1	0.687×10^1	32	0.72 ± 0.24	Acceptable
¹³⁴ Cs	0.191×10^3	0.167×10^3	2	0.87 ± 0.03	Acceptable
¹³⁷ Cs	0.245×10^3	0.247×10^3	2	1.01 ± 0.04	Acceptable
²³⁹ Pu	0.109×10^1	0.110×10^1	11	1.01 ± 0.13	Acceptable
²⁴¹ Am	0.578×10^1	0.422×10^1	4	0.73 ± 0.05	Acceptable
U (pCi)	0.490×10^1	0.490×10^1	7	1.00 ± 0.08	Acceptable
<i>Soil (pCi/g)</i>					
⁹⁰ Sr	0.139×10^1	0.832×10^0	15	0.60 ± 0.09	Acceptable
¹³⁷ Cs	0.910×10^0	0.868×10^0	11	0.95 ± 0.12	Acceptable
²³⁹ Pu	0.380×10^0	0.354×10^0	5	0.93 ± 0.06	Acceptable
²⁴¹ Am	0.270×10^0	0.175×10^0	5	0.65 ± 0.08	Acceptable
U (pCi)	0.158×10^1	0.662×10^0	4	0.42 ± 0.02	Unacceptable

Table 7.2.15. Proficiency Environmental Testing Control Program at the Y-12 Plant
Environmental Laboratory in 1988—Level 1 concentrations

Parameter	Average recovery (%) ^a	Average number of standard deviations ^b	Performance ^c		
			Acceptable	Marginal	Unacceptable
Biochemical oxygen demand	101	0.34	12	0	0
Chemical oxygen demand	91	0.58	12	0	0
Total organic carbon	93	0.74	11	1	0
Ammonia nitrogen	114	0.49	12	0	0
Nitrate nitrogen	102	0.33	12	0	0
Phosphate-P	98	0.29	12	0	0
Kjeldahl nitrogen	120	0.28	10	0	0
Total phosphorus	107	0.54	12	0	0
Total suspended solids	89	0.48	11	0	1
Total dissolved solids	100	0.48	12	0	0
Oil and grease	105	0.46	12	0	0
Alkalinity	100	0.23	12	0	0
Calcium	103	0.56	11	0	0
Chloride	100	0.27	12	0	0
Conductivity	95	0.52	11	1	0
Magnesium	102	0.39	11	0	0
Potassium	104	0.79	11	0	0
Sodium	99	0.57	11	0	0
Sulfate	101	0.56	12	0	0
Total hardness	103	0.58	11	0	0
pH	101	0.51	12	0	0
Aluminum	100	0.33	10	0	0
Arsenic	106	1.61	7	2	1
Barium	105	0.93	11	0	0
Beryllium	98	0.47	11	0	0
Cadmium	102	0.77	10	1	0
Chromium	98	0.44	11	0	0
Copper	106	0.57	11	0	0
Iron	104	0.47	12	0	0
Lead	107	0.96	10	0	1
Manganese	103	0.69	11	0	0
Mercury	105	0.38	12	0	0
Nickel	97	0.76	10	1	0
Selenium	109	0.49	12	0	0
Silver	97	0.55	11	0	0
Thallium	97	1.14	5	3	0
Zinc	100	0.40	11	0	0
Phenol	97	1.25	9	1	1 ^d
Cyanide	91	0.78	11	0	0
Residual chlorine	90	0.40	12	0	0
Fluoride	99	0.48	12	0	0
Organic halides	128	0.77	4	0	0
Chromium +6	103	0.54	12	0	0
Uranium	91	0.87	12	0	0

^aAverage of all results for the Y-12 laboratory. All parameters were not measured every month.

^bThe average number of standard deviations from the mean of all participants. The number of participant laboratories varied depending on the parameter and the month.

^cThe adopted limits place the warning (marginal) level at 1.96 standard deviations and the acceptance level at 2.58 deviations from the mean.

^dThe unacceptable result was a statistical outlier. Were this result omitted, the average number of standard deviations would be 0.82.

**Table 7.2.16. Proficiency Environmental Testing Control Program at the Y-12 Plant
Environmental Laboratory in 1988—Level 2 concentrations**

Parameter	Average recovery (%) ^a	Average number of standard deviations ^b	Performance ^c		
			Acceptable	Marginal	Unacceptable
Biochemical oxygen demand	92	0.68	12	0	0
Chemical oxygen demand	94	0.36	12	0	0
Total organic carbon	93	0.91	12	0	0
Ammonia nitrogen	102	0.25	12	0	0
Nitrate nitrogen	102	0.59	11	1	0
Phosphate-P	100	0.32	12	0	0
Kjeldahl nitrogen	105	0.30	11	0	0
Total phosphorus	99	0.41	12	0	0
Total suspended solids	94	0.68	11	0	1
Total dissolved solids	98	0.51	12	0	0
Oil and grease	92	0.36	12	0	0
Alkalinity	100	0.29	12	0	0
Calcium	114	1.65	9	1	1 ^d
Chloride	101	0.24	12	0	0
Conductivity	93	0.45	12	0	0
Magnesium	112	2.21	9	0	2 ^d
Potassium	103	1.01	8	2	0
Sodium	89	2.19	9	0	2 ^e
Sulfate	101	0.50	12	0	0
Total hardness	113	2.95	9	0	2 ^d
pH	101	0.43	12	0	0
Aluminum	97	0.35	9	1	0
Arsenic	90	0.77	11	0	0
Barium	105	1.00	11	0	0
Beryllium	99	0.46	11	0	0
Cadmium	103	1.13	9	2	0
Chromium	98	0.40	11	0	0
Copper	102	0.70	11	0	0
Iron	101	0.61	11	0	0
Lead	104	0.95	11	0	0
Manganese	105	0.93	10	0	1
Mercury	101	0.41	12	0	0
Nickel	104	0.92	10	0	1
Selenium	104	0.43	12	0	0
Silver	98	0.79	11	0	0
Thallium	97	0.65	8	1	0
Zinc	104	0.56	10	1	0
Phenol	99	1.26	9	1	1 ^f
Cyanide	84	0.86	10	0	1
Residual chlorine	94	0.25	11	0	0
Fluoride	100	0.48	12	0	0
Organic halides	92	0.23	4	0	0
Chromium +6	101	0.57	10	1	0
Uranium	93	1.06	12	0	0

^aAverage of all results for the Y-12 laboratory. All parameters were not measured every month.

^bThe average number of standard deviations from the mean of all participants. The number of participant laboratories varied depending on the parameter and the month.

^cThe adopted limits place the warning (marginal) level at 1.96 standard deviations and the acceptance level at 2.58 deviations from the mean.

^dOne unacceptable result on each of these parameters was a statistical outlier, probably the result of a sample mix-up. If these results are omitted, the average number of standard deviations are 0.57 for calcium; 0.64 for magnesium; and 0.46 for hardness.

^eThe two unacceptable results were statistical outliers. If these results are omitted, the average number of standard deviations is 0.79.

^fThe unacceptable result was a statistical outlier. If this result is omitted, the average number of standard deviations is 0.92.

Table 7.2.17. Proficiency Environmental Testing Control Program at ORNL in 1988—Level 1 concentration

Parameter	Average recovery (%) ^a	Average number of standard deviations ^b	Performance		
			Acceptable ^c	Marginal ^c	Unacceptable ^c
Biochemical O demand	104	0.39	12	0	0
Chemical O demand	97	1.05	4	0	1
TOC	99	0.27	12	0	0
Ammonia N	119	0.48	18	0	1
Nitrate N	102	0.23	4	0	0
Orthophosphate as P	101	0.33	8	0	0
Kjeldahl N	102	0.21	1	0	0
Total P	89	0.61	3	0	0
Suspended solids	94	0.27	12	0	0
Dissolved solids	110	0.39	12	0	0
O & G	100	0.39	12	0	0
Alkalinity	98	0.39	12	0	0
Ca	100	0.13	11	0	0
Chloride	102	0.29	12	0	0
Conductivity	94	0.32	12	0	0
Mg	98	0.38	12	0	0
K	101	0.18	12	0	0
Na	97	0.54	11	0	0
Sulfate	102	0.63	12	0	0
Total hardness (as CaCO ₃)	98	0.26	12	0	0
pH	101	0.51	12	0	0
As	108	0.61	4	0	1
Ba	98	0.20	12	0	0
Cd	97	0.35	12	0	0
Cr	99	0.40	13	0	0
Cu	102	0.36	12	0	0
Fe	104	0.38	12	0	0
Pb	107	0.73	7	0	0
Mn	98	0.31	12	0	0
Hg	99	0.25	11	0	0
Ni	99	0.19	12	0	0
Se	133	1.28	1	1	0
Ag	99	0.24	12	0	0
Zn	98	0.59	11	0	0
Phenol	102	0.50	12	1	0
Cyanide	108	0.27	12	0	0
Total residual Cl	93	0.87	11	0	1
Al	98	0.45	5	0	0
Be	95	0.48	12	0	0
Total organic halides	85	0.57	4	0	0
Cr ⁶⁺	95	0.38	11	1	0

^aAverage of 12 months' results at ORNL. All parameters were not analyzed each month.

^bThe average number of standard deviations from the mean of all participants. The number of participant laboratories varied depending on the parameters and the month.

^cFor EPA, the warning level is 1.96 standard deviations, and the acceptance level is 2.58 standard deviations from the mean.

Table 7.2.18. Proficiency Environmental Testing Control Program at ORNL in 1988—Level 2 concentrations

Parameter	Average recovery (%) ^a	Average number of standard deviations ^b	Performance		
			Acceptable ^c	Marginal ^c	Unacceptable ^c
Biochemical O demand	86	0.56	12	0	0
Chemical O demand	87	0.61	5	0	0
TOC	98	0.34	12	0	0
Ammonia N	107	0.59	18	0	1
Nitrate N	101	0.32	4	0	0
Orthophosphate as P	98	0.42	9	0	0
Kjeldahl N	105	0.09	1	0	0
Total P	91	0.49	4	0	0
Suspended solids	97	0.47	12	0	0
Dissolved solids	101	0.30	12	0	0
O & G	94	0.40	12	0	0
Alkalinity	97	0.43	12	0	0
Ca	99	0.17	11	0	0
Chloride	103	0.58	12	0	0
Conductivity	93	0.41	12	0	0
Mg	98	0.32	12	0	0
K	100	0.36	12	0	0
Na	97	0.57	10	0	0
Sulfate	100	0.40	12	0	0
Total hardness (as CaCO ₃)	98	0.20	12	0	0
pH	101	0.53	12	0	0
As	103	0.32	13	0	0
Ba	100	0.30	12	0	0
Cd	98	0.39	12	0	0
Cr	100	0.24	13	0	0
Cu	102	0.30	12	0	0
Fe	101	0.34	12	0	0
Pb	102	0.18	12	0	0
Mn	97	0.56	12	0	0
Hg	101	0.16	11	0	0
Ni	102	0.23	12	0	0
Se	109	0.79	11	1	0
Ag	102	0.42	12	0	0
Zn	99	0.47	12	0	0
Phenol	105	0.59	12	1	0
Cyanide	111	0.36	12	0	0
Total residual Cl	103	0.60	12	0	0
Al	100	0.44	12	0	0
Be	96	0.52	12	0	0
Total organic halides	85	0.63	4	0	0
Cr ⁶⁺	100	0.37	11	0	0

^aAverage of 12 months' results at ORNL. All parameters were not analyzed each month.

^bThe average number of standard deviations from the mean of all participants. The number of participant laboratories varied depending on the parameters and the month.

^cFor EPA, the warning level is 1.96 standard deviations, and the acceptance level is 2.58 standard deviations from the mean.

Table 7.2.19. Proficiency Environmental Testing Control Program at ORGDP in 1988—Level 1 concentrations

Parameter ^a	Average recovery (%) ^a	Average number of standard deviations ^b	Performance ^c		
			Acceptable	Marginal	Unacceptable
Alkalinity	92.934	-1.9	10	2	0
Al	157.984	0.30	11	0	1
Ammonia N	104.580	-0.14	11	1	0
As	96.274	-0.23	12	0	0
Ba	96.209	-0.32	12	0	0
Be	96.362	-0.23	12	0	0
Biochemical O demand	107.284	0.39	12	0	0
Cd	96.343	-0.27	12	0	0
Ca	97.079	-0.30	12	0	0
Chemical O demand	96.899	0.17	12	0	0
Chloride	102.782	0.25	11	1	0
Cr	90.087	-0.74	11	0	1
Conductivity	87.935	-0.54	12	0	0
Cu	104.022	-0.17	11	1	0
Cyanide	115.208	0.74	12	0	0
Cr +6	102.759	0.18	12	0	0
Fe	116.588	0.54	10	1	1
Pb	102.760	0.01	12	0	0
Mg	101.366	0.00	12	0	0
Mn	99.167	-0.02	12	0	0
Hg	99.856	-0.12	12	0	0
Ni	100.072	-0.09	11	1	0
Nitrate N	102.050	0.05	12	0	0
O&G	90.223	0.04	12	0	0
Orthophosphate as P	96.174	-0.31	12	0	0
pH	101.245	0.47	12	0	0
Phenol	103.701	0.21	10	1	1
K	110.047	0.80	12	0	0
Se	103.087	-0.31	12	0	0
Ag	90.970	-1.3	10	0	0
Na	101.082	-0.05	12	0	0
Sulfate	99.597	-0.05	12	0	0
Tl	93.923	-0.21	12	0	0
Total dissolved solids	128.082	0.70	12	0	0
Total hardness (as CaCO ₃)	98.031	-0.21	12	0	0
Total Kjeldahl N	130.115	0.28	12	0	0
Total organic C	94.617	-0.46	12	0	0
Total organic halides (TO _X)	146.380	0.67	11	1	0
Total P as P	110.270	0.02	12	0	0
Total residual Cl	74.858	-0.77	10	2	0
Total suspended solids	93.292	0.05	12	0	0
U	102.765	0.33	11	1	0
Zn	135.203	1.1	10	1	1

^aAverage of all results for ORGDP. All parameters were not measured every month.

^bThe average number of standard deviations from the mean of all participants. The number of participant laboratories varied depending on the parameters and the month.

^cFor the EPA, the warning (marginal) level is 1.96 standard deviations and the acceptance level is 2.58 standard deviations from the mean.

Table 7.2.20. Proficiency Environmental Testing Control Program at ORGDP in 1988—Level 2 concentrations

Parameter ^a	Average recovery (%) ^a	Average number of standard deviations ^b	Performance ^c		
			Acceptable	Marginal	Unacceptable
Alkalinity	95.152	-0.83	9	3	0
Al	115.542	1.2	11	0	1
Ammonia N	100.157	-0.24	11	1	0
As	93.488	-0.32	12	0	0
Ba	95.978	-0.39	12	0	0
Be	96.509	-0.34	11	1	0
Biochemical O demand	108.362	0.38	12	0	0
Cd	97.103	-0.32	12	0	0
Ca	100.050	-0.15	11	0	1
Chemical O demand	101.799	0.15	12	0	0
Chloride	103.410	0.62	8	2	2
Cr	93.317	-0.70	11	1	0
Conductivity	89.707	-0.12	9	1	2
Cu	96.623	-0.38	12	0	0
Cyanide	114.457	0.57	12	0	0
Cr +6	100.686	0.15	12	0	0
Fe	96.894	-0.44	11	1	0
Pb	106.052	0.39	12	0	0
Mg	103.697	0.46	11	0	1
Mn	98.638	-0.30	12	0	0
Hg	95.228	-0.21	12	0	0
Ni	100.126	0.04	12	0	0
Nitrate N	99.666	0.07	12	0	0
O&G	83.487	-0.13	12	0	0
Orthophosphate as P	98.233	-0.24	12	0	0
pH	101.465	0.48	12	0	0
Phenol	93.970	-0.29	12	0	0
K	114.766	1.7	11	0	1
Se	95.440	-0.33	12	0	0
Ag	86.185	-2.1	9	0	3
Na	104.645	0.20	11	0	1
Sulfate	102.300	0.23	11	1	0
Tl	104.825	0.72	12	0	0
Total dissolved solids	113.341	0.91	9	2	1
Total hardness (as CaCO ₃)	102.201	0.16	11	1	0
Total Kjeldahl N	98.007	0.08	12	0	0
Total organic C	105.026	0.16	12	0	0
Total organic halides (TO _x)	84.478	-0.52	12	0	0
Total P as P	98.675	-0.11	12	0	0
Total residual Cl	93.275	-0.01	11	1	0
Total suspended solids	98.174	0.31	12	0	0
U	103.641	0.15	12	0	0
Zn	154.480	7.1	11	0	1

^aAverage of all results for ORGDP. All parameters were not measured every month.

^bThe average number of standard deviations from the mean of all participants. The number of participant laboratories varied depending on the parameters and the month.

^cFor the EPA, the warning (marginal) level is 1.96 standard deviations and the acceptance level is 2.58 standard deviations from the mean.

Table 7.2.21. EPA performance evaluation DMR-QA study number 008—Y-12 Plant, 1988

Analytes	Values		Limits		Performance evaluation
	Reported	True ^a	Acceptance	Warning	
<i>Trace metals (µg/L)</i>					
Al	119	115	45.3–225	67.7–203	Acceptable
As	373	391	293–479	316–455	Acceptable
Be	71	70.4	59.9–80.9	62.6–78.2	Acceptable
Cd	189	180	158–208	164–202	Acceptable
Cr	801	832	673–967	709–930	Acceptable
Co	78	75.3	63.7–89.5	66.9–86.2	Acceptable
Cu	315	291	263–319	270–312	Acceptable
Fe	1440	1410	1250–1570	1290–1530	Acceptable
Pb	166	171	143–200	150–193	Acceptable
Mn	221	211	186–233	192–227	Acceptable
Hg	2.29	2.24	1.43–3.05	1.63–2.84	Acceptable
Ni	561	571	492–646	511–627	Acceptable
Se	31.5	32.0	19.3–40.7	21.9–38.0	Acceptable
V	1270	1310	1100–1510	1150–1450	Acceptable
Zn	666	650	552–734	574–712	Acceptable
<i>Miscellaneous analytes (mg/L)</i>					
pH (units)	7.48	7.50	7.28–7.66	7.33–7.61	Acceptable
Total suspended solids	51.4	56.3	44.9–67.7	47.7–64.9	Acceptable
O&G	13.2	14.0	6.52–18.7	8.04–17.2	Acceptable
<i>Nutrients (mg/L)</i>					
Ammonia-nitrogen	2.25	2.10	1.59–2.63	1.71–2.50	Acceptable
Nitrate-nitrogen	5.30	5.50	4.50–6.48	4.74–6.24	Acceptable
Kjeldahl-nitrogen	8.10	8.10	5.98–10.0	6.47–9.53	Acceptable
Total P	8.57	9.50	7.45–11.0	7.87–10.6	Acceptable
Orthophosphate	1.10	1.10	0.919–1.27	0.961–1.23	Acceptable
<i>Demands (mg/L)</i>					
COD	24.2	25.0	13.7–34.4	16.3–31.8	Acceptable
TOC	9.48	9.82	7.74–11.5	8.24–11.0	Acceptable
5-day BOD	22.3	16.0	7.54–24.4	9.63–22.3	Acceptable
<i>Additional miscellaneous analytes (mg/L)</i>					
Total cyanide	0.406	0.460	0.308–0.587	0.343–0.552	Acceptable
Total phenolics	0.128	0.134	0.0538–0.214	0.0740–0.194	Acceptable
Total residual chlorine	3.73	4.14	2.97–4.88	3.22–4.63	Acceptable

^aBased on theoretical calculations or a reference value when necessary.

Table 7.2.22. EPA performance evaluation DMR-QA study number 008—ORNL, 1988

Analytes	Values		Limits		Performance evaluation
	Reported	True ^a	Acceptance	Warning	
<i>Trace metals (µg/L)</i>					
Al	136	115	45.3–225	67.7–203	Acceptable
As	404	381	293–479	316–455	Acceptable
Be	69.8	70.4	59.9–80.9	62.6–78.2	Acceptable
Cd	178	180	158–208	164–202	Acceptable
Cr	874	832	673–967	709–930	Acceptable
Co	75.0	75.3	63.7–89.5	66.9–86.2	Acceptable
Cu	297	291	263–319	270–312	Acceptable
Fe	1430	1410	1250–1570	1290–1530	Acceptable
Pb	160	171	143–200	150–193	Acceptable
Mn	216	211	186–233	192–227	Acceptable
Hg	2.22	2.24	1.43–3.05	1.63–2.84	Acceptable
Ni	603	571	492–646	511–627	Acceptable
Se	33.1	32.0	19.3–40.7	21.9–38.0	Acceptable
V	1350	1310	1100–1510	1150–1450	Acceptable
Zn	690	650	552–734	574–712	Acceptable
<i>Miscellaneous parameters (mg/L)^b</i>					
pH (units)	7.51	7.50	7.28–7.66	7.33–7.61	Acceptable
Total suspended solids	62.4	56.3	44.9–67.7	47.7–64.9	Acceptable
O&G N	15.9	14.0	6.52–18.7	8.04–17.2	Acceptable
Ammonia	2.52	2.10	1.59–2.63	1.71–2.50	Recheck
Nitrate	5.79	5.50	4.50–6.48	4.74–6.24	Acceptable
Kjeldahl	7.47	8.10	5.98–10.0	6.47–9.53	Acceptable
Total P	7.84	9.50	7.45–11.0	7.87–10.6	Recheck

^aBased on theoretical calculations or a reference value when necessary.

^bUnits are mg/L except for pH, which is reported in pH units.

Table 7.2.23. EPA performance evaluation DMR-QA study number 007—ORGDP, 1988

Analytes	Values		Limits		Performance evaluation
	Reported ^a	True ^b	Acceptance	Warning	
<i>Trace metals (µg/L)</i>					
Al	89.2	115	45.3–225	67.7–203	Acceptable
As	376	391	293–479	316–455	Acceptable
Be	68.2	70.4	59.9–80.9	62.6–78.2	Acceptable
Cd	175	180	158–208	164–202	Acceptable
Cr	792	832	673–967	709–930	Acceptable
Co	74.3	75.3	63.7–89.5	66.9–86.2	Acceptable
Cu	280	291	263–319	270–312	Acceptable
Fe	1397	1410	1250–1570	1290–1530	Acceptable
Pb	159	171	143–200	150–193	Acceptable
Mn	206	211	186–233	192–227	Acceptable
Hg	2.25	2.24	1.43–3.05	1.63–2.84	Acceptable
Ni	574	571	492–646	511–627	Acceptable
Se	31.1	32.0	19.3–40.7	21.9–38.0	Acceptable
V	1277	1310	1100–1510	1150–1450	Acceptable
Zn	659	650	552–734	574–712	Acceptable
<i>Miscellaneous parameters (mg/L)^c</i>					
pH (units)	7.48	7.50	7.28–7.66	7.33–7.61	Acceptable
Total suspended solids	62	56.3	44.9–67.7	47.7–64.9	Acceptable
O&G	12.6	14.0	6.52–18.7	8.04–17.2	Acceptable
N					
Ammonia	1.90	2.10	1.59–2.63	1.71–2.50	Acceptable
Nitrate	5.49	5.50	4.50–6.48	4.74–6.24	Acceptable
Kjeldahl	8.06	8.10	5.98–10.0	6.47–9.53	Acceptable
Total P	9.60	9.50	7.45–11.0	7.87–10.6	Acceptable
Orthophosphate	1.11	1.10	0.919–1.27	0.961–1.23	Acceptable
Total cyanide	0.44	0.460	0.308–0.587	0.343–0.552	Acceptable
Total phenolics	0.12	0.134	0.0538–0.214	0.0740–0.194	Acceptable
Total residual Cl	5.00	4.14	2.97–4.88	3.22–4.63	Unacceptable
<i>Demands (mg/L)</i>					
COD	24	25.0	13.7–34.4	16.3–31.8	Acceptable
TOC	10.6	9.82	7.74–11.5	8.24–11.0	Acceptable
5-d BOD	19	16.0	7.54–24.4	9.63–22.3	Acceptable

^aThere was an error in data transfer that resulted in samples from the laboratory being in mg/L. The EPA values were in µg/L, as reflected in the evaluated EPA report. This was explained in a letter dated June 26, 1987, which was sent to EPA and the state of Tennessee.

^bBased on theoretical calculations or a reference value when necessary.

^cUnits are mg/L except for pH, which is reported in pH units.

^dSeveral samples are processed as a batch with known controls, and the known controls were within acceptable limits. No apparent reason for this nonconformance.

Table 7.2.24. Water supply performance evaluation study number WS-022—Y-12 Plant, 1988

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True ^a		
<i>Trace metals (µg/L)</i>					
As	1	5	5.33	3.49–7.57	Acceptable
	2	20	28.4	22.7–33.3	Unacceptable
Ba	1	632	567	485–632	Acceptable
	2	101	86.7	66.2–105	Acceptable
Cd	1	45 ^b	42.0	32.5–45.8	Acceptable
	2	4	3.36	2.60–4.11	Acceptable
Cr	1	40	39.4	33.7–45.3	Acceptable
	2	122	118	103–133	Acceptable
Pb	1	5	5.28	3.31–7.63	Acceptable
	2	72	66.0	54.9–75.9	Acceptable
Hg	1	1.09	1.00	0.656–1.32	Acceptable
	2	7.81	7.50	5.57–9.07	Acceptable
Se	1	27.5	26.6	20.4–32.1	Acceptable
	2	65.3	76.0	58.3–91.1	Acceptable
Ag	1	75	73.3	65.2–83.0	Acceptable
	2	5	5.38	3.98–7.16	Acceptable
<i>Nitrate/nitrite/fluoride (mg/L)</i>					
Nitrate as N	1	1.44	1.50	1.27–1.76	Acceptable
	2	7.10	6.02	4.98–7.37	Acceptable
Nitrite as N	1	0.11	0.104	0.0857–0.122	Acceptable
	2	1.04	1.00	0.871–1.13	Acceptable
Fluoride	1	0.71	0.701	0.631–0.771	Acceptable
	2	1.45	1.46	1.31–1.61	Acceptable
<i>Trihalomethanes (µg/L)</i>					
Bromodichloromethane	1	16.6	16.7	13.4–20.0	Acceptable
	2	53.4	55.7	44.6–66.8	Acceptable
Bromoform	1	53.5	54.9	43.9–65.9	Acceptable
	2	21.3	23.2	18.6–27.8	Acceptable
Chlorodibromomethane	1	65.2	67.6	54.1–81.1	Acceptable
	2	13.4	14.2	11.4–17.0	Acceptable
Chloroform	1	46.2	42.4	33.9–50.9	Acceptable
	2	23.3	21.2	17.0–25.4	Acceptable
Total Trihalomethanes	1	181.5	181.6	145–218	Acceptable
	2	111.4	114.3	91.4–137	Acceptable

Table 7.2.24 (continued)

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True ^a		
<i>Insecticides (µg/L)</i>					
Endrin	1	6.99	6.71	4.32–8.53	Acceptable
	2	0.606	0.479	0.333–0.617	Acceptable
Lindane	1	3.927	3.47	2.04–4.74	Acceptable
	2	0.1485	0.116	0.0629–0.159	Acceptable
Methoxychlor	1	81.16	65.4	42.7–84.4	Acceptable
	2	5.07	2.62	1.67–3.54	Unacceptable
Toxaphene	3	13.08	8.94	5.04–11.5	Unacceptable
	4	7.18	2.58	1.26–3.49	Unacceptable
<i>Herbicides (µg/L)</i>					
2,4-D	1	82.7 ^b	89.6	34.6–121	Acceptable
	2	2.68	2.87	0.498–4.87	Acceptable
2,4,5-TP	1	16.2 ^b	25.0	8.47–33.6	Acceptable
	2	0.642 ^b	1.20	0.409–1.59	Acceptable
<i>Volatile organic compounds (µg/L)</i>					
1,2-Dichloroethane	1	2.22	2.56	1.54–3.58	Acceptable
1,2-Dichloroethylene	1	4.88	4.35	2.61–6.09	Acceptable
	2	11.8	13.5	10.8–16.2	Acceptable
1,1,1-Trichloroethane	1	7.48	6.41	3.85–8.97	Acceptable
Trichloroethylene	1	2.46	2.57	1.54–3.60	Acceptable
	2	9.97	11.0	8.80–13.2	Acceptable
Vinyl chloride	1	5.01	3.04	1.82–4.26	Unacceptable
Chlorobenzene	2	6.00	7.50	4.50–10.5	Acceptable
1,2-Dibromo-3-chloropropane	2		0.235	0.141–0.329	Unacceptable
Dibromomethane	2	4.70	5.12	3.07–7.17	Acceptable
1,2-Dichlorobenzene	2	10.3	12.1	9.68–14.5	Acceptable
T 1,2-Dichloroethylene	2	5.13	5.45	3.27–7.63	Acceptable
Dichloromethane	2		2.60	1.56–3.64	Unacceptable
1,2-Dichloropropane	2	3.45	3.41	2.05–4.77	Acceptable
Benzene	1	6.52	6.32	3.79–8.85	Acceptable
Carbon tetrachloride	1	3.92	3.65	2.19–5.11	Acceptable
	2	7.31	8.36	5.02–11.7	Acceptable
1,4-Dichlorobenzene	1	8.30	8.72	5.23–12.2	Acceptable
	2	8.79	11.1	8.88–13.3	Unacceptable
Ethylene dibromide (EDB)	2		0.150	0.0900–0.210	Unacceptable
Tetrachloroethylene	2	3.72	4.52	2.71–6.33	Acceptable

Table 7.2.24 (continued)

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True ^a		
<i>Miscellaneous analytes</i>					
Residual free Cl (mg/L)	1	0.44	0.521	0.281–0.773	Acceptable
	2	1.6	1.42	1.01–1.79	Acceptable
Turbidity (NTUs)	1	3.54	3.75	3.21–4.29	Acceptable
	2	0.53 ^b	0.350	0.250–0.612	Acceptable
Total filterable residue (mg/L)	1	338 ^b	301	192–485	Acceptable
Calcium (as CaCO ₃) (mg/L)	1	168	148	136–159	Unacceptable
pH (units)	1	9.17	9.10	8.77–9.34	Acceptable
Alkalinity (as CaCO ₃) (mg/L)	1	44 ^b	42.0	38.4–48.0	Acceptable
Corrosivity (Langelier ind. at 20°C)	1	+1.06	0.92	0.498–1.24	Acceptable
Sodium (mg/L)	1	21.1	19.3	17.7–21.8	Acceptable

^aBased upon theoretical calculations, or a reference value when necessary.

^bSignificant general method bias is anticipated for this result.

Table 7.2.25. Water supply performance evaluation WS-020—ORNL, 1988

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True		
<i>Miscellaneous parameters (mg/L)</i>					
Chloride	1	74.6	69.6	69.6–77.0	Acceptable
	2	234	218	209–237	Acceptable
Fluoride	1	1.09	1.11	0.953–1.25	Acceptable
	2	0.377	0.123	0.0601–0.198	Unacceptable
Sulfate	1	4.41	5.01	2.61–7.11	Acceptable
	2	119	120	101–137	Acceptable
Ammonia-N	1	2.58	2.10	1.59–2.63	Acceptable
	2	10.7	10.3	8.42–12.0	Acceptable
Nitrate-N	1	5.81	5.50	4.50–6.48	Acceptable
	2	0.87	0.950	0.750–1.16	Acceptable
Ortho-P	1	1.20	1.10	0.919–1.27	Acceptable
	2	5.13	4.80	4.14–5.46	Acceptable
Kjeldahl-N	1	8.48	8.10	5.98–10.0	Acceptable
	2	14.0	14.5	11.0–17.6	Acceptable
Total P	1	9.57	9.50	7.45–11.0	Acceptable
	2	4.16	4.40	3.52–5.11	Acceptable
Cyanide	1	0.444	0.460	0.308–0.587	Acceptable
	2	0.141	0.155	0.0845–0.207	Acceptable
Non-F Res	1	53	56.3	44.9–67.7	Acceptable
	2	38	34.8	24.7–45.0	Acceptable
O&G	1	13.4	14.0	6.52–18.7	Acceptable
	2	18.6	21.0	10.1–27.4	Acceptable

Table 7.2.26. Water supply performance evaluation WP-021—ORNL, 1988

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True		
<i>Miscellaneous parameters (mg/L)</i>					
Chloride	1	172	172	157–179	Acceptable
	2	66.0	65.4	58.6–71.7	Acceptable
Fluoride	1	0.40	0.320	0.242–0.403	Acceptable
	2	3.71	3.70	3.06–4.12	Acceptable
Sulfate	1	14.8	15.1	11.5–18.2	Acceptable
	2	123	116	96.1–133	Acceptable
Cyanide	1	0.154	0.150	0.0844–0.196	Acceptable
	2	0.226	0.225	0.128–0.297	Acceptable

Table 7.2.27. Water supply performance evaluation study number WS-021—ORGDP, 1988

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True ^a		
<i>Trace metals (µg/L)</i>					
As	1	60.0	66.0	53.8–75.5	Acceptable
	2	18.0	20.0	15.9–23.9	Acceptable
Ba	1	167	142.5	111–174	Acceptable
	2	897	938	802–1030	Acceptable
Cd	1	1.60 ^b	1.60	1.21–2.25	Acceptable
	2	11.3	14.1	11.8–16.6	Unacceptable
Cr	1	115	102	86.8–116	Acceptable
	2	31.4	33.0	27.5–38.9	Acceptable
Pb	1	34.0	34.7	28.1–40.6	Acceptable
	2	116	109	93.4–127	Acceptable
Hg	1	1.57	1.44	0.966–1.86	Acceptable
	2	5.05	4.81	3.73–5.92	Acceptable
Se	1	26.0	27.7	20.5–33.8	Acceptable
	2	80.0	86.9	65.9–105	Acceptable
Ag	1	87.2	74.3	62.3–84.4	Unacceptable
	2	7.48	7.70	5.70–10.1	Acceptable
Nitrate-N (mg/L)	1	0.66	0.650	0.529–0.777	Acceptable
	2	4.27	4.51	3.84–5.10	Acceptable
Fluoride (mg/L)	1	0.239	0.250	0.210–0.300	Acceptable
	2	1.92	2.00	1.83–2.17	Acceptable
<i>Trihalomethanes (µg/L)</i>					
Chloroform	1	10.0	14.1	11.3–16.9	Unacceptable
	2	57.6	74.2	59.4–89.0	Unacceptable
Bromoform	1	58.5	63.3	50.6–76.0	Acceptable
	2	28.5	27.4	21.9–32.9	Acceptable
Bromodi- chloromethane	1	8.77	11.1	8.88–13.3	Unacceptable
	2	33.9	40.9	32.7–49.1	Acceptable
Dibromo- chloromethane	1	40.9	44.4	35.5–53.3	Acceptable
	2	17.7	17.8	14.2–21.4	Acceptable
Total Tri- halomethanes	1	118.2	132.9	106–159	Acceptable
	2	137.7	160.3	128–192	Acceptable

Table 7.2.27 (continued)

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True ^a		
<i>Volatile organic compounds (µg/L)</i>					
Vinyl chloride	1	1.38	1.28	0.768–1.79	Acceptable
1,1-Dichloroethylene	1	6.60	7.27	4.36–10.2	Acceptable
1,2-Dichloroethane	1	4.06	4.78	2.87–6.69	Acceptable
	2	0.495		DL ^c	Unacceptable
1,1,1-Trichloroethane	1	3.84	4.77	2.86–6.68	Acceptable
	2	195	214.5	172–257	Acceptable
Carbon tetrachloride	1	5.81	7.31	4.39–10.2	Acceptable
Trichloroethylene	1	3.26	3.57	2.14–5.00	Acceptable
Benzene	1	2.25	2.37	1.42–3.32	Acceptable
	2	11.4	11.9	9.52–14.3	Acceptable
1,4-Dichlorobenzene	1	2.92	4.68	2.81–6.55	Acceptable
	2	8.65	12.6	10.1–15.1	Unacceptable
Toluene	2	7.50	8.10	4.86–11.3	Acceptable
Ethylbenzene	2	8.43	9.32	5.59–13.0	Acceptable
Total xylenes	2	5.71	6.86	4.12–9.60	Acceptable
Styrene	2	14.2	11.4	9.12–13.7	Unacceptable
Bromoform	1	58.5		DL ^c	Unacceptable
	2	28.5		DL ^c	Unacceptable
<i>N</i> -Propylbenzene	2	11.4	8.35	5.01–11.7	Acceptable
<i>N</i> -Butylbenzene	2	<5.00	10.5	8.40–12.6	Unacceptable
<i>Miscellaneous parameters</i>					
Residual free Cl (mg/L)	1	0.3	0.450	0.214–0.703	Acceptable
	2	1.4	1.59	1.11–2.03	Acceptable
Turbidity (NTUs)	1	1.50	1.4	1.06–1.81	Acceptable
	2	5.10	5.0	4.14–5.62	Acceptable

^aBased upon theoretical calculations or a reference value when necessary.

^bSignificant general method bias is anticipated for this result.

^cDetection limit (DL) = acceptance limit.

Table 7.2.28. Water supply performance evaluation study number WS-022—ORGDP, 1988

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True ^a		
<i>Trace metals (µg/L)</i>					
As	1	5.10	5.33	3.49–7.57	Acceptable
	2	26.2	28.4	22.7–33.3	Acceptable
Ba	1	524	567	485–632	Acceptable
	2	78.7	86.7	66.2–105	Acceptable
Cd	1	43.1 ^b	42.0	32.5–45.8	Acceptable
	2	6.52	3.36	2.60–4.11	Unacceptable
Cr	1	33.9	39.4	33.7–45.3	Acceptable
	2	95.1	118	103–133	Unacceptable
Cu	1	1310	1320	1220–1400	Acceptable
	2	26.4	22.0	13.5–25.8	Unacceptable
Pb	1	6.30	5.28	3.31–7.63	Acceptable
	2	71.6	66.0	54.9–75.9	Acceptable
Hg	1	0.87	1.00	0.656–1.32	Acceptable
	2	7.11	7.50	5.57–9.07	Acceptable
Se	1	25.4	26.6	20.4–32.1	Acceptable
	2	73.6	76.0	58.3–91.1	Acceptable
Ag	1	68.0	73.3	65.2–83.0	Acceptable
	2	5.73	5.38	3.98–7.16	Acceptable
<i>Nitrate, nitrite, and fluoride (mg/L)</i>					
Nitrate-N	1	1.43	1.50	1.27–1.76	Acceptable
	2	5.87	6.02	4.98–7.37	Acceptable
Nitrite-N	1	0.09	0.104	0.357–0.122	Acceptable
	2	0.91	1.00	0.871–1.13	Acceptable
Fluoride	1	0.686	0.701	0.631–0.771	Acceptable
	2	1.42	1.46	1.31–1.61	Acceptable
<i>Insecticides (µg/L)</i>					
Endrin	1	7.03	6.71	4.32–8.53	Acceptable
	2	0.40	0.479	0.333–0.617	Acceptable
Heptachlor	1	1.95	1.91	0.397–2.65	Acceptable
	2	0.20	0.334	0.141–0.452	Acceptable
Heptachlor epoxide	1	1.32	1.55	1.01–2.02	Acceptable
	2	0.24	0.233	0.150–0.292	Acceptable
Lindane	1	4.20	3.47	2.04–4.74	Acceptable
	2	0.15	0.116	0.0629–0.159	Acceptable
Methoxychlor	1	74.7	65.4	42.7–84.4	Acceptable
	2	2.66	2.62	1.67–3.54	Acceptable
Toxaphene	3	13.3	8.94	5.04–11.5	Unacceptable
	4	3.77	2.58	1.26–3.49	Unacceptable
Chlordane	5	2.12 ^b	1.65	0.851–2.09	Unacceptable
	6	8.67 ^b	6.60	4.15–7.90	Unacceptable

Table 7.2.28 (continued)

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True ^a		
<i>Herbicides (µg/L)</i>					
2,4-D	1	91.8 ^b	89.6	34.6–121	Acceptable
	2	2.54	2.87	0.498–4.87	Acceptable
2,4,5-TP (Silvex)	1	22.3 ^b	25.0	8.47–33.6	Acceptable
	2	0.949 ^b	1.20	0.409–1.59	Acceptable
<i>Polychlorinated biphenyls (µg/L)</i>					
PCB-Aroclor 1016/1242	1	1.45	0.981	0.544–1.36	Unacceptable
	2	0.500		DL ^c	Unacceptable
PCB-Aroclor 1254	2	2.49	2.66	1.35–3.45	Acceptable
<i>Trihalomethanes (µg/L)</i>					
Chloroform	1	40.6	42.4	33.9–50.9	Acceptable
	2	19.9	21.2	17.0–25.4	Acceptable
Bromoform	1	49.9	54.9	43.9–65.9	Acceptable
	2	21.4	23.2	18.6–27.8	Acceptable
Bromodi- chloromethane	1	14.8	16.7	13.4–20.0	Acceptable
	2	51.8	55.7	44.6–66.8	Acceptable
Dibromo- chloromethane	1	62.5	67.6	54.1–81.1	Acceptable
	2	13.8	14.2	11.4–17.0	Acceptable
Total tri- halomethanes	1	168.1	181.6	145–218	Acceptable
	2	106.9	114.3	91.4–137	Acceptable
<i>Volatile organic compounds (µg/L)</i>					
Vinyl chloride	1	3.59	3.04	1.82–4.26	Acceptable
1,1-Dichloroethylene	1	4.80	4.35	2.61–6.09	Acceptable
	2	13.7	13.5	10.8–16.2	Acceptable
1,2-Dichloroethane	1	2.46	2.56	1.54–3.58	Acceptable
1,1,1-Trichloroethane	1	5.95	6.41	3.85–8.97	Acceptable
Carbon tetrachloride	1	2.95	3.65	2.19–5.11	Acceptable
	2	6.47	8.36	5.02–11.7	Acceptable
Trichloroethylene	1	2.62	2.57	1.54–3.60	Acceptable
	2	10.8	11.0	8.80–13.2	Acceptable
Benzene	1	6.11	6.32	3.79–8.85	Acceptable
Tetrachloroethylene	2	4.50	4.52	2.71–6.33	Acceptable
1,4-Dichlorobenzene	1	8.44	8.72	5.23–12.2	Acceptable
	2	10.6	11.1	8.88–13.3	Acceptable

Table 7.2.28 (continued)

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True ^a		
Chlorobenzene	2	<5.00	7.50	4.50–10.5	Unacceptable
1,2-Dibromochloropropane	2	<5.00	0.235	0.141–0.329	Unacceptable
Dibromomethane	2	5.51	5.12	3.07–7.17	Acceptable
1,2-Dichlorobenzene	2	13.8	12.1	9.68–14.5	Acceptable
T 1,2-Dichloroethylene	2	5.57	5.45	3.27–7.63	Acceptable
Dichloromethane	2	2.64	2.60	1.56–3.64	Acceptable
1,2-Dichloropropane	2	3.19	3.41	2.05–4.77	Acceptable
Ethylene dibromide (EDB)	2	<5.00	0.150	0.0900–0.210	Unacceptable
<i>Miscellaneous analyses</i>					
Residual free	1	0.4	0.521	0.281–0.773	Acceptable
Cl (mg/L)	2	1.4	1.42	1.01–1.79	Acceptable
Turbidity	1	3.4	3.75	3.21–4.29	Acceptable
(NTUs)	2	0.4 ^b	0.350	0.250–0.612	Acceptable

^aBased upon theoretical calculations or a reference value when necessary.

^bSignificant general method bias is anticipated for this result.

^cDetection limit (DL) = acceptance limit.

**Table 7.2.29. CLP performance evaluation results—inorganics
(ORNL, 1988)**

Scoring classification	Points deducted			
	1st quarter	2d quarter	3rd quarter	4th quarter
Duplicate precision ^a	0	2.0	0	0
Matrix spikes ^b	0.5	0.5	0.5	1.0
<i>Water sample</i>				
Identification	0	0	0	0
Quantitation	13	3.4	3.2	9.5
False positives and unmet CRDLs ^c	0	0	0	0
<i>Soil sample</i>				
Identification	0	0	0	0
Quantitation	0	0	0	0
False positives and unmet CRDLs ^c	0	0	0	0
Total points deducted	13.5	5.9	3.7	10.5
Laboratory score ^d	86.5	94.1	96.3	89.5

^aMaximum of 10 points deducted based on number of duplicate results that are outside of the control limits.

^bMaximum of 10 points deducted based on number of matrix spike results that are outside of the control limits.

^cPoints deducted for false positive values and for not meeting the contract-required detection limits (CRDLs).

^dThe maximum number of possible points is 100.

**Table 7.2.30. CLP performance evaluation results—organics
(ORNL, 1988)**

Scoring classification	Points deducted			
	1st quarter	2d quarter	3rd quarter	4th quarter
No. of TCL compounds not identified	0	0	8.0	0
No. of TCL compounds misquantified	33.3	12.5	6.0	0
No. of TCL contaminants	0	0	4.0	0
No. of non-TCL compounds not identified	0	2.2	4.4	0
No. of non-TCL contaminants	4.4	6.6	4.4	0
Total points deducted	37.7	21.3	26.8	0
Laboratory score ^a	62.3	78.7	73.0	100

^aThe maximum number of possible points is 100.

**Table 7.2.31. CLP performance evaluation results—inorganics
(ORGDP, FY 1988)**

Scoring classification	Points deducted			
	1st quarter	2d quarter	3rd quarter	4th quarter
Duplicate precision ^a	0	0	0	0
Matrix spikes ^b	0	0.5	0	0
<i>Water sample</i>				
Identification	0	0	0	0
Quantitation	3.4	0	3.2	0
False positives and unmet CRDLs ^c	0	0	0	0
<i>Soil sample</i>				
Identification	0	0	0	0
Quantitation	14.2	13.0	0	3.4
False positives and unmet CRDLs ^c	0	0	0	0
Total points deducted	17.6	13.5	3.2	3.4
Laboratory score ^d	82.4	86.5	96.8	96.6

^aMaximum of 10 points deducted based on number of duplicate results that are outside of the control limits.

^bMaximum of 10 points deducted based on number of matrix spike results that are outside of the control limits.

^cPoints deducted for false positive values and for not meeting the contract-required detection limits (CRDLs).

^dThe maximum number of possible points is 100.

**Table 7.2.32. CLP performance evaluation results—organics
(ORGDP, FY 1988)**

Scoring classification	Points deducted			
	1st quarter	2d quarter	3rd quarter	4th quarter
No. of TCL compounds not identified	1	0	2	0
No. of TCL compounds misquantified	3	1	5	1
No. of TCL contaminants	1	0	1	0
No. of non-TCL compounds not identified	1	0	0	0
No. of non-TCL contaminants	0	1	0	0
Total points deducted	14.4	6.4	31.4	4.4
Laboratory score ^a	85.6	93.6	68.6	95.6

^aThe maximum number of possible points is 100.

Table 7.3.1. Environmental audits and reviews at the Y-12 Plant during 1988

Date	Audit/review	Reviewer/Auditor	Subject	Findings/outcome
<i>External regulatory</i>				
2/29/88	RCRA inspection	TDHE	Review of RCRA facilities and records.	One notice of violation that was corrected.
3/28/88	Site clearing inspection	TDHE	Site clearing on 54 acres north of Bear Creek Road at Y-12 Plant.	Several findings and recommendations were made. All have been addressed.
4/14/88	RCRA inspection	TDHE	Review of RCRA facilities and records.	Several findings and recommendations were made. All have been addressed.
5/2/88	Water Quality Act inspection	TDHE	Review of best management practices at West Borrow area	All observations and recommendations have been addressed.
5/9/88	Water Quality Control Act inspection	TDHE	Review of activities related to Bear Creek rechannelization and channel restrictions	One notice of noncompliance that was corrected
6/6-8/88	RCRA inspection	TDHE	Review of RCRA facilities and records	Two notices of violation that have been corrected
6/21/88	NPDES compliance evaluation inspection	TDHE	Review of NPDES program	No report was ever received from TDHE
8/3/88	Water Quality Act inspection	TDHE	Review of activities related to West Borrow area	Verbal comments are being addressed.
8/19/88	Water Quality Act inspection	TDHE	Review of activities related to Bear Creek and West Borrow area	Notice of noncompliance has been addressed.
9/19/88	Water Quality Act inspection	TDHE	Review of activities related to West Borrow area	Several recommendations were made. All have been addressed.
9/19-23/88	RCRA inspection	TDHE/EPA	Review of RCRA facilities and records	A notice of violation was received from each agency. All findings have been addressed.
11/22/88	RCRA inspection	TDHE	Follow-up to 9/19-23/88 review of RCRA facilities and records	Notice of violation that has been corrected
12/20/88	Water Quality Act inspection	TDHE	Review of activities related to Pine Ridge	Several verbal recommendations were made. All have been addressed.
12/29/88-1/11/89	Interim oversight	National Academy of Science	Interim oversight of DOE's Non-Reactor Nuclear Facilities	A report on recommendations and findings has not been received.
<i>DOE</i>				
2/29/88-3/3/88	Environmental Protection Appraisal	DOE-ORO	Review of Environmental Monitoring and Compliance program	Twelve recommendations were made. An action plan was prepared to address the recommendations.

Table 7.3.2. Environmental audits and reviews at ORNL during 1988

Date	Audit/review	Reviewer/ auditor	Subject	Findings/outcome
<i>External regulatory</i>				
5/24-25/88	RCRA inspection	TDHE	Review of RCRA facilities and records	All records were in order. One notice of violation that was corrected.
6/15/88	NPDES performance audit inspection follow-up	EPA	Follow-up to previous audit of ORNL's NPDES self-monitoring program	All deficiencies previously identified had been corrected. ORNL's rating increased to a 4 on scale of 1 to 5 (highest=5).
9/15/88	Air permit inspection	TDHE	Inspection of ORNL's permitted air emission sources	All facilities were in order.
9/24-25/88	RCRA inspection	EPA/TDHE	Review of RCRA facilities and records	Ten inspection findings and several recommendations were made.
11/28/88	RCRA inspection	TDHE	Follow-up to inspection conducted 5/8	All findings and recommendations had been brought into compliance.
<i>DOE</i>				
8/8-12/88	Environmental protection appraisal	DOE/ORO	Review of Environmental Monitoring and Compliance Program	A number of findings and recommendations were made. An action plan was prepared to address recommendations.
8/10-12/88	NPDES field activity audit	DOE/PEER	Review of field sampling activities	Several minor recommendations were made; all have been addressed.
9/21-23/88	Ambient Environmental Monitoring Program Assessment	DOE/CH2M Hill	Review of regulatory requirements governing the development and implementation of environmental monitoring activities at the three facilities on the ORR. An evaluation of the adequacy of monitoring activities was measured against regulatory requirements.	The final report included a number of recommendations designed to strengthen the existing environmental monitoring and surveillance program.

Table 7.3.3. Environmental audits and reviews at ORGDP during 1988

Date	Audit/review	Reviewer/Auditor	Inspection type	Findings
March 20, 1988	Environmental protection appraisal	DOE/ORO	Review of environmental monitoring and compliance program	Several findings and recommendations were made. Action plans and completion schedules were prepared for each finding. All facilities were in order.
April 8, 1988	Air permit and sources inspection	TDHE	Inspection of ORGDP's permitted air emission sources	
April 14, 1988	NPDES laboratory evaluation	Environmental and Safety Activities (ESA)	Inspection of laboratory NPDES analyses and procedures	Several findings and recommendations were made.
May 18, 1988	RCRA inspection	Environmental Management Department (EMD)	Review of RCRA facilities and records	Several findings and recommendations were made.
June 1, 1988	NPDES laboratory evaluation	MMES laboratory audit team	Inspection of the laboratory NPDES procedures	Several findings and recommendations were made. The findings have been evaluated and many corrected.
June 9, 1988	NPDES field monitoring	Environmental and safety activities	Review of NPDES field monitoring and operations	Several findings and recommendations were made.
June 13, 1988	RCRA inspection	TDHE	Review of RCRA facilities and records	Notice of violation was received for noncompliance; some violations were corrected during inspection; action plans were prepared.
June 14, 1988	NPDES inspection	EPA	Inspection of the NPDES field and laboratory facilities	Inspection confirmed that the field/laboratory deficiencies had been corrected—ORGDP rating increased to a 4.
August 23, 1988	Environmental NPDES audit	DOE	Review of the NPDES field/laboratory facilities	Minor findings and recommendations were made.
September 6, 1988	RCRA inspection	TDHE/EPA	Inspection of the RCRA facilities and records	A notice of violation was issued for deficiencies in various storage facilities.
September 13, 1988	Air permit and sources inspection	TDHE	Inspection of ORGDP's permitted air emission sources	All facilities were in order.
November 23, 1988	RCRA inspection (follow-up)	TDHE	Follow-up inspection of the previous deficiencies observed	All deficiencies were corrected and the facilities were in order.

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