Volume 2

Oak Ridge

RESERVATION

ENVIRON

OAK RIDGE RESERVATION ENVIRONMENTAL REPORT FOR 1990

VOLUME 2: DATA PRESENTATION

Project director
F. C. Kornegay

Project coordinator
D. C. West

Technical coordinators
R. A. Evans S. T. Goodpasture M. F. Tardiff

Coordinating editor
A. R. Wilson

Date Published: September 1991

Prepared by
Environmental, Safety, and Health Compliance
and
Environmental Management Staff
of the
Oak Ridge Y-12 Plant, Oak Ridge National Laboratory,
and Oak Ridge K-25 Site
managed by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
P.O. Box 2008
Oak Ridge, Tennessee 37831
for the
U.S. DEPARTMENT OF ENERGY
under Contract No. DE-AC05-84OR21400

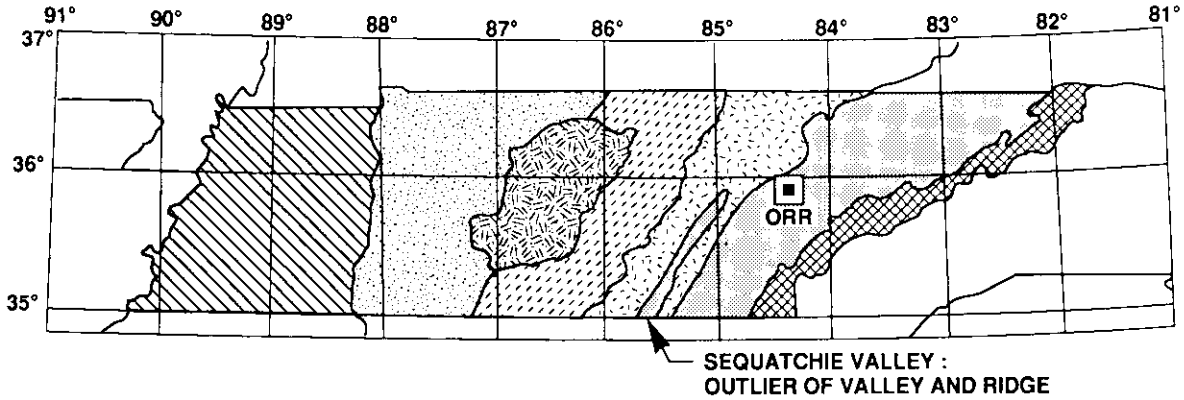
CONTENTS

INTRODUCTION

1. INTRODUCTION

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 1990. 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 1990 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.

ORNL-DWG 91M-8938



PHYSIOGRAPHIC PROVINCES:

- MISSISSIPPI EMBAYMENT
- WESTERN HIGHLAND RIM
- EASTERN HIGHLAND RIM
- CENTRAL BASIN
- CUMBERLAND PLATEAU
- VALLEY AND RIDGE
- BLUE RIDGE

Fig. 1.1. Physiographic map of Tennessee.

ORNL-DWG 91M-8939LB

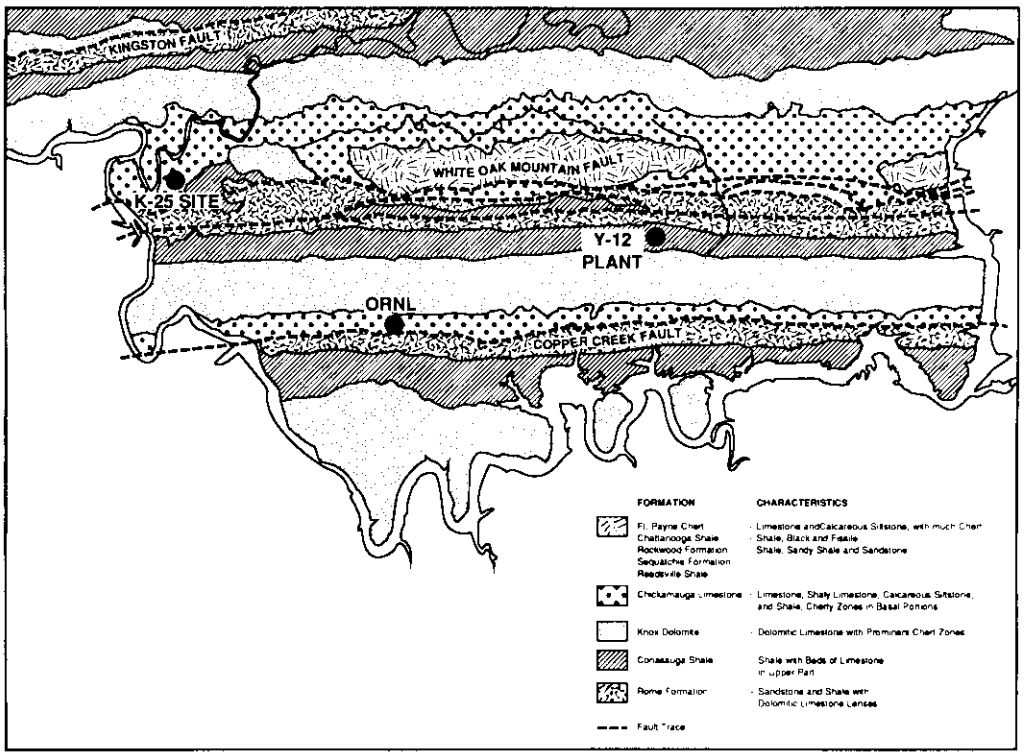


Fig. 1.2. Geologic map of the Department of Energy's Oak Ridge Reservation.

Table 1.1. Administrative[a] units on the ORR in 1990

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 K-25 Site	688	1,700
Oak Ridge Associated Universities[c]	121	298
Total	14,266	35,252

[a]Administrative units are those units that are managed by a major installation or by central Energy Systems.

[b]The Oak Ridge Reservation actually encompasses all of the contiguous 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).

[c]Oak Ridge Associated Universities manages the Scarboro Facility, as well as, other facilities within the Oak Ridge area.

Table 1.2. Populations of central East Tennessee towns[a]

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

[a]*Source: 1980 Census of Population, U.S. Department of Commerce, Bureau of the Census.*

Table 1.3. 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)	✓	3	✓	✓	✓	✓	✓
Poplar Creek	km 0.0–0.8		✓	3	✓	✓	✓	
Poplar Creek	km 0.8–2.1			✓		3	✓	
Poplar Creek	km 2.1–8.8			✓	3	✓	✓	
East Fork Poplar Creek	km 0.0–7.7			✓	3	✓	✓	
Bear Creek	km 0.0–origin			✓	3	✓	✓	
East Fork Poplar Creek	km 7.7–13.3			✓		3	✓	
East Fork Poplar Creek	km 13.3–dam at Y-12 Plant			✓	3	✓	✓	
Poplar Creek	km 8.8–19.8			✓	3	✓	✓	
Poplar Creek	km 19.8–23.0			✓		3	✓	
Indian Creek	At Poplar Creek (km 22.9); km 0.0–origin			✓	3	✓	✓	
Poplar Creek	km 23.0–origin			✓	3	✓	✓	
Clinch River	km 19.2–32.0	✓	3	✓	✓	✓	✓	
White Oak Creek	km 0.0–origin			✓			3	
Melton Branch	km 0.0–origin			✓			3	
Clinch River	km 32.0–63.4	✓	3	✓	✓	✓	✓	✓
Clinch River	km 63.4–65.8	✓	3	✓	✓	✓	✓	✓
Scarboro Creek	km 0.0–1.6			✓	3	✓	✓	
Scarboro Creek	km 1.6–2.1			✓		3	✓	
Scarboro Creek	km 2.1–origin			✓	3	✓	✓	
Clinch River	km 65.8–74.7	✓	3	✓	✓	✓	✓	✓
All other tributaries in the Clinch River basin, named and unnamed, that have not been specifically treated shall be classified				✓	3	✓	✓	

[a]*Source:* Tennessee's Water Quality Criteria and Stream Use Classifications for Interstate and Intrastate Streams, February 1987.
[b]DOM = Domestic water supply.
[c]IND = Industrial water supply.
[d]FISH = Fish and aquatic life.
[e]REC = Recreation.
[f]IRR = Irrigation.
[g]LW&W = Livestock watering and wildlife.
[h]NAV = Navigation.

AIRBORNE DISCHARGES, AMBIENT AIR MONITORING, METEOROLOGICAL MONITORING, AND EXTERNAL GAMMA RADIATION

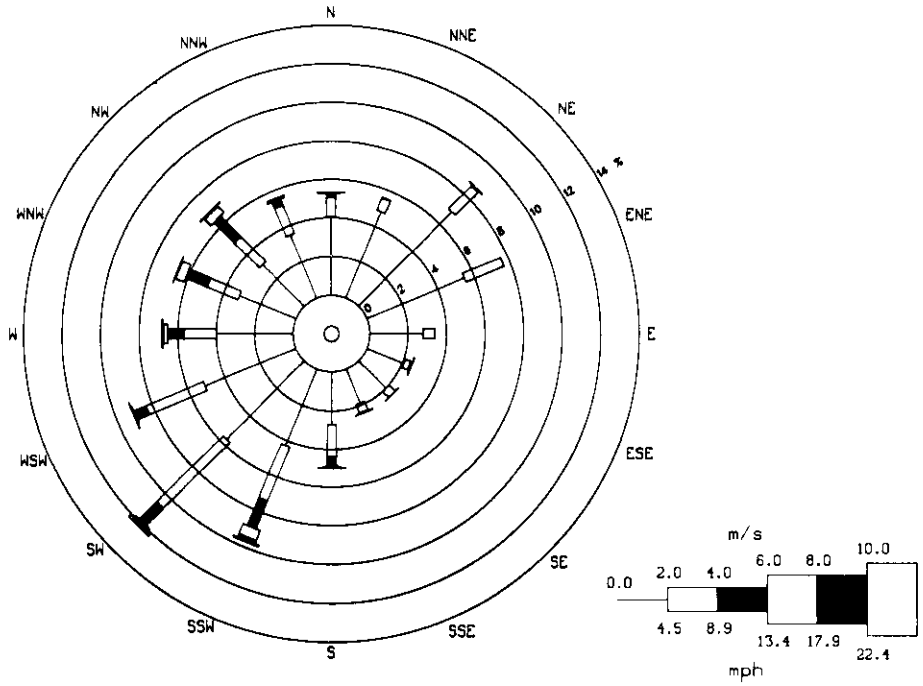


Fig. 2.1. 1990 wind rose for K-25 tower MT1 (10-m level), with 87.5% of possible data.

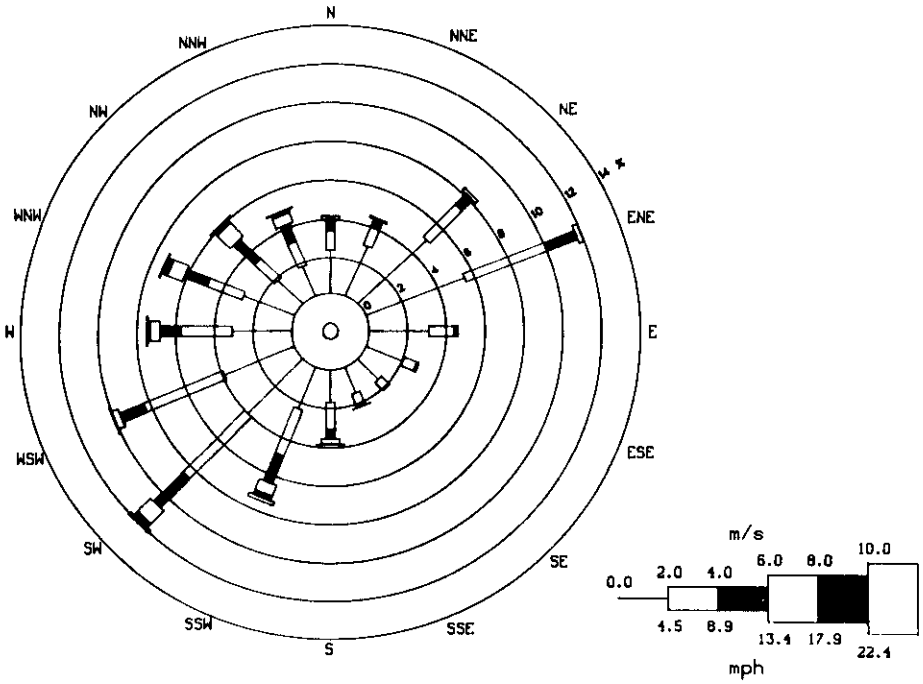


Fig. 2.2. 1990 wind rose for K-25 tower MT1 (60-m level), with 88.2% of possible data.

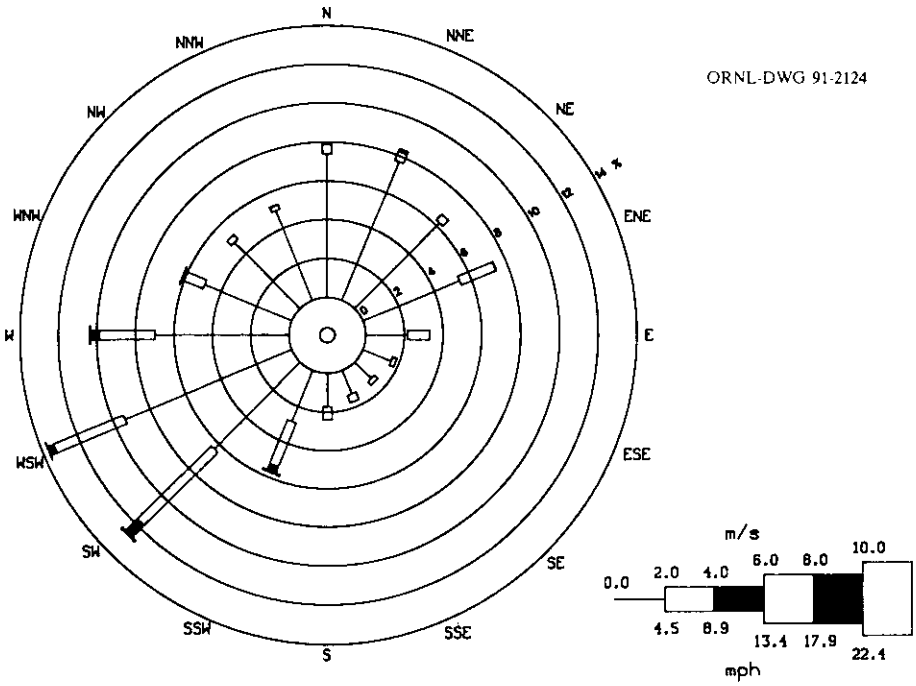


Fig. 2.3. 1990 wind rose for ORNL tower MT2 (10-m level), with 90.1% of possible data.

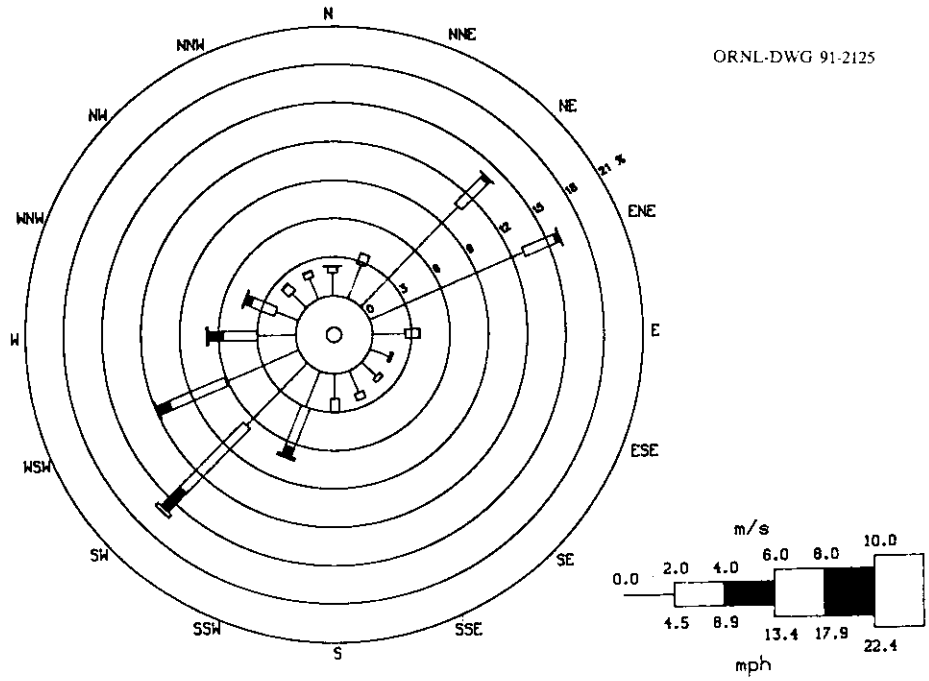


Fig. 2.4. 1990 wind rose for ORNL tower MT2 (30-m level), with 89.9% of possible data.

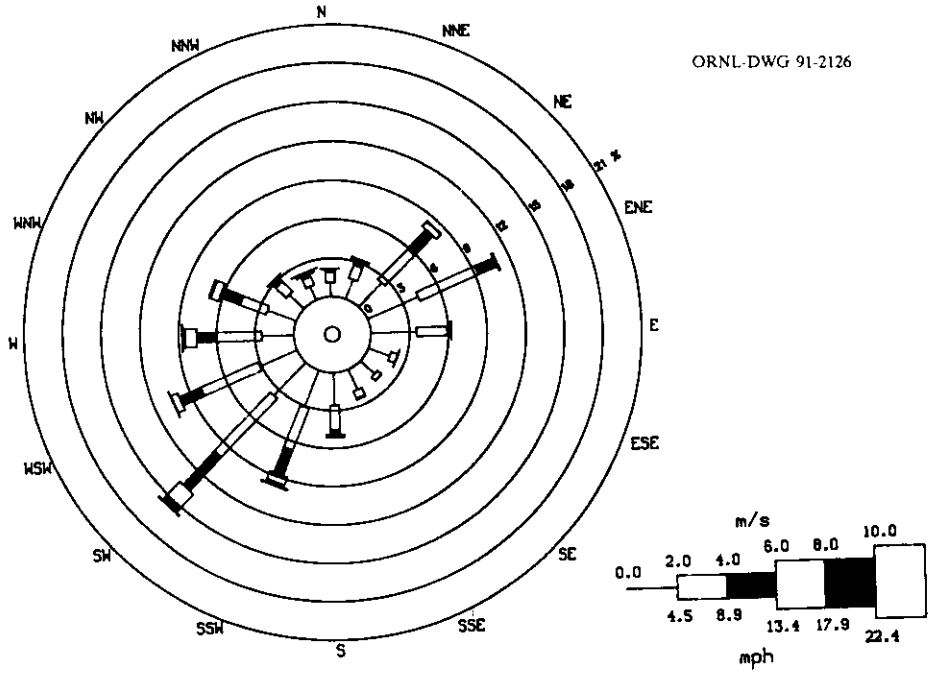


Fig. 2.5. 1990 wind rose for ORNL tower MT2 (100-m level), with 89.8% of possible data.

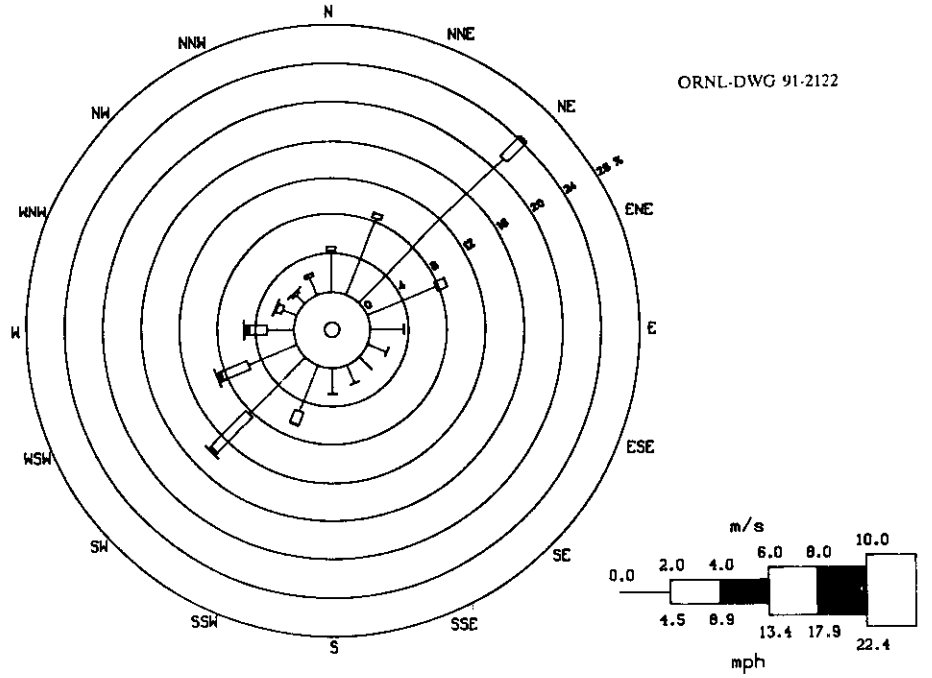


Fig. 2.6. 1990 wind rose for ORNL tower MT3 (10-m level), with 89.1% of possible data.

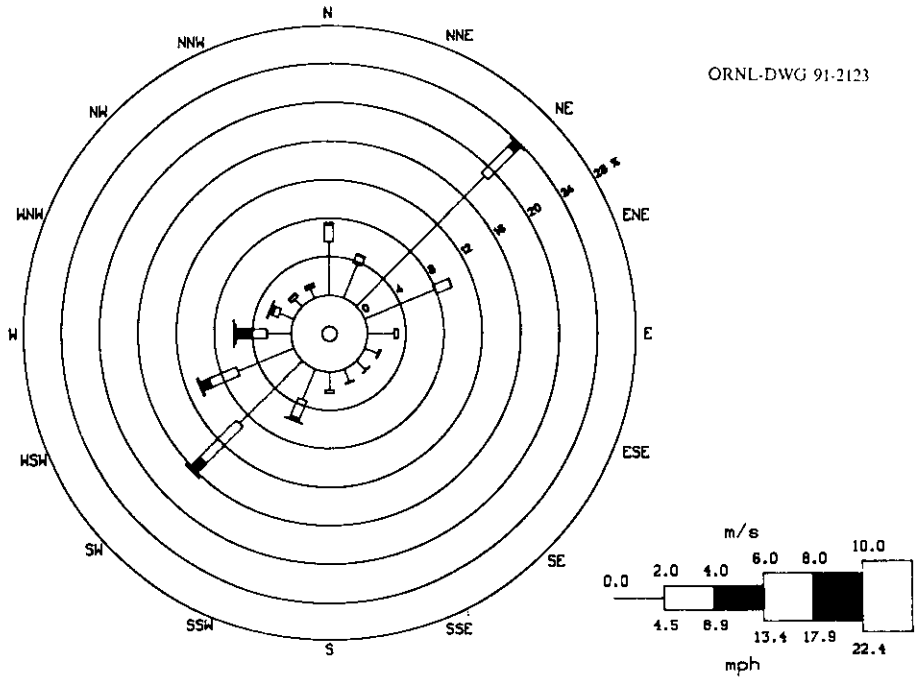


Fig. 2.7. 1990 wind rose for ORNL tower MT3 (30-m level), with 87.5% of possible data.

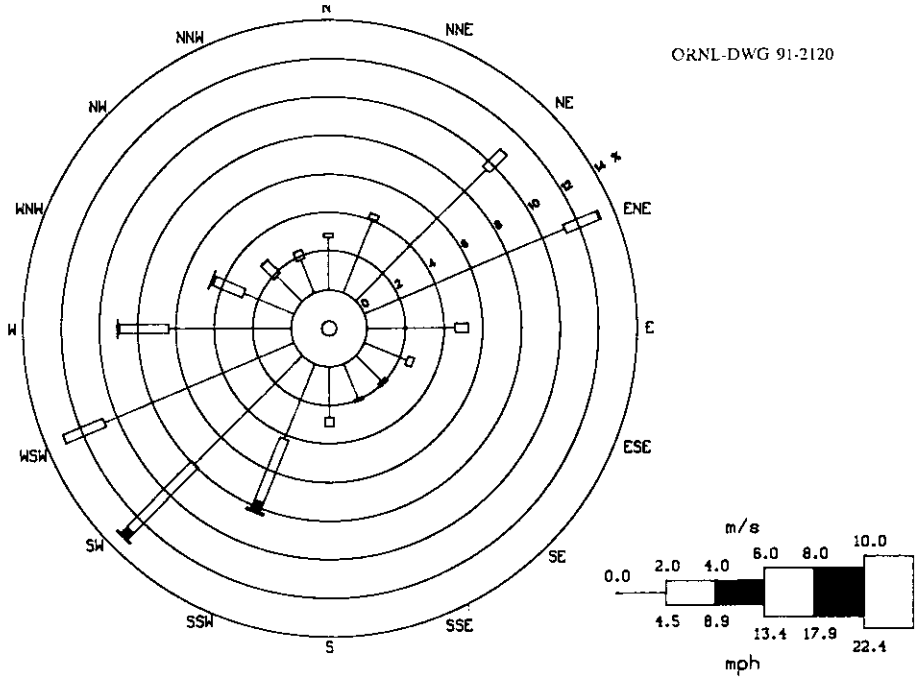


Fig. 2.8. 1990 wind rose for ORNL tower MT4 (10-m level), with 85.6% of possible data.

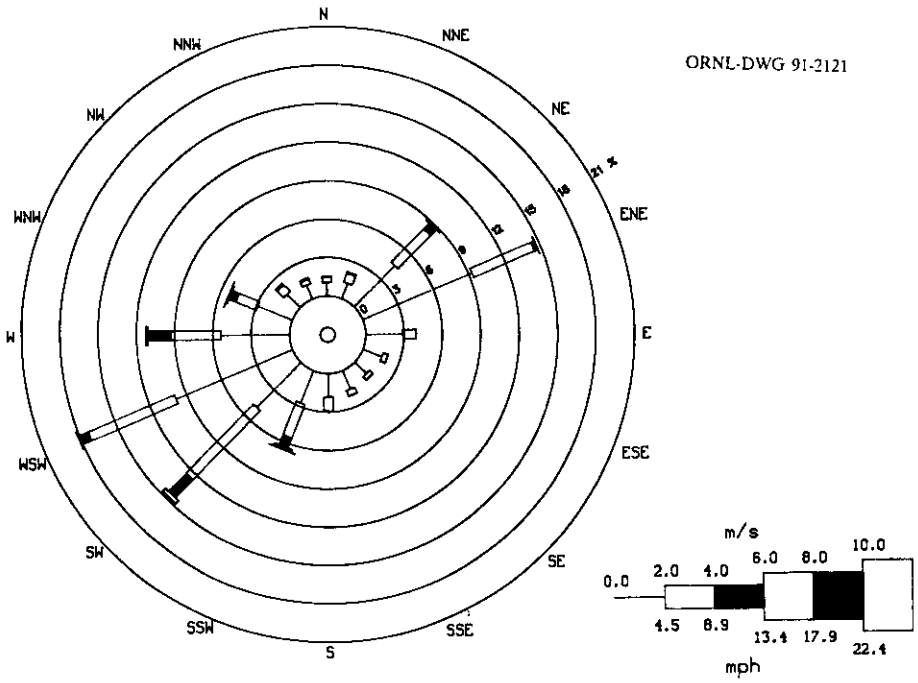


Fig. 2.9. 1990 wind rose for ORNL tower MT4 (30-m level), with 86.6% of possible data.

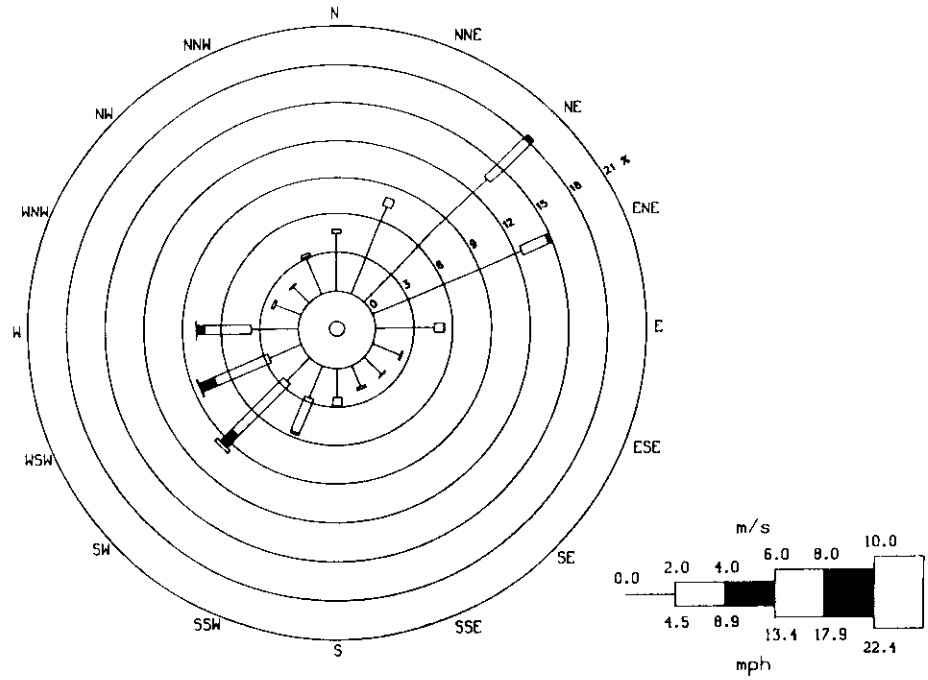


Fig. 2.10. 1990 wind rose for Y-12 tower MTE (east) (10-m level), with 98.4% of possible data.

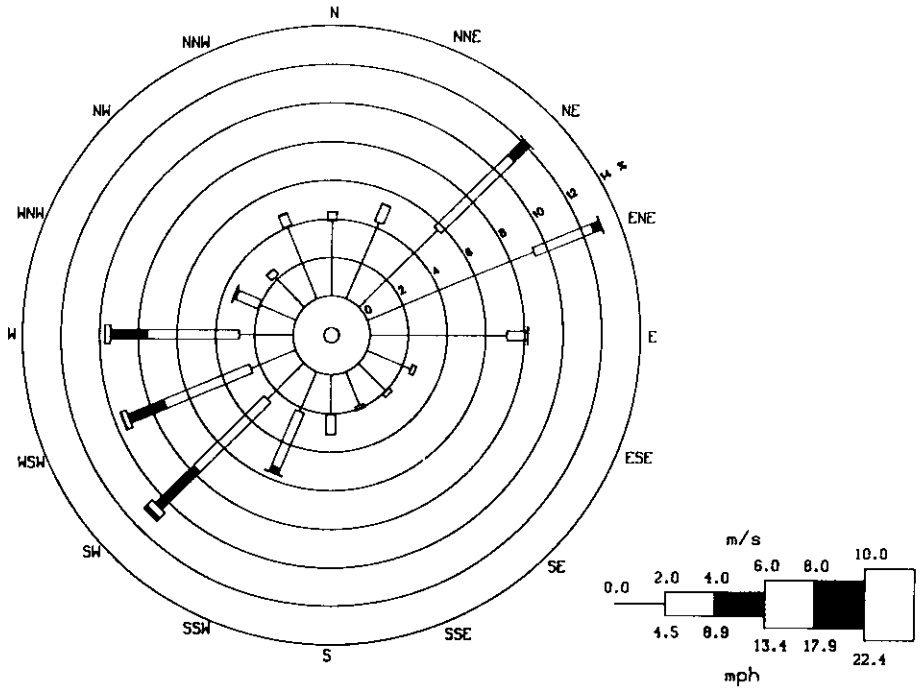


Fig. 2.11. 1990 wind rose for Y-12 tower MTE (east) (30-m level), with 97.8% of possible data.

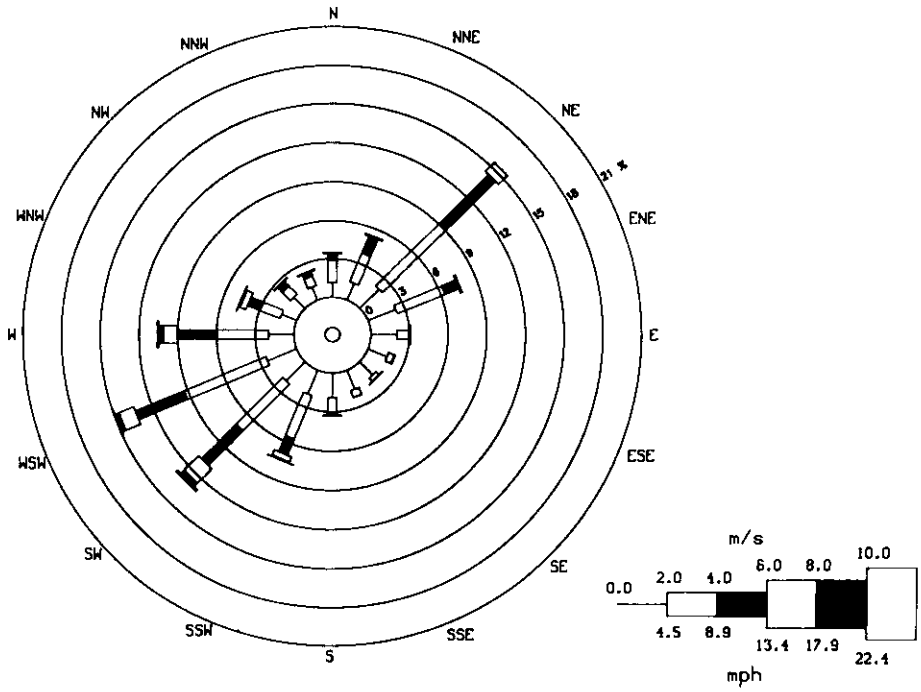


Fig. 2.12. 1990 wind rose for Y-12 tower MTE (east) (100-m level), with 98.2% of possible data.

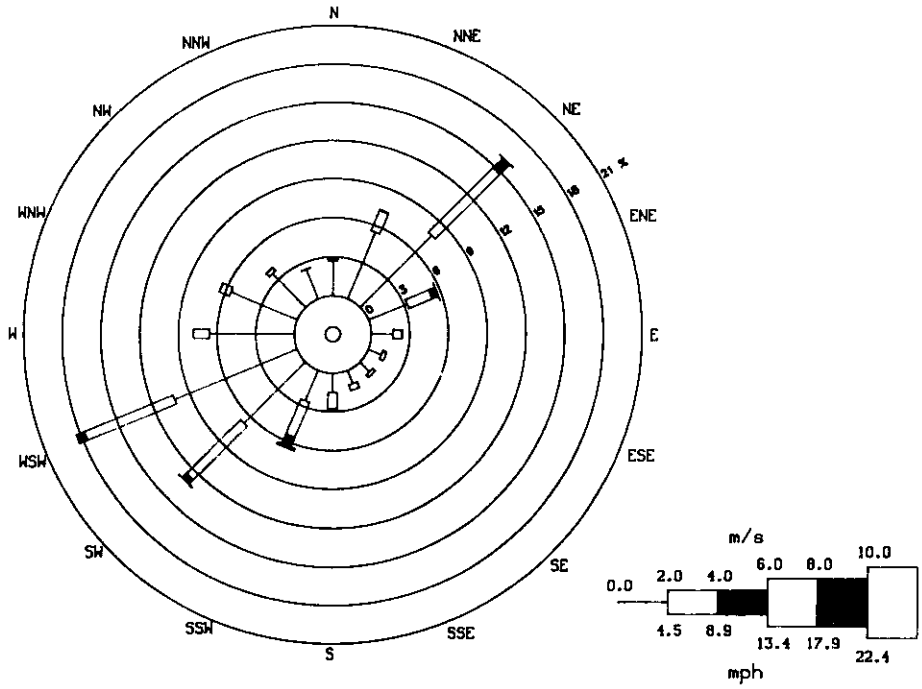


Fig. 2.13. 1990 wind rose for Y-12 tower MTW (west) (10-m level), with 94.0% of possible data.

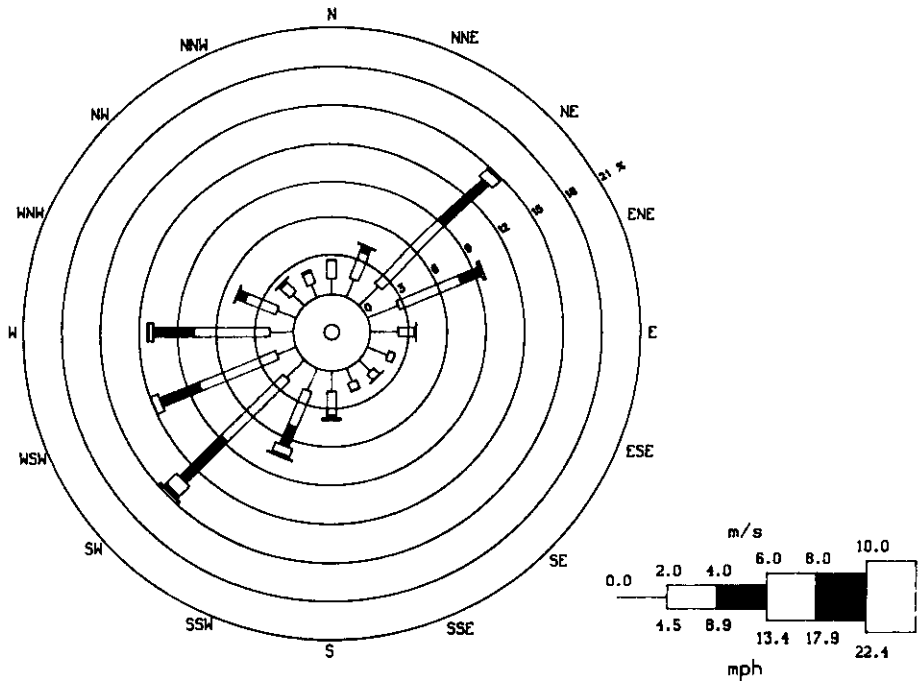


Fig. 2.14. 1990 wind rose for Y-12 tower MTW (west) (60-m level), with 94.3% of possible data.

Table 2.1. 1990 monthly fluoride averages in ambient air—Y-12 Plant[a]

Station	Average concentrations ($\mu g/m^3$)					
	Jan	Feb	Mar	Apr	May	Jun
1	<0.0092	<0.010	<0.0077	<0.0075	<0.0073	<0.0091
2	<0.0118	<0.0118	<0.0070	<0.0076	<0.0074	<0.0081
3	<0.0125	<0.0105	<0.0075	<0.0079	<0.0072	<0.0093
4	<0.0103	<0.0096	<0.0091	<0.0071	<0.0072	<0.0092
5	<0.0109	<0.0101	<0.0070	<0.0078	<0.0072	<0.0091
6	<0.0090	<0.0091	<0.0074	<0.0070	<0.0072	<0.0074
7	<0.0088	<0.0095	<0.0082	<0.0078	<0.0072	<0.0070
8	<0.0095	<0.0100	<0.0091	<0.0072	<0.0072	<0.0070
9	<0.0099	<0.0089	<0.0070	<0.0075	<0.0072	<0.0070
10	<0.0091	<0.0082	<0.0070	<0.0076	<0.0072	<0.0070
11	<0.0087	<0.0084	<0.0070	<0.0075	<0.0072	<0.0070
	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0166	0.0120	0.0145	0.0111	0.0195	0.0159
2	0.0162	0.0139	0.0177	0.0143	0.0232	<0.0082
3	0.0179	0.0155	0.0208	0.0136	0.0257	0.0101
4	0.0193	0.0141	0.0281	0.0141	0.0202	0.0086
5	0.0189	<0.0112	0.0287	0.0146	0.0234	0.0113
6	0.0231	<0.0124	0.0176	0.0131	0.0210	0.0111
7	0.0205	0.0117	0.0185	0.0162	0.0222	0.0139
8	0.0216	<0.0106	0.0149	0.0135	0.0205	0.0184
9	0.0136	0.0119	0.0154	0.0127	0.0285	0.0131
10	0.0158	<0.0118	0.0153	*b*	0.0143	0.0130
11	0.0164	<0.0110	0.0143	0.0140	0.0230	0.0176

[a]Tennessee standard for 30-day average = 1.2 $\mu g/m^3$.
[b]Indicates no sample or downtime.

Table 2.2. 1990 ^{234}U, ^{235}U, ^{236}U, and ^{238}U in air at the Y-12 Plant

Station number	Concentration (10^{-15} μCi/cm^3)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
		^{234}U		
1	4.220 ± 2.86	0.482 ± 0.088	0.0165 ± 0.0281	0.1422 ± 0.0250
2	0.612 ± 0.097	0.814 ± 0.117	0.1487 ± 0.0256	0.0234 ± 0.0284
3	1.900 ± 0.224	3.210 ± 0.351	0.7091 ± 0.0611	0.3790 ± 0.0330
4	3.160 ± 0.395	1.750 ± 0.196	0.5266 ± 0.0540	0.4262 ± 0.0372
5	4.700 ± 0.512	4.490 ± 0.489	0.1021 ± 0.0811	0.7645 ± 0.0235
6	2.700 ± 0.295	1.100 ± 0.139	0.3073 ± 0.0354	0.7792 ± 0.0847
7	1.110 ± 0.139	0.859 ± 0.115	0.2814 ± 0.0340	0.1310 ± 0.0387
8	0.523 ± 0.084	0.565 ± 0.079	0.2343 ± 0.0347	0.3021 ± 0.0330
9	1.070 ± 0.148	0.314 ± 0.061	0.7571 ± 0.0633	0.2387 ± 0.0305
10	0.236 ± 0.057	0.400 ± 0.066	0.1721 ± 0.0265	0.3089 ± 0.0748
11	0.426 ± 0.075	0.420 ± 0.080	0.1850 ± 0.0270	0.1115 ± 0.0190
12	0.581 ± 0.097	0.477 ± 0.080	0.1050 ± 0.0260	0.1208 ± 0.0207
		^{235}U		
1	*a*	0.0202 ± 0.0145	0.0115 ± 0.0067	*a*
2	0.0186 ± 0.0187	0.0556 ± 0.0254	0.0223 ± 0.0092	0.0031 ± 0.0054
3	0.0652 ± 0.0316	0.1800 ± 0.0493	0.0271 ± 0.0097	0.0115 ± 0.0056
4	0.1150 ± 0.0476	0.0456 ± 0.0245	0.0197 ± 0.0104	0.0130 ± 0.0065
5	0.2220 ± 0.0656	0.1990 ± 0.0534	0.0610 ± 0.0155	0.0317 ± 0.0117
6	0.1650 ± 0.0452	0.0294 ± 0.0172	0.0222 ± 0.0085	0.0170 ± 0.0170
7	0.0339 ± 0.0242	0.0723 ± 0.0293	0.0122 ± 0.0061	0.0196 ± 0.0080
8	0.0173 ± 0.0212	0.0321 ± 0.0198	0.0156 ± 0.0096	0.0144 ± 0.0072
9	0.0490 ± 0.0298	0.0287 ± 0.0168	0.0299 ± 0.0101	*a*
10	*a*	0.0189 ± 0.0135	0.0236 ± 0.0090	*a*
11	0.0322 ± 0.0230	0.0212 ± 0.0213	0.0188 ± 0.0078	0.0059 ± 0.0042
12	0.0287 ± 0.0255	0.0086 ± 0.0149	*a*	0.0071 ± 0.0050
		^{236}U		
1	*a*	0.0692 ± 0.0271	0.0038 ± 0.0038	*a*
2	0.0077 ± 0.0077	0.0373 ± 0.0231	*a*	*a*
3	0.0230 ± 0.0135	0.0433 ± 0.0198	0.0068 ± 0.0048	*a*
4	0.1090 ± 0.0364	0.0227 ± 0.0133	*a*	0.0065 ± 0.0046
5	0.0683 ± 0.0287	0.0509 ± 0.0233	0.0039 ± 0.0038	0.0106 ± 0.0061
6	0.0397 ± 0.0182	0.0164 ± 0.0164	0.0063 ± 0.0045	0.0170 ± 0.0170
7	0.0213 ± 0.0125	0.0454 ± 0.0190	0.0061 ± 0.0043	*a*
8	0.0071 ± 0.0072	0.0132 ± 0.0094	0.0039 ± 0.0039	0.0072 ± 0.0051
9	0.0504 ± 0.0212	0.0160 ± 0.0114	0.0033 ± 0.0033	0.0065 ± 0.0046
10	0.0068 ± 0.0068	*a*	0.0034 ± 0.0034	*a*
11	0.0066 ± 0.0066	0.0088 ± 0.0088	0.0031 ± 0.0031	0.0059 ± 0.0059
12	0.0078 ± 0.0079	0.0154 ± 0.0110	*a*	0.0036 ± 0.0036

Table 2.2 (continued)

Station number	Concentration (10^{-15} μCi/cm^3)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
		^{238}U		
1	3.2800 ± 2.06	0.1100 ± 0.0360	0.0027 ± 0.0102	0.0132 ± 0.0081
2	0.0850 ± 0.0277	0.1100 ± 0.0322	0.0186 ± 0.0084	0.0156 ± 0.0093
3	0.1030 ± 0.0285	0.0596 ± 0.0309	0.0408 ± 0.0129	0.0167 ± 0.0079
4	0.1440 ± 0.0468	0.1030 ± 0.0282	0.0510 ± 0.0154	0.0358 ± 0.0108
5	0.1650 ± 0.0431	0.1860 ± 0.0462	0.0762 ± 0.0175	0.0229 ± 0.0103
6	0.0771 ± 0.0251	0.1900 ± 0.0418	0.0475 ± 0.0125	0.0170 ± 0.0207
7	0.1440 ± 0.0334	0.1220 ± 0.0389	0.0642 ± 0.0150	0.0327 ± 0.0113
8	0.0925 ± 0.0308	0.1220 ± 0.0292	0.1327 ± 0.0244	0.0683 ± 0.0157
9	0.1300 ± 0.0341	0.2450 ± 0.0494	0.0631 ± 0.0149	0.0425 ± 0.0127
10	0.1280 ± 0.0321	0.1130 ± 0.0300	0.0472 ± 0.0129	0.0134 ± 0.0300
11	0.1950 ± 0.0387	0.2540 ± 0.0590	0.0188 ± 0.0089	0.0235 ± 0.0093
12	0.1160 ± 0.031	0.0355 ± 0.0294	0.0306 ± 0.0132	0.0320 ± 0.0107

[a]No data available.

Table 2.3. 1990 sulfur dioxide in air at the Y-12 Plant[a,b]

Month	Station	Monthly av. SO_2 (ppm)	Max 24-h av SO_2 (ppm)	Max 3-h av SO_2 (ppm)
January	East	0.014	0.026	0.083
	West	0.004	0.008	0.019
February	East	0.010	0.021	0.065
	West	0.005	0.015	0.035
March	East	0.011	0.025	0.073
	West	0.005	0.013	0.036
April	East	0.011	0.028	0.123
	West	0.006	0.016	0.038
May	East	0.004	0.013	0.050
	West	0.005	0.008	0.013
June	East	0.009	0.019	0.063
	West	0.006	0.016	0.056
July	East	0.006	0.014	0.063
	West	0.007	0.010	0.022
August[c]	East	0.017	0.023	0.072
	West	0.007	0.009	0.011

[a]See Vol. 1, Fig. 2.17 for station locations.
[b]Tennessee 24-h average standard is 0.14 ppm; Tennessee 3-h average standard is 0.5 ppm.
[c]SO_2 monitoring was terminated after August.

Table 2.4. 1990 total suspended particulates in air at the Y-12 Plant[a]

Sample date	Concentration[b,c] ($\mu g/m^3$)		Sample date	Concentration ($\mu g/m^3$)	
	East	West		East	West
01/05/90	22.58	45.14	07/04/90	41.35	46.87
01/11/90	26.67	33.03	07/10/90	48.79	56.62
01/17/90	30.04	43.70	07/16/90	32.94	31.39
01/23/90	27.53	19.59	07/22/90	15.96	25.39
01/29/90	10.07	10.75	07/28/90	41.11	45.89
02/04/90	5.36	6.57	08/03/90	50.98	55.46
02/10/90	10.13	9.41	08/09/90	41.39	47.81
02/16/90	12.26	13.94	08/15/90	29.22	41.78
02/22/90	14.71	20.80	08/21/90	52.83	60.48
02/28/90	31.38	28.41	08/27/90	67.07	41.87
03/06/90	36.77	41.78	09/02/90	38.67	43.20
03/12/90	26.73	25.56	09/08/90	*d*	*d*
03/18/90	23.60	16.60	09/14/90	15.68	*d*
03/24/90	21.16	19.78	09/20/90	*d*	*d*
03/30/90	16.88	17.36	09/26/90	37.04	*d*
04/05/90	54.17	44.97	10/02/90	37.18	30.85
04/11/90	24.07	23.78	10/08/90	18.46	36.21
04/17/90	37.10	36.28	10/14/90	35.35	18.61
04/23/90	53.00	57.78	10/20/90	23.42	19.21
04/29/90	34.86	33.99	10/26/90	18.96	15.94
05/05/90	32.08	29.92	11/01/90	55.40	37.41
05/11/90	54.83	35.25	11/07/90	24.71	22.37
05/17/90	8.67	23.97	11/13/90	73.27	32.82
05/23/90	29.50	24.35	11/19/90	44.92	30.58
05/29/90	30.80	29.55	11/25/90	15.70	17.29
06/04/90	42.62	35.27	12/01/90	23.34	18.99
06/10/90	29.82	27.83	12/07/90	49.42	44.18
06/16/90	50.37	43.83	12/13/90	25.95	32.18
06/22/90	27.44	31.42	12/19/90	9.69	12.52
06/28/90	71.86	64.84	12/25/90	*d*	9.91
			12/31/90	*d*	39.38

[a]See Fig. 2.17 in Vol.1 for station locations.

[b]Tennessee primary air quality standard = 260 $\mu g/(m^3 \cdot 24h)$.

[c]Tennessee secondary air quality standard = 150 $\mu g/(m^3 \cdot 24h)$.

[d]Invalid sample or no sample (downtime).

Table 2.5. 1990 gross alpha and beta in air at the Y-12 Plant

Station number	Concentration (10^{-15} μCi/cm^3)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
		Gross alpha		
1	2.49 + 0.554	2.30 ± 0.616	0.098 ± 0.644	0.466 ± 0.151
2	2.11 + 0.540	2.30 ± 0.616	0.390 ± 0.179	0.447 ± 0.145
3	4.60 + 0.635	4.15 ± 0.713	0.650 ± 0.193	0.641 ± 0.155
4	4.18 + 0.638	2.36 ± 0.620	0.163 ± 0.168	0.813 ± 0.173
5	6.47 + 0.936	5.33 ± 0.814	0.716 ± 0.196	0.806 ± 0.160
6	5.00 + 0.700	3.90 ± 0.700	0.293 ± 0.174	0.491 ± 0.368
7	3.28 + 0.601	5.04 + 0.757	0.195 ± 0.170	0.676 ± 0.163
8	3.03 + 0.570	2.78 ± 0.647	0.358 ± 0.178	0.577 ± 0.150
9	2.72 + 0.567	1.85 ± 0.591	0.293 ± 0.174	0.619 ± 0.149
10	2.84 + 0.582	2.43 ± 0.623	0.130 ± 0.166	*a*
11	2.97 + 0.566	2.23 ± 0.613	0.114 ± 0.165	0.617 ± 0.152
12	3.50 + 0.598	2.11 ± 0.606	0.358 ± 0.178	0.457 ± 0.148
		Gross beta		
1	16.7 + 1.31	14.3 ± 1.24	4.285 ± 0.423	6.932 ± 0.308
2	12.9 + 1.11	14.2 ± 1.23	6.200 ± 0.498	7.772 ± 0.311
3	17.9 + 1.35	17.7 ± 1.42	5.959 ± 0.489	7.790 ± 0.312
4	18.0 + 1.38	13.4 ± 1.19	4.527 ± 0.432	7.949 ± 0.332
5	12.9 + 1.27	15.2 ± 1.37	5.707 ± 0.478	7.265 ± 0.302
6	16.6 + 1.31	15.8 ± 1.31	6.715 ± 0.520	10.44 ± 0.698
7	16.0 + 1.28	15.5 ± 1.30	5.979 ± 0.489	7.079 ± 0.314
8	18.4 + 1.39	15.5 ± 1.30	5.858 ± 0.484	7.459 ± 0.304
9	16.8 + 1.32	14.9 ± 1.27	6.030 ± 0.491	7.409 ± 0.300
10	18.0 + 1.39	14.1 ± 1.22	5.858 ± 0.484	9.639 ± 0.999
11	16.8 + 1.30	14.0 ± 1.22	5.878 ± 0.485	6.996 ± 0.298
12	18.6 + 1.41	16.1 ± 1.33	6.342 ± 0.504	8.248 ± 0.321

[a]No data available.

Table 2.6. Long-lived gross alpha activity in air—ORR, 1990

Station	Number of samples	Concentration (10^{-15} μCi/mL)			
		Max	Min	Mean[a]	Standard error of mean
		ORNL PAM stations[b]			
3	18	5.7	0.12	1.5*	0.30
7	19	7.4	0.19	1.7*	0.40
9	26	4.5	0.15	1.3*	0.19
20	21	4.3	0.16	1.6*	0.22
21	14	16	0.11	1.8	1.1
22	19	4.2	0.25	1.8*	0.28
Summary	117	16	0.11	1.6*	0.17
		ORR PAM stations[b]			
23	21	4.1	–0.11	1.2*	0.23
33	26	7.1	0.31	1.8*	0.28
34	17	6.3	0.16	1.8*	0.37
40	25	14	0.32	2.1*	0.54
41	24	5	0.24	1.6*	0.26
42	22	5.8	0.38	1.7*	0.33
43	21	8.1	0.31	1.6*	0.38
44	24	5.4	0.12	1.4*	0.26
45	24	9.4	0.13	2.2*	0.41
46	22	5.7	0.069	1.8*	0.31
Summary	226	14	–0.11	1.7*	0.11
		RAM stations[c]			
52	19	12	–0.14	2.4*	0.76
58	16	6.5	0.022	1.7*	0.41
Summary	35	12	–0.14	2.1*	0.45
Overall summary	378	16	–0.14	1.7*	0.094

[a]Means marked with an asterisk (*) are statistically determined to be significantly different from zero.
[b]Locations of ORNL and ORR perimeter stations are shown in Fig. 2.19, Vol. 1.
[c]Locations of remote stations are shown in Fig. 2.20, Vol. 1.

Table 2.7. Long-lived gross beta activity in air—ORR, 1990

Station	Number of samples	Concentration (10^{-15} μCi/mL)			
		Max	Min	Mean[a]	Standard error of mean
		ORNL PAM stations[b]			
3	18	49	7.3	23*	2.8
7	19	55	5.9	22*	2.9
9	26	38	5.9	20*	1.6
20	21	43	5.7	24*	2.3
21	14	39	4.7	17*	2.9
22	19	71	7.5	27*	3.4
Summary	117	71	4.7	22*	1.1
		ORR PAM stations[b]			
23	21	46	4.5	21*	2.3
33	26	55	6.6	27*	2.5
34	17	34	4.9	20*	2.1
40	25	42	7.9	21*	1.7
41	24	37	6.3	21*	1.8
42	22	40	7.8	22*	1.8
43	21	41	7.3	23*	2.2
44	24	38	4.4	21*	2.0
45	24	39	7.7	23*	1.8
46	22	52	5.0	25*	2.5
Summary	226	55	4.4	23*	0.67
		RAM stations[c]			
52	20	74	0.47	25*	4.0
58	16	61	0.59	28*	3.5
Summary	36	74	0.47	26*	2.7
Overall summary	379	74	0.47	23*	0.58

[a]Means marked with an asterisk (*) are statistically determined to be significantly different from zero.
[b]Locations of ORNL and ORR perimeter stations are shown in Fig. 2.19, Vol. 1.
[c]Locations of remote stations are shown in Fig. 2.20, Vol. 1.

Table 2.8. ^{131}I concentration in air—ORR, 1990

Station	Number of samples	Concentration (10^{-15} μCi/mL)				
		Max	Min	Mean[a]	Standard error of mean	Percent of DCG[b]
			ORNL PAM stations[c]			
3	18	8.1	–7.8	0.76	0.91	<0.01
7	19	5.5	–3.3	0.25	0.47	<0.01
9	26	4.6	–2.1	0.30	0.31	<0.01
20	21	4.8	–4.6	0.59	0.47	<0.01
21	15	6.7	–13	–0.40	1.1	<0.01
22	19	13	–13	0.13	1.1	<0.01
Summary	118	13	–13	0.30	0.29	<0.01
			ORR PAM stations[c]			
23	21	6.9	–4.1	0.46	0.45	<0.01
34	17	8.7	–7.3	2.2*	0.97	<0.01
40	25	7.8	–3.0	0.69*	0.40	<0.01
41	24	2.8	–7.2	–0.56	0.42	<0.01
44	24	3.9	–4.0	–0.063	0.32	<0.01
45	24	2.5	–12	–1.0	0.75	<0.01
46	22	7.4	–14	0.25	0.90	<0.01
Summary	157	8.7	–14	0.19	0.24	<0.01
Overall summary	275	13	–14	0.24	0.18	<0.01

[a]Means marked with an asterisk (*) are statistically determined to be significantly different from zero.

[b]Percent of DCG = Mean/DCG × 100. The derived concentration guide (DCG) for ^{131}I is $400{,}000 \times 10^{-15}$ μCi/mL.

[c]Locations of ORNL and ORR perimeter stations are shown in Fig. 2.19, Vol. 1.

Table 2.9. Tritium concentration in air—ORR, 1990

Station[a]	Number of samples	Concentration (10^{-6} pCi/mL)				
		Max	Min	Mean[b]	Standard error of mean	Percent of DCG[c]
3	13	180	2.6	33*	14	0.033
8	11	26	0.26	13*	2.8	0.013
Overall summary	24	180	0.26	24*	8.2	0.024

[a]Station locations are shown in Fig. 2.19, Vol. 1.

[b]Means marked with an asterisk (*) are statistically determined to be significantly different from zero.

[c]Percent of DCG = Mean/DCG × 100. The derived concentration guide (DCG) for tritium is 0.1 pCi/mL. The concentration guide assumes that 50% of the tritium is absorbed through the skin.

Table 2.10. 1990 continuous air monitoring data[a]

Analysis	Concentration (10^{-15} μCi/mL)					
	Station 34	Percentage DCG[b]	Station 40	Percentage DCG[b]	Station 41	Percentage DCG[b]
^{60}Co	0.067	<0.010	0.019	<0.010	0.021	<0.010
^{137}Cs	0.0023	<0.010	0.023	<0.010	0.024	<0.010
^{238}Pu	0.0014	<0.010	0.00042	<0.010	0.0012	<0.010
^{239}Pu	–0.0014	<0.010	–0.00094	<0.010	–0.0017	<0.010
^{228}Th	0.023	0.058	0.020	0.051	0.016	0.039
^{230}Th	0.0040	0.010	0.0053	0.013	0.0057	0.014
^{232}Th	0.0034	0.048	0.0030	0.042	0.0044	0.063
Total-Sr	0.071	<0.010	0.057	<0.010	0.026	<0.010
^{234}U	0.0048	<0.010	0.11	0.12	0.033	0.037
^{235}U	0.0011	<0.010	0.0038	<0.010	0.0018	<0.010
^{238}U	0.0026	<0.010	0.012	0.012	0.0048	<0.01

Analysis	Station 45	Percentage DCG[b]	Station 46	Percentage DCG[b]	ORNL network	Percentage DCG[b]
^{60}Co	0.012	<0.010	–0.0065	<0.010	0.012	<0.010
^{137}Cs	–0.0052	<0.010	0.028	<0.010	0.030	<0.010
^{238}Pu	0.00032	<0.010	0.0023	<0.010	0.00049	<0.010
^{239}Pu	0.00018	<0.010	–0.0013	<0.010	–0.00027	<0.010
^{228}Th	0.017	0.043	0.025	0.062	0.0069	0.017
^{230}Th	0.0049	0.012	0.0055	0.014	0.0042	0.010
^{232}Th	0.0035	0.049	0.0052	0.075	0.0033	0.048
Total-Sr	–0.014	<0.010	0.0036	<0.010	–0.0015	<0.010
^{234}U	0.061	0.068	0.062	0.069	0.0078	<0.010
^{235}U	0.0027	<0.010	0.0040	<0.010	0.00027	<0.010
^{238}U	0.012	0.012	0.012	0.012	0.0023	<0.010

Analysis	ORR network	Percentage DCG[b]	Remote network	Percentage DCG[b]
^{60}Co	–0.0015	<0.010	0.020	<0.010
^{137}Cs	–0.00060	<0.010	0.0011	<0.010
^{238}Pu	0.00009	<0.010	0.0017	<0.010
^{239}Pu	–0.00022	<0.010	0.00017	<0.010
^{228}Th	0.0076	0.019	0.018	0.045
^{230}Th	0.0038	<0.010	0.0052	0.013
^{232}Th	0.0046	0.066	0.0061	0.087
Total-Sr	0.016	<0.010	0.043	<0.010
^{234}U	0.0092	0.010	0.0040	<0.010
^{235}U	0.00069	<0.010	0.00091	<0.010
^{238}U	0.0024	<0.010	0.0024	<0.010

[a]See Figs. 2.19 and 2.20 in Vol. 1 for monitoring locations.

[b]Percentage of DCG = average/derived concentration guide (DCG) × 100. The DCG for ^{60}Co is 8×10^{-11} μCi/mL; ^{137}Cs is 4×10^{-10} μCi/mL; ^{238}Pu is 3×10^{-14} μCi/mL; ^{239}Pu is 2×10^{-14} μC/mL; ^{228}Th is 4×10^{-14} μCi/mL; ^{230}Th is 4×10^{-14} μCi/mL; ^{232}Th is 7×10^{-15} μCi/mL; Total Sr is 9×10^{-12} μCi/mL; ^{234}U is 9×10^{-14} μCi/mL; ^{235}U is 1×10^{-13} μCi/mL; ^{238}U is 1×10^{-13} μCi/mL. Source for DCG is DOE Order 5400.5, "Radiation Protection of the Public and the Environment," Chapter III.

Table 2.11. Air permits at the Y-12 Plant

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Open Burn Plan			O
Paint Spray Booth	01-0020-63	015116P	O
X-9201-2-B(02)	01-0020-43	012887P	O
Y-12 Woodshop	01-0020-86	015115P	O
Y-1501-2-A(01)	01-0020-70	023506P	O
Y-1501-2-A(02)	01-0020-70	023506P	O
Y-9201-1-A(01)	01-0020-15	730303P	C/O
Y-9201-1-A(02)	01-0020-15	730303P	C/O
Y-9201-1-A(03)	01-0020-15	730303P	C/O
Y-9201-1-A(04)	01-0020-15	730303P	C/O
Y-9201-1-A(05)	01-0020-15	730303P	C/O
Y-9201-1-A(15)	01-0020-15	730303P	C/O
Y-9201-1-A(19)	01-0020-15	730303P	C/O
Y-9201-1-B(16)	01-0020-59	730310P	C/O
Y-9201-1-B(18)	01-0020-59	730310P	C/O
Y-9201-1-C(3)	01-0020-17	730304P	C/O
Y-9201-1-C(4)	01-0020-17	730304P	C/O
Y-9201-1-D(09)	01-0020-61	730310P	C/O
Y-9201-1-D(10)	01-0020-61	730310P	C/O
Y-9201-1-D(11)	01-0020-61	730310P	C/O
Y-9201-1-D(13)	01-0020-61	730310P	C/O
Y-9201-1-FAB-[E]-(00)	01-1020-92	930996P	C
Y-9201-2-C(01)	01-0020-67	015146P	O
Y-9201-2-C(02)	01-0020-67	015146P	O
Y-9201-2-C(03)	01-0020-67	015146P	O
Y-9201-3-A(01)	01-0020-55	013002F	O
Y-9201-5-A(01)	01-0020-29	730306P	C/O
Y-9201-5-A(02)	01-0020-29	730306P	C/O
Y-9201-5-A(03)	01-0020-29	730306P	C/O
Y-9201-5-A(04)	01-0020-29	730306P	C/O
Y-9201-5-A(05)	01-0020-29	730306P	C/O
Y-9201-5-A(06)	01-0020-29	730306P	C/O
Y-9201-5-A(07)	01-0020-29	730306P	C/O
Y-9201-5-A(08)	01-0020-29	730306P	C/O
Y-9201-5-A(09)	01-0020-29	730306P	C/O
Y-9201-5-A(10)	01-0020-29	730306P	C/O
Y-9201-5-B(01)	01-0020-21	730305P	C/O
Y-9201-5-B(02)	01-0020-21	730305P	C/O
Y-9201-5-B(03)	01-0020-21	730305P	C/O
Y-9201-5-B(04)	01-0020-21	730305P	C/O
Y-9201-5-B(05)	01-0020-21	730305P	C/O
Y-9201-5-B(06)	01-0020-21	730305P	C/O
Y-9201-5-B(07)	01-0020-21	730305P	C/O
Y-9201-5-C(01)	01-1020-43	025949P	O
Y-9201-5-D(01)	01-1020-44	730306P	C/O
Y-9201-5-D(02)	01-1020-44	730306P	C/O
Y-9201-5-E(01)	01-1020-70	025983P	O
Y-9201-5-E(02)	01-1020-70	025983P	O
Y-9201-5-E(08)	01-1020-70	025983P	O
Y-9201-5-F(01)	01-0020-36	025973P	O

Table 2.11 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Y-9201-5-F(02)	01-0020-36	025973P	O
Y-9201-5-F(03)	01-0020-36	025973P	O
Y-9201-5-F(04)	01-0020-36	025973P	O
Y-9201-5-F(05)	01-0020-36	025973P	O
Y-9201-5-G(01)	01-0020-44	730308P	C/O
Y-9201-5-G(02)	01-0020-44	730308P	C/O
Y-9201-5-G(03)	01-0020-44	730308P	C/O
Y-9201-5-G(04)	01-0020-44	730308P	C/O
Y-9201-5-G(05)	01-0020-44	730308P	C/O
Y-9201-5-G(06)	01-0020-44	025896P	O
Y-9201-5-G(07)	01-0020-44	730308P	C/O
Y-9201-5-H(01)	01-0020-16	026019P	O
Y-9201-5-H(02)	01-0020-16	026019P	O
Y-9201-5-H(03)	01-0020-16	026019P	O
Y-9201-5-H(04)	01-0020-16	026019P	O
Y-9201-5-H(05)	01-0020-16	026019P	O
Y-9201-5-H(06)	01-0020-16	026019P	O
Y-9201-5-H(07)	01-0020-16	026019P	O
Y-9201-5-H(08)	01-0020-16	026019P	O
Y-9201-5N-A(01)	01-0020-18	730314P	C/O
Y-9201-5N-B(03)	01-0020-30	025962P	O
Y-9201-5N-B(04)	01-0020-30	025962P	O
Y-9201-5N-B(05)	01-0020-30	025962P	O
Y-9201-5N-LIO-[B]-(239)	01-0020-30	025962P	O
Y-9201-5N-LIO-[B]-(240)	01-0020-30	025962P	O
Y-9201-5N-LIO-[B]-(241)	01-0020-30	025962P	O
Y-9201-5N-LIO-[B]-(242)	01-0020-30	025962P	O
Y-9201-5N-LIO-[B]-(243)	01-0020-30	025962P	O
Y-9201-5N-LIO-[B]-(244)	01-0020-30	025962P	O
Y-9202-A-(01)	01-0020-21	021086P	O
Y-9202-A-(02)	01-0020-21	021086P	O
Y-9202-A-(03)	01-0020-21	021086P	O
Y-9202-A-(04)	01-0020-21	021086P	O
Y-9203-C(1)	01-1020-86	929878P	C
Y-9203-C(2)	01-1020-86	929878P	C
Y-9204-2-A(01)	01-0020-46	026107P	O
Y-9204-2-A(02)	01-0020-46	026107P	O
Y-9204-2-A(03)	01-0020-46	026107P	O
Y-9204-2-A(04)	01-0020-46	026107P	O
Y-9204-2-A(05)	01-0020-46	026107P	O
Y-9204-2-A(06)	01-0020-46	026107P	O
Y-9204-2-A(07)	01-0020-46	026107P	O
Y-9204-2-A(08)	01-0020-46	026107P	O
Y-9204-2-A(09)	01-0020-46	026107P	O
Y-9204-2-A(10)	01-0020-46	026107P	O
Y-9204-2-A(11)	01-0020-46	026107P	O
Y-9204-2-A(12)	01-0020-46	026107P	O
Y-9204-2-A(13)	01-0020-46	026107P	O
Y-9204-2-B	01-0020-45	012889P	O
Y-9204-2-B(14)	01-0020-71	025954P	O

Table 2.11 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Y-9204-2-B(15)	01-0020-71	025954P	O
Y-9204-2-B(16)	01-0020-71	025954P	O
Y-9204-2-B(17)	01-0020-71	025954P	O
Y-9204-2-B(18)	01-0020-71	025954P	O
Y-9204-2-B(19)	01-0020-71	025954P	O
Y-9204-2-B(20)	01-0020-71	025954P	O
Y-9204-2-B(21)	01-0020-71	025954P	O
Y-9204-2-B(22)	01-0020-71	025954P	O
Y-9204-2-B(23)	01-0020-71	025954P	O
Y-9204-2-B(24)	01-0020-71	025954P	O
Y-9204-2-B(25)	01-0020-71	025954P	O
Y-9204-2-B(26)	01-0020-71	025954P	O
Y-9204-2-B(27)	01-0020-71	025954P	O
Y-9204-2-B(28)	01-0020-71	025954P	O
Y-9204-2-C(29)	01-1020-19	730315P	C/O
Y-9204-2-C(30)	01-1020-19	730315P	C/O
Y-9204-2-C(31)	01-1020-19	730315P	C/O
Y-9204-2-C(32)	01-1020-19	730315P	C/O
Y-9204-2-C(33)	01-1020-19	730315P	C/O
Y-9204-2-C(34)	01-1020-19	730315P	C/O
Y-9204-2-C(35)	01-1020-19	730315P	C/O
Y-9204-2-C(36)	01-1020-19	730315P	C/O
Y-9204-2-C(37)	01-1020-19	730315P	C/O
Y-9204-2-C(38)	01-1020-19	730315P	C/O
Y-9204-2-C(39)	01-1020-19	730315P	C/O
Y-9204-2-C(40)	01-1020-19	730315P	C/O
Y-9204-2-C(41)	01-1020-19	730315P	C/O
Y-9204-2-C(42)	01-1020-19	730315P	C/O
Y-9204-2-C(43)	01-1020-19	730315P	C/O
Y-9204-2-C(44)	01-1020-19	730315P	C/O
Y-9204-2-C(45)	01-1020-19	730315P	C/O
Y-9204-2-C(46)	01-1020-19	730315P	C/O
Y-9204-2-C(47)	01-1020-19	730315P	C/O
Y-9204-2-C(48)	01-1020-19	730315P	C/O
Y-9204-2-C(49)	01-1020-19	730315P	C/O
Y-9204-2-C(50)	01-1020-19	730315P	C/O
Y-9204-2-C(51)	01-1020-19	730315P	C/O
Y-9204-2-D(52)	01-1020-57	730327P	C/O
Y-9204-2-D(53)	01-1020-57	730327P	C/O
Y-9204-2-D(54)	01-1020-57	730327P	C/O
Y-9204-2-D(55)	01-1020-57	730327P	C/O
Y-9204-2-D(56)	01-1020-57	730327P	C/O
Y-9204-2-D(57)	01-1020-57	730327P	C/O
Y-9204-2-D(58)	01-1020-57	730327P	C/O
Y-9204-2-D(59)	01-1020-57	730327P	C/O
Y-9204-2-D(60)	01-1020-57	730327P	C/O
Y-9204-2-D(61)	01-1020-57	730327P	C/O
Y-9204-2-D(62)	01-1020-57	730327P	C/O
Y-9204-2-D(63)	01-1020-57	730327P	C/O
Y-9204-2-D(64)	01-1020-57	730327P	C/O

Table 2.11 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Y-9204-2-D(65)	01-1020-57	730327P	C/O
Y-9204-2-D(66)	01-1020-57	730327P	C/O
Y-9204-2-D(67)	01-1020-57	730327P	C/O
Y-9204-2-E(068)	01-1020-55	730325P	C/O
Y-9204-2-E(069)	01-1020-55	730325P	C/O
Y-9204-2-E(070)	01-1020-55	730325P	C/O
Y-9204-2-E(071)	01-1020-55	730325P	C/O
Y-9204-2-E(072)	01-1020-55	730325P	C/O
Y-9204-2-E(073)	01-1020-55	730325P	C/O
Y-9204-2-E(074)	01-1020-55	730325P	C/O
Y-9204-2-E(075)	01-1020-55	730325P	C/O
Y-9204-2-E(076)	01-1020-55	730325P	C/O
Y-9204-2-E(077)	01-1020-55	730325P	C/O
Y-9204-2-E(078)	01-1020-55	730325P	C/O
Y-9204-2-E(079)	01-1020-55	730325P	C/O
Y-9204-2-E(080)	01-1020-55	730325P	C/O
Y-9204-2-E(081)	01-1020-55	730325P	C/O
Y-9204-2-F	01-0020-32	730309P	C/O
Y-9204-2-F(082)	01-0020-51	730309P	C/O
Y-9204-2-F(083)	01-0020-51	730309P	C/O
Y-9204-2-F(084)	01-0020-51	730309P	C/O
Y-9204-2-F(085)	01-0020-51	730309P	C/O
Y-9204-2-F(086)	01-0020-51	730309P	C/O
Y-9204-2-F(087)	01-0020-51	730309P	C/O
Y-9204-2-G(088)	01-1020-79	730329P	C/O
Y-9204-2-G(089)	01-1020-79	730329P	C/O
Y-9204-2-G(090)	01-1020-79	730329P	C/O
Y-9204-2-G(091)	01-1020-79	730329P	C/O
Y-9204-2-G(092)	01-1020-79	730329P	C/O
Y-9204-2-G(093)	01-1020-79	730329P	C/O
Y-9204-2-H(01)	01-1020-42	025952P	O
Y-9204-2-H(02)	01-1020-42	025952P	O
Y-9204-2-H(03)	01-1020-42	025952P	O
Y-9204-2-H(04)	01-1020-42	025952P	O
Y-9204-2-H(05)	01-1020-42	025952P	O
Y-9204-2-H(06)	01-1020-42	025952P	O
Y-9204-2-I(94)	01-1020-71	026067P	O
Y-9204-2-I(95)	01-1020-71	026067P	O
Y-9204-2E-A(01)	01-0020-68	730312P	C/O
Y-9204-2E-A(02)	01-0020-68	730312P	C/O
Y-9204-2E-A(03)	01-0020-68	730312P	C/O
Y-9204-2E-A(04)	01-0020-68	730312P	C/O
Y-9204-2E-A(05)	01-0020-68	730312P	C/O
Y-9204-2E-A(06)	01-0020-68	730312P	C/O
Y-9204-2E-A(07)	01-0020-68	730312P	C/O

Table 2.11 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Y-9204-2E-A(08)	01-0020-68	730312P	C/O
Y-9204-2E-A(09)	01-0020-68	730312P	C/O
Y-9204-2E-A(10)	01-0020-68	730312P	C/O
Y-9204-2E-A(11)	01-0020-68	730312P	C/O
Y-9204-2E-A(16)	01-0020-68	730312P	C/O
Y-9204-2E-A(17)	01-0020-68	730312P	C/O
Y-9204-2E-A(18)	01-0020-68	730312P	C/O
Y-9204-2E-A(19)	01-0020-68	730312P	C/O
Y-9204-2E-B(12)	01-1020-41	730319P	C/O
Y-9204-2E-B(14)	01-1020-41	025953P	O
Y-9204-2E-B(15)	01-1020-41	730319P	C/O
Y-9204-2E-C(12)	01-1020-68	730328P	C/O
Y-9204-2E-C(13)	01-1020-68	730328P	C/O
Y-904-4-AJ-106	01-0020-89	018208P	O
Y-9204-4-A(01)	01-1020-56	730326P	C/O
Y-9204-4-A(02)	01-1020-56	730326P	C/O
Y-9204-4-A(03)	01-1020-56	730326P	C/O
Y-9204-4-A(04)	01-1020-56	730326P	C/O
Y-9204-4-A(05)	01-1020-56	730326P	C/O
Y-9204-4-A(06)	01-1020-56	730326P	C/O
Y-9204-4-A(07)	01-1020-56	730326P	C/O
Y-9204-4-A(08)	01-1020-56	730326P	C/O
Y-9204-4-A(09)	01-1020-56	730326P	C/O
Y-9204-4-A(10)	01-1020-56	730326P	C/O
Y-9204-4-A(11)	01-1020-56	730326P	C/O
Y-9204-4-A(12)	01-1020-56	730326P	C/O
Y-9204-4-A(13)	01-1020-56	730326P	C/O
Y-9204-4-A(14)	01-1020-56	730326P	C/O
Y-9204-4-A(15)	01-1020-56	730326P	C/O
Y-9204-4-A(17)	01-1020-56	730326P	C/O
Y-9204-4-A(18)	01-1020-56	730326P	C/O
Y-9204-4-A(19)	01-1020-56	730326P	C/O
Y-9204-4-B(01)	01-0020-72	730313P	C/O
Y-9204-4-B(02)	01-0020-72	730313P	C/O
Y-9204-4-B(03)	01-0020-72	730313P	C/O
Y-9204-4-B(04)	01-0020-72	730313P	C/O
Y-9204-4-B(05)	01-0020-72	730313P	C/O
Y-9204-4-B(06)	01-0020-72	730313P	C/O
Y-9204-4-B(07)	01-0020-72	730313P	C/O
Y-9204-4-B(08)	01-0020-72	730313P	C/O
Y-9204-4-B(09)	01-0020-72	730313P	C/O
Y-9204-4-B(10)	01-0020-72	730313P	C/O
Y-9204-4-B(11)	01-0020-72	730313P	C/O
Y-9204-4-C(01)	01-1020-36	025968P	O
Y-9204-4-D(01)	01-1020-35	730317P	C/O

Table 2.11 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Y-9204-4-E(01)	01-0020-33	030819P	O
Y-9204-4-E(02)	01-0020-33	025002P	O
Y-9204-4-E(03)	01-0020-33	025002P	O
Y-9204-4-E(04)	01-0020-33	025002P	O
Y-9204-4-E(05)	01-0020-33	025002P	O
Y-9206-A(02)	01-0020-48	012892P	O
Y-9206-A(03)	01-0020-48	012892P	O
Y-9206-B(01)	01-0020-03	730302P	C/O
Y-9206-B(02)	01-0020-03	730302P	C/O
Y-9206-B(03)	01-0020-03	730302P	C/O
Y-9206-B(04)	01-0020-03	730302P	C/O
Y-9206-B(05)	01-0020-03	730302P	C/O
Y-9206-B(06)	01-0020-03	730302P	C/O
Y-9206-B(07)	01-0020-03	730302P	C/O
Y-9206-B(08)	01-0020-03	730302P	C/O
Y-9206-B(09)	01-0020-03	730302P	C/O
Y-9206-B(10)	01-0020-03	730302P	C/O
Y-9206-B(11)	01-0020-03	730302P	C/O
Y-9206-B(12)	01-0020-03	730302P	C/O
Y-9206-B(13)	01-0020-03	730302P	C/O
Y-9206-C(01)	01-1020-24	730316P	C/O
Y-9206-C(02)	01-1020-24	730316P	C/O
Y-9206-D(13)	01-1020-38	025901P	O
Y-9206-E (NEW)	01-1020-24	730316P	C/O
Y-9212-A(01)	01-1020-72	997756P	C
Y-9212-A(02)	01-1020-72	997756P	C
Y-9212-A(03)	01-1020-72	997756P	C
Y-9212-A(04)	01-1020-72	997756P	C
Y-9212-A(05)	01-1020-72	997756P	C
Y-9212-A(06)	01-1020-72	997756P	C
Y-9212-A(07)	01-1020-72	997756P	C
Y-9212-A(08)	01-1020-72	997756P	C
Y-9212-A(10)	01-1020-72	997756P	C
Y-9212-A(11)	01-1020-72	997756P	C
Y-9212-A(12)	01-1020-72	997756P	C
Y-9212-A(13)	01-1020-72	997756P	C
Y-9212-A(14)	01-1020-72	997756P	C
Y-9212-A(15)	01-1020-72	997756P	C
Y-9212-A(16)	01-1020-72	997756P	C
Y-9212-A(17)	01-1020-72	997756P	C
Y-9212-A(18)	01-1020-72	997756P	C
Y-9212-A(19)	01-1020-72	997756P	C
Y-9212-A(20)	01-1020-72	997756P	C
Y-9212-A(21)	01-1020-72	997756P	C
Y-9212-A(22)	01-1020-72	997756P	C

Table 2.11 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Y-9212-A(23)	01-1020-72	997756P	C
Y-9212-A(24)	01-1020-72	997756P	C
Y-9212-A(25)	01-1020-72	997756P	C
Y-9212-A(26)	01-1020-72	997756P	C
Y-9212-A(27)	01-1020-72	997756P	C
Y-9212-A(28)	01-1020-72	997756P	C
Y-9212-B(01)	01-0020-02	730301P	C/O
Y-9212-B(02)	01-0020-02	730301P	C/O
Y-9212-B(03)	01-0020-02	730301P	C/O
Y-9212-B(04)	01-0020-02	730301P	C/O
Y-9212-C(01)	01-0020-05	025984P	O
Y-9212-C(02)	01-0020-05	025984P	O
Y-9212-C(03)	01-0020-05	025984P	O
Y-9212-C(04)	01-0020-05	025984P	O
Y-9212-C(05)	01-0020-05	025984P	O
Y-9212-C(06)	01-0020-05	025984P	O
Y-9212-C(07)	01-0020-05	025984P	O
Y-9212-C(08)	01-0020-05	025984P	O
Y-9212-C(09)	01-0020-05	025984P	O
Y-9212-D(01)	01-1020-46	025904P	O
Y-9212-F(01)	01-1020-49	730321P	C/O
Y-9212-F(02)	01-1020-49	730321P	C/O
Y-9212-F(03)	01-1020-49	730321P	C/O
Y-9212-F(04)	01-1020-49	730321P	C/O
Y-9212-F(05)	01-1020-49	730321P	C/O
Y-9212-G(01)	01-1020-47	028435P	O
Y-9215-A(01)	01-0020-37	730307P	C/O
Y-9215-B(02)	01-0020-38	012880P	O
Y-9215-C(02)	01-1020-52	730323P	C/O
Y-9215-C(03)	01-1020-52	730323P	C/O
Y-9215-C(10)	01-1020-52	730323P	C/O
Y-9215-C(11)	01-1020-52	730323P	C/O
Y-9215-C(17)	01-1020-52	730323P	C/O
Y-9215-C(19)	01-1020-52	730323P	C/O
Y-9215-D(12)	01-1020-53	025966P	O
Y-9215-D(13)	01-1020-53	025966P	O
Y-9215-D(14)	01-1020-53	025966P	O
Y-9215-D(15)	01-1020-53	025966P	O
Y-9215-E(6)	01-1020-54	730324P	C/O
Y-9215-E(7)	01-1020-54	025972P	O
Y-9215-E(8)	01-1020-54	730324P	C/O
Y-9215-MEP-[B]-(1)	01-1020-51	730600P	C
Y-9215-MEP-[B]-(2)	01-1020-51	730600P	C
Y-9215-MEP-[B]-(4)	01-1020-51	730600P	C
Y-9215-MEP-[B]-(6)	01-1020-51	730600P	C

Table 2.11 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Y-9219-A(1)	01-1020-67	023853P	O
Y-9401-2-LIO-[A]-(205)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(220)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(221)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(222)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(223)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(224)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(225)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(226)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(227)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(228)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(229)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(230)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(231)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(232)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(233)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(234)	01-0020-88	730286P	C
Y-9401-2-LIO-[A]-(235)	01-0020-88	730286P	C
Y-9401-3-A	01-1020-01	027914F	O
Y-9401-3-B(1)	01-1020-01	027914F	O
Y-9401-3-C	01-1020-01	027914F	O
Y-9401-3-D(2)	01-1020-01	027914F	O
Y-9401-3-F(04)	01-1020-27	023498P	O
Y-9401-3-G(01)	01-1020-61	026472P	O
Y-9401-3-G(02)	01-1020-61	026472P	O
Y-9401-3-H(01) [9616-10]	01-1020-62	029280P	O
Y-9401-3-H(01)	01-1020-61	995278P	C
Y-9401-3-I(1)	01-1020-66	023852P	O
Y-9401-5-A(01)	01-0020-92	026108P	O
Y-9404-11-A(1)	01-1020-81	028426P	O
Y-9404-11-A(2)	01-1020-81	028426P	O
Y-9404-11-A(3)	01-1020-81	028426P	O
Y-9404-11-A(4)	01-1020-81	028426P	O
Y-9404-16-A	01-0220-47	012891P	O
Y-9404-5-B(02)	01-0020-25	012866P	O
Y-9404-5-B(03)	01-0020-25	012866P	O
Y-9404-9-C(03)	01-0020-40	012882P	O
Y-9404-9-D(04)	01-0020-40	012882P	O
Y-9404-9-E(05)	01-0020-40	012882P	O
Y-9423-PMU-[A]-(140)	01-1020-90	930258P	C
Y-9616-7-A(01)	01-1020-74	026502P	O
Y-9616-7-A(02)	01-1020-74	026502P	O
Y-9616-7-A(03)	01-1020-74	026502P	O
Y-9616-7-A(04)	01-1020-74	026502P	O
Y-9616-7-A(05)	01-1020-74	026502P	O

Table 2.11 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Y-9616-7-A(06)	01-1020-74	026502P	O
Y-9616-7-A(07)	01-1020-74	026502P	O
Y-9616-7-A(08)	01-1020-74	026502P	O
Y-9616-7-A(09)	01-1020-74	026502P	O
Y-9616-7-A(10)	01-1020-74	026502P	O
Y-9616-7-A(11)	01-1020-74	026502P	O
Y-9616-7-A(12)	01-1020-74	026502P	O
Y-9616-7-WST-[A]-(1)	01-1020-80	028956P	C
Y-9620-2A	01-0020-50	012894P	O
Y-9623-A(01)	01-1020-25	025970P	O
Y-9623-A(02)	01-1020-25	025970P	O
Y-9623-A(03)	01-1020-25	025970P	O
Y-9623-A(04)	01-1020-25	025970P	O
Y-9623-A(05)	01-1020-25	025970P	O
Y-9623-A(06)	01-1020-25	025970P	O
Y-9712-A(1)	01-0020-74	024479P	O
Y-9712-A(01)	01-1020-65	023851P	O
Y-9720-19-A(01)	01-0020-41	012885P	O
Y-9720-19-C(01)	01-0020-23	012864P	O
Y-9720-19-D(03)	01-0020-27	012869P	O
Y-9720-20-A(01)	01-1020-39	025971P	O
Y-9720-25(A)	01-1020-83	930031P	C
Y-9720-32-SAS-[A]-201	01-0020-42	930263P	C
Y-9720-41-A(01)	01-1020-63	028384P	O
Y-9720-41-A(02)	01-1020-63	028384P	O
Y-9720-41-A(03)	01-1020-63	028384P	O
Y-9720-41-A(04)	01-1020-63	028384P	O
Y-9720-41-A(05)	01-1020-63	028384P	O
Y-9720-5-ASM-[A]-(130)	01-1020-75	930706P	C
Y-9720-5-B	01-1020-51	028299P	O
Y-9720-5-FAB-[B]-247	01-1020-85	930487P	C
Y-9720-6-A(1)	01-0020-26	012867P	O
Y-9720-6-A(2)	01-0020-26	012867P	O
Y-9720-6-B(01)	01-0020-75	015154P	O
Y-9720-6-B(03)	01-0020-26	012867P	O
Y-9720-6-C(01)	01-0020-76	015155P	O
Y-9720-6-C(02)	01-0020-76	015155P	O
Y-9720-6-E(01)	01-0020-83	016548P	O
Y-9728-A1	01-0020-54	013001F	O
Y-9728-B(2)	01-0020-54	013001F	O
Y-9728-B(3)	01-0020-54	013001F	O
Y-9728-B(4)	01-0020-54	013001F	O
Y-9737-A(01)	01-0020-22	012863P	O
Y-9737-B(02)	01-0020-78	015157P	O
Y-9737-C(02)	01-0020-78	015157P	O
Y-9737-D(02)	01-0020-78	015157P	O
Y-9737-E(02)	01-0020-78	015157P	O
Y-9737-F(02)	01-0020-78	015157P	O
Y-9737-G(03)	01-0020-79	015160P	O

Table 2.11 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Permit type[a]
Y-9737-H(04)	01-0020-79	015160P	O
Y-9737-I(05)	01-0020-79	015160P	O
Y-9738-A(01)	01-0020-14	025975P	O
Y-9738-A(02)	01-0020-14	025975P	O
Y-9738-A(03)	01-0020-14	025975P	O
Y-9738-A(04)	01-0020-14	025975P	O
Y-9738-A(05)	01-0020-14	025975P	O
Y-9739-A(01)	01-1020-78	028105P	O
Y-9739-B(02)	01-1020-78	028105P	O
Y-9754-2-A(01)	01-0020-52	012897P	O
Y-9767-4-A(01)	01-0020-35	012877P	O
Y-9808-A	01-0020-80	015156P	O
Y-9808-A(01)	01-1020-22	026109P	O
Y-9809-A(01)	01-0020-93	025899P	O
Y-9811-6-PMU-A(1)	01-1020-82		
Y-9811-A	01-0020-42	012886P	O
Y-9811-B(02)	01-1020-45	025903P	O
Y-9812-A(01)	01-1020-29	022474P	O
Y-9812-A(02)	01-1020-29	022474P	O
Y-9812-A(03)	01-1020-29	022474P	O
Y-9815-A(03)	01-0020-11	025895P	O
Y-9815-A(04)	01-0020-11	025895P	O
Y-9815-A(05)	01-0020-11	025895P	O
Y-9815-A(06)	01-0020-11	025895P	O
Y-9815-A(07)	01-0020-11	025895P	O
Y-9815-A(08)	01-0020-11	025895P	O
Y-9818-A(01)	01-0020-12	025965P	O
Y-9818-A(02)	01-0020-12	025965P	O
Y-9818-A(03)	01-0020-12	025965P	O
Y-9818-A(04)	01-0020-12	025965P	O
Y-9818-A(05)	01-0020-12	025965P	O
Y-9818-A(06)	01-0020-12	025965P	O
Y-9818-A(07)	01-0020-12	025965P	O
Y-9818-A(08)	01-0020-12	025965P	O
Y-9818-A(09)	01-0020-12	025965P	O
Y-9818-A(10)	01-0020-12	025965P	O
Y-9818-A(11)	01-0020-12	025965P	O
Y-9818-A(12)	01-0020-12	025965P	O
Y-9929-1-A(1)	01-0020-56	013003F	O
Y-9929-F(01)	01-0020-39	012881P	O
Y-9995-A(01)	01-0020-21	021086P	O
Y-9998-A(01)	01-0020-13	025957P	O
Y-9998-A(02)	01-0020-13	025957P	O
Y-9998-A(03)	01-0020-13	025957P	O
Y-9998-A(04)	01-0020-13	025957P	O
Y-9998-A(05)	01-0020-13	025957P	O
Y-9998-A(06)	01-0020-13	025957P	O
Y-9998-B(1)	01-1020-40	730318P	C/O
Y-9998-C(01)	01-1020-84	997769P	C
Y-BCBG-NAK	N/A	1-020-0-2	O
Y-KHQ-WST			O
Y-Townsite	01-0020-53	012889F	O

[a]O = operating; C = construction; C/O = construction/operating.

Table 2.12. Air permits at ORNL

ORNL source number	Emission source reference number	Permit number	Source	Permit type[a]
X-0001-02	73-0112-98	731172P	In situ vitrification process	O
X-2000-09	73-0112-32	024135P	Laser with wet scrubber	O
X-2000-SV2	73-0112-75	024473P	Furnace, ovens, hoods, pumps	O
X-2013-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-2013-SV4	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	028027P	5 boilers at steam plant and ash	O
X-2519-T1	73-0112-57	730542P Amended	Tank, sulfuric acid	O
X-2522-T1A	73-0112-10	024114P	Tank, fuel oil	O
X-2525-01	73-0112-14	030835P	Degreaser (perchloroethylene)	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 (Fabrication 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-2547-01	73-0112-27	028439P	Spray booth	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	730837P	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	73-0112-41	024115P	Tank, sulfuric acid	O
X-3500-02	73-0112-65	026944P	Parts washer (degreaser)	O
X-3500-S12	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	930343P	Cyclone and carpentry shop	O
X-3504-SV1	73-0112-80	024451P	Oven	O
X-3544-SV1	73-0112-70	730468P	PWTP	O
X-3587-SV1	73-0112-56	029830P	Printed Circuit Board Facility	O
X-3608-01	73-0112-37	029025P	NRWTP	O

Table 2.12 (continued)

ORNL source number	Emission source reference number	Permit number	Source	Permit type[a]
X-4500N1-93	73-0112-65	026944P	Parts washer (degreaser)	O
X-4500S1-01	73-0112-87	029920P	Parts washer (degreaser)	O
X-4500S3-50	73-0112-31	024088P	Mercury purification system	O
X-4500S54-1	73-0112-01	016577P	Furnaces (2)	O
X-4508-S16	73-0112-51	024909P	Spray booth	O
X-4508-SV8	73-0112-61	025121P	Acid etching process	O
X-4508-SV9	73-0112-55	024306P	Sand blaster	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-SV2	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-7002-05	73-0112-08	013025P	Spray booth	O
X-7002-T1	73-0112-88	025659P	Tank, waste oil	O
X-7003-01	73-0112-65	026944P	Parts washer (degreaser)	O
X-7003-SV1	73-0112-79	024452P	Furnace	O
X-7005-00	73-0112-45	024118P	Machining tools	O
X-7005-3-7	73-0112-26	028438P	Lead shop	O
X-7007-1/2	73-0112-09	030824P	Spray booth and cleaning 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	73-0112-89	025660P	Tank, waste oil	O
X-7025-00	73-0112-92	026070P	TTFF	O
X-7057-SV1	73-0112-76	030101P	Sand blaster	O
X-7069-T1	73-0112-60	730836P	Gasoline tank (1)	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-SV1	73-0112-71	731010P	LWSP (see comments)	O
X-7831-00	73-0112-84	025281P	Baler and box compactor	O
X-7877-SV1	73-0112-71	027132P	LWSP (previously EASC)	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-7903-T1	73-0112-48	024138P	Tank, sulfuric 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-SV2	73-0112-53	024912P	Silver recovery system	O
X-7935-SV1	73-0112-78	027393P	Equipment cleaning facility	O
X-7667-0	73-0112-67	73-00112-0067-3	Chemical detonation site	OB

[a]O = operating; M = under modification; C = construction, OB = open burning.

Table 2.13. Air permits at the K-25 Site

K-25 source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type[a]
K-25 B1	0106-19	016309P	Plant Freon	O
K-25 B2	0106-41	012659P	Labs and ovens	O
K-25 ELC	0106-34	012483P	Coolers	O
K-2526 8092	0106-40	012508P	Ovens	O
K-25A-E	0106-33	012478P	Drying trucks	O
K-25B3	0106-50	015596P	Vents	O
K-25 BURNA-1	0106-57	012469P	Burners	O
K-25 VAO	0106-15	012488P	Vacuums	O
K-291	0106-63	015097P	Air evac.	O
K-31 OLIS	0106-47	015100P	Manifold vent	O
K-3102 LISWD	0106-65	019609P	Withdrawal vent	O
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	Evaluation of cascade cells	O
K-602 1-6 LO	0106-23	016310P	Tanks	O
K-602 2-325172	0106-28	024500P	Tanks	O
K-602 2-325172 Freon R-114	0106-28	024500P	Misc. chemical storage (19 tanks)	O
K-602 4-325285 Freon R-114	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-631 F1-P0	0106-10	020721P	Vents	O
K-6334	0106-44	016492P	Test stand	O
K-704316MO	0106-24	016311P	Tanks	O
K-732	0106-24	016311P	Tanks	O
K-762	0106-24	016311P	Tanks	O
K-792	0106-24	016311P	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
K0902-1-8	0106-23	016310P	Tanks	O
K-902-8 PCB	1106-10	024947P	Tanks	O
K-902 3-324383 Freon R-114	0106-28	024500P	Misc. chemical storage (18 tanks)	O
K-902 3-324389			Storage tank	O
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-1001 C Blueprint 1 and 2	1106-11	024943P	Blueprint machines (2)	O

Table 2.13 (continued)

K-25 source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type[a]
K-1001 Opti-copy	1106-07	024395P	Photographic reproduction	O
K-1004 L oven	0106-95	024299P	Sintering operation	O
K-1004 L	0106-95	024299P	Main vent of Dev. Facility	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-1020 FT1	0106-07	015690P	Filter test	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 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
K-1037 AVLIS LABAB	0106-68	020691P	AVLIS Expansions Labs A&B	O
K-1037 AVLIS LSSB	0106-85	023663P	Small sand blaster	O
K-1037 AVLIS LCDEV	0106-69	029897P	Expansion Lab. C spray	O
			coating west exhaust filters	O
K-1037 AVLIS OOVEN	0106-73	029900P	Electric oxidation oven	O
K-1037 AVLIS LAB	1106-35	930506P	AVLIS lab	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-1037 AVLIS PRODCON	1106-36	930871P	Product Conreversion Demo	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-1095 PS123	0106-14	015830P	Paint spray operation	O
K-1098 FSB1	0106-13	015098P	Grit blast	O
K-1131 MS	0106-29	015099P	Fluorine	O
K-1200 275387	0106-50	015596P	Exhaust hood	O
K-1200 CPL	0106-50	015596P	Component prep.	O
K-1200 A123	0106-56	019608P	Purge evac.	O
K-1200 CUTF	0106-62	017339P	Centrifuge	O
K-1200 FAE1	0106-86	029192P	Isotope separation	O
K-1200 center bay	0106-87	026548P	Center bay	O
K-1200 center bay hood	0106-87	026548P	Center bay hood	O
				O

Table 2.13 (continued)

K-25 source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type[a]
K-1200 center bay oven	0106-87	026548P	Center bay oven	O
K-1200 FAE	0106-86	995492P	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-1202-2508LO	0106-23	016310P	Lube oil tank	O
K-1202-2509LO	0106-23	016310P	Lube oil tank	O
K-1220 B	0106-48	015101P	Machine repair	O
K-1231 AP216	0106-53	015704P	Transfer vent	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	O
K-12331	0106-51	015702P	Process	O
K-1300 B	0106-37	012505P	Hazardous ops emergency vent	O
K-1302 stack	0106-42	029896P	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 cleaning 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 tricho e tank	1106-10	024947P	Trichloroethane storage tank	O
K-1401 000 oven, NE-2	0106-89	028424P	Oven for curing	O
K-1401 121659	0106-09	016306P	Trichloroethane degreaser	O
K-1401 275029PL	0106-58	012506P	Plastic shop	O
K-1401 JIGANDFIX	0106-71	029898P	Shop	O
K-1401 MB01	0106-45	017336P	Oven	O
K-1401 MSMC1	0106-32	017337P	Oven	O
K-1401 MSMC3	0106-66	18526P	Oven	O
K-1401 PLS1,2,3,4,6	0106-72	029899P	Ovens	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-1407 ASAT	1106-21	024454P	Tank	O
K-1413 propane LBD121422	0106-28	024500P	Propane storage tank	O
K-1413 MS	0106-52	015703P	Vent	O
K-1413 97720TRICH	0106-52	012661P	Tank	O
K-1414 diesel	1106-02	024335P	Underground storage tank	O
				O

Table 2.13 (continued)

K-25 source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type[a]
K-1414 UG methanol, unleaded gas	0106-28	024500P	Methanol/gasoline storage tank	O
K-1414	0106-28	016312P	Tanks	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 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
K-1420 237306 vapor degreaser	0106-49	023797P	Detrex vapor degreaser	O
K-1420 WODF	0106-67	018527P	Waste oil	O
K-1420 DISSASSEM	0106-74	021563P	Disassembly	O
K-1420 1200CPL	0106-54	017055P	Preparation	O
K-1420 CPL1	0106-58	017051P	Spray chamber	O
K-1420 A	0106-55	017846P	A-area ventilation	O
K-1420 B	0106-63	015097P	Small parts clean	O
K-1420 C	0106-63	015097P	Electroless plating	O
K-1423 process	0106-37	023001P	Toll enrichment facility	O
K-1425 WOS	0106-11	029895P	Storage tanks	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-1501 F02 Oil	0106-28	016312P	Tanks	O
K-1501 FA	0106-50	015596P	Air washer	O
K-1501 FB	0106-64	018525P	Air washer	O
K-1501 Boiler 8	0106-12	998065F	Boiler	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-1600 TTFL	0106-59	017053P	Lab	O

[a]O = operating; PTC = permit to construct.

Table 2.14. 1990 external gamma radiation measurements

Location	Number of samples[a]	Exposure rate (μ R/h)			
		Max	Min	Av	Standard error[b]
		ORNL PAM stations[c]			
03	206	10	0.53	3.6	0.24
07	2,437	24	1.1	6.5	0.030
20	5,957	13	7.8	8.8	0.0084
Network summary	8,600	24	0.53	8.0	0.018
		Oak Ridge Reservation PAM stations[c]			
08	3,713	13,000	6.5	11	3.6
31	3,573	17	7.2	7.9	0.0061
33	6,700	14	0.057	7.2	0.015
34	5,365	21	7.0	8.1	0.0082
36	2,117	88	6.7	7.3	0.064
40	3,736	14	7.2	8.4	0.0095
41	6,406	6.6	5.1	5.5	0.0019
42	2,700	22	2.2	7.2	0.011
43	5,277	29	0.89	7.2	0.012
44	7,886	12	5.9	6.6	0.0053
45	6,051	13	6.3	7.2	0.0059
46	3,748	120	8.1	9.2	0.041
Network summary	57,272	13,000	0.057	7.5	0.23

[a]Real-time readings were collected at all stations at 10-minute intervals. The number of samples indicate the total number of valid hourly averages during the year.

[b]Standard deviation of the mean.

[c]See Fig. 2.19.

SURFACE WATER

Table 3.1. Radionuclide concentrations in surface waters around ORNL in 1990

Radionuclide	Number of samples	Concentrations (pCi/L)[a]					Percentage of DCG[e]
		Max	Min	Av[b]	Standard error[c]	DCG[d]	
				Melton Hill Dam			
^{60}Co	12	41	−38	3.6	6.9	5,000	*f*
^{137}Cs	12	46	−38	6.0	7.5	3,000	*f*
Gross alpha	12	25	−1.6	5.2*	2.2	*f*	*f*
Gross beta	12	24	−24	3.1	4.3	*f*	*f*
^{238}Pu	1	−0.14	−0.14	−0.14	*f*	40	*f*
^{239}Pu	1	0.027	0.027	0.027	*f*	30	*f*
Total Sr[g]	1	2.2	2.2	2.2	*f*	1,000	*f*
Total U (mg/L)	1	0.00053	0.00053	0.00053*	*f*	*f*	*f*
^{234}U	1	0.41	0.41	0.41*	*f*	500	0.079
^{235}U	1	0.081	0.081	0.081	*f*	600	*f*
^{238}U	1	0.16	0.16	0.16*	*f*	600	0.027
				White Oak Creek Headwaters			
^{60}Co	12	51	−59	8.2	8.9	5,000	*f*
^{137}Cs	12	57	−24	5.2	7.2	3,000	*f*
Gross alpha	12	19	−11	2.7	2.1	*f*	*f*
Gross beta	12	32	−14	5.2	4.9	*f*	*f*
^{238}Pu	1	0.54	0.54	0.54	*f*	40	*f*
^{239}Pu	1	0.30	0.30	0.30*	*f*	30	1.0
Total Sr[g]	1	−1.1	−1.1	−1.1	*f*	1,000	*f*
Total U (mg/L)	1	0.0014	0.0014	0.0014*	*f*	*f*	*f*
^{234}U	1	1.6	1.6	1.6*	*f*	500	0.32
^{235}U	1	0.27	0.27	0.27*	*f*	600	0.045
^{238}U	1	0.43	0.43	0.43*	*f*	600	0.073
				7500 Bridge			
^{60}Co	12	38	−38	−0.20	5.3	5,000	*f*
^{137}Cs	12	180	5.4	99*	19	3,000	3.3
Total Sr[g]	12	92	43	62*	4.6	1,000	6.2
^{3}H	12	4,100	2,200	3,000*	160	2,000,000	0.15
				First Creek			
^{60}Co	12	51	−27	11*	5.5	5,000	0.21
^{137}Cs	12	59	−27	8.6	6.4	3,000	*f*
Total Sr[g]	12	460	150	300*	37	1,000	30
				Fifth Creek			
^{60}Co	12	84	−59	−0.77	10	5,000	*f*
^{137}Cs	12	30	−35	−1.1	6.0	3,000	*f*
Total Sr[g]	12	57	20	36*	3.0	1,000	3.6
				Melton Branch 2			
^{60}Co	12	32	−78	−2.7	9.8	5,000	*f*
^{137}Cs	12	46	−38	−8.5	6.3	3,000	*f*
Total Sr[g]	12	14	0.27	2.7*	1.1	1,000	0.27
^{3}H	11	97,000	860	11,000	8,600	2,000,000	*f*

Table 3.1 (continued)

Radionuclide	Number of samples	Concentrations (pCi/L)[a]					Percentage of DCG[e]
		Max	Min	Av[b]	Standard error[c]	DCG[d]	
				Northwest Tributary			
^{60}Co	12	46	−14	17*	4.8	5,000	0.33
^{137}Cs	12	73	−16	13	7.9	3,000	*f*
Total Sr[g]	12	62	19	45*	3.7	1,000	4.5
				Raccoon Creek			
^{60}Co	12	57	−35	19*	7.3	5,000	0.36
^{137}Cs	12	51	−49	1.4	7.1	3,000	*f*
Total Sr[g]	12	68	3.0	29*	5.7	1,000	2.9

[a]Multiply pCi/L by 0.037 to convert to Bq/L.

[b]Mean concentrations significantly greater than zero are identified by an asterisk (*).

[c]Standard error of the mean.

[d]Derived concentration guide (DCG) for ingestion of water (from DOE Order 5400.5).

[e]Mean concentration as a percentage of the derived concentration guide, calculated only when a DCG exists and mean concentration is significantly greater than zero.

[f]Not applicable.

[g]Total radioactive Sr ($^{89}Sr + {}^{90}Sr$).

Table 3.2. Radionuclide concentrations in water around the K-25 Site in 1990

Parameter	Number of samples	Concentration (pCi/L)			Percentage of DCG[a]
		Max	Min	Av	
		West Fork Poplar Creek			
^{237}Np	4	0	-8.00×10^{-1}	-2.20×10^{-1}	<0.01
$^{239/240}Pu$	2	0	-1.10×10^{-1}	-5.50×10^{-2}	<0.01
^{99}Tc	4	1.59×10^{2}	1.66×10^{1}	1.05×10^{2}	0.01
^{137}Cs	4	2.09	-2.59×10^{1}	−5.95	<0.01
U[b]	4	<0.7	<0.7	<0.7	0.11
U (mg/L)	4	<0.001	<0.001	<0.001	0.11
^{238}Pu	2	-1.3×10^{-1}	-4.6×10^{-1}	-2.95×10^{-1}	<0.01
^{239}Pu	2	4.00×10^{-1}	-1.3×10^{-1}	1.35×10^{-1}	0.05
		K-1710			
^{237}Np	12	1.62	-2.6×10^{-1}	2.74×10^{-1}	0.09
$^{239/240}Pu$	5	9.87×10^{-1}	-4.8×10^{-1}	-4.08×10^{-2}	<0.01
^{99}Tc	12	9.14×10^{2}	-2.44×10^{-2}	8.17×10^{-1}	0.08
^{137}Cs	12	1.16×10^{1}	-9.60×10^{-1}	1.39	0.04
U[b]	12	7.38	<0.7	2.80	0.47
U (mg/L)	12	1.10×10^{-2}	<0.001	4.17×10^{-3}	0.47
^{238}Pu	7	6.70×10^{-1}	-6.00×10^{-1}	-4.86×10^{-2}	<0.01
^{239}Pu	7	6.00×10^{-1}	-9.00×10^{-2}	1.35×10^{-1}	0.04
		K-716			
^{237}Np	12	5.19×10^{-1}	-4.30×10^{-1}	7.55×10^{-2}	0.25
$^{239/240}Pu$	5	1.90	-6.50×10^{-1}	4.20×10^{-1}	1.40
^{99}Tc	12	7.27×10^{2}	-4.20×10^{2}	$6.10 \times 10^{+1}$	0.06
^{137}Cs	12	7.71	−2.36	4.05×10^{-1}	0.01
U[b]	12	2.01	<0.7	1.06	0.18
U (mg/L)	12	0.003	<0.001	1.58×10^{-3}	0.18
^{238}Pu	7	4.20×10^{-1}	-7.70×10^{-1}	-2.23×10^{-1}	<0.01
^{239}Pu	7	5.60×10^{-1}	-9.0×10^{-2}	1.43×10^{-1}	0.05
		K-1513			
^{237}Np	12	4.05×10^{1}	-4.70×10^{-1}	3.42	11.40
$^{239/240}Pu$	5	4.23×10^{-1}	-3.20×10^{-1}	-1.54×10^{-2}	<0.01
^{99}Tc	12	7.30×10^{2}	-3.76×10^{2}	6.73×10^{1}	0.07
^{137}Cs	12	4.13	−4.65	6.09×10^{-1}	0.02
U[b]	12	<0.7	<0.7	<0.7	0.11
U (mg/L)	12	<0.001	<0.001	<0.001	0.11
^{238}Pu	7	2.00×10^{-1}	−1.50	-3.60×10^{-1}	<0.01
^{239}Pu	7	5.60×10^{-1}	-3.00×10^{-1}	8.43×10^{-3}	0.03

Table 3.2 (continued)

Parameter	Number of samples	Concentration (pCi/L)			Percentage of DCG[a]
		Max	Min	Av	
			K-1770		
^{237}Np	12	3.6×10^{-1}	-4.4×10^{-1}	1.53×10^{-2}	0.05
$^{239/240}Pu$	5	1.67	-6.6×10^{-1}	3.06×10^{-1}	1.02
^{99}Tc	12	3.99×10^{2}	-2.44×10^{2}	-1.12×101	<0.01
^{137}Cs	12	8.01	−1.64	8.27×10^{-1}	0.03
U[b]	12	<0.7	<0.7	<0.7	0.11
U (mg/L)	12	<0.001	<0.001	<0.001	0.11
^{238}Pu	7	4.50×10^{-1}	-6.6×10^{-1}	-1.06×10^{-1}	<0.01
^{239}Pu	7	5.70×10^{-1}	-3.0×10^{-1}	8.43×10^{-2}	<0.01
			Clinch		
^{237}Np	4	9.00×10^{-2}	-9.00×10^{-2}	4.00×10^{-2}	0.13
$^{239/240}Pu$	2	8.00×10^{-2}	-3.50×10^{-1}	-1.35×10^{-1}	<0.01
^{99}Tc	4	$1.89 \times 10^{+2}$	-1.45×10^{2}	-3.02×10^{1}	<0.01
^{137}Cs	4	1.97	0	7.50×10^{-1}	0.03
U[b]	4	<0.7	<0.7	<0.7	0.11
U (mg/L)	4	<0.001	<0.001	<0.001	0.11
^{238}Pu	2	9.00×10^{-2}	0	4.5×10^{-2}	0.01
^{239}Pu	2	7.0×10^{-2}	-9.00×10^{-2}	-1.00×10^{-2}	<0.01
			Mitchell Branch		
Gross alpha	4	5.83	−1.00	1.25	*c*
Gross beta	4	5.14	−1.20	1.59	*c*
Gross gamma	4	0	0	0	*c*
^{137}Cs	2	3.56	-8.21×10^{-1}	1.37	0.05

[a]Average concentration as a percentage of the derived concentration guide (DCG) from DOE Order 5400.5.

[b]The specific activity for natural uranium of 1.49×1^{6} g/Ci was used to determine pCi/L.

[c]Not applicable.

[d]Because of the intrinsic uncertainties associated with making radiation measurements, it is possible to subtract a background value from a sample result and obtain a negative number. Statistical summaries previously used detection limits to represent sample results even when samples were less than detection limits, which resulted in high biases. To remove these biases and to enable statistical summaries to be equally representative of all component values, recent changes in reporting methods include accepting all results at face value.

Table 3.3. 1990 K-25 Site concentrations at West Fork Poplar Creek

Parameter	Concentration		
	Max	Min	Av
1,1,1-Trichloroethane, µg/L	<5	<5	<5
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5
1,1,2-Trichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethene, µg/L	<5	<5	<5
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10
1,2-Dichlorobenzene, µg/L	<10	<10	<10
1,2-Dichloroethane, µg/L	<5	<5	<5
1,2-Dichloropropane, µg/L	<5	<5	<5
1,3-Dichlorobenzene, µg/L	<10	<10	<10
1,4-Dichlorobenzene, µg/L	<10	<10	<10
2,4,6-Trichlorophenol, µg/L	<10	<10	<10
2,4-Dichlorophenol, µg/L	<10	<10	<10
2,4-Dimethylphenol, µg/L	<10	<10	<10
2,4-Dinitrophenol, µg/L	<10	<10	<10
2,4-Dinitrotoluene, µg/L	<10	<10	<10
2,6-Dinitrotoluene, µg/L	<10	<10	<10
2-Chloroethylvinyl ether, µg/L	<10	<10	<10
2-Chloronaphthalene, µg/L	<10	<10	<10
2-Chlorophenol, µg/L	<10	<10	<10
2-Nitrophenol, µg/L	<10	<10	<10
3,3'-Dichlorobenzidine, µg/L	<20	<20	<20
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50
4-Bromophenyl-phenylether, µg/L	<10	<10	<10
4-Chloro-3-methylphenol, µg/L	<10	<10	<10
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10
4-Nitrophenol, µg/L	<50	<50	<50
Acenaphthene, µg/L	<10	<10	<10
Acenaphthylene, µg/L	<10	<10	<10
Ammonia nitrogen, mg/L	<0.2	<0.2	<0.2
Anthracene, µg/L	<10	<10	<10
Arsenic, mg/L	<0.005	<0.005	<0.005
Benzene, µg/L	<5	<5	<5
Benzidine, µg/L	<10	<10	<10
Benzo(a)anthracene, µg/L	<10	<10	<10
Benzo(a)pyrene, µg/L	<10	<10	<10
Benzo(b)fluoranthene, µg/L	<10	<10	<10
Benzo(g,h,i)perylene, µg/L	<10	<10	<10
Benzo(k)fluoranthene, µg/L	<10	<10	<10
Bromodichloromethane, µg/L	<5	<5	<5
Bromoform, µg/L	<5	<5	<5
Bromomethane, µg/L	<10	<10	<10
Butylbenzylphthalate, µg/L	<10	<10	<10
Cadmium, mg/L	<0.002	<0.002	<0.002
Carbon tetrachloride, µg/L	<5	<5	<5
Chemical oxygen demand (COD), mg/L	<5	<5	<5
Chlorobenzene, µg/L	<5	<5	<5
Chloroethane, µg/L	<10	<10	<10
Chloroform, µg/L	<5	<5	<5
Chloromethane, µg/L	<10	<10	<10

Table 3.3 (continued)

Parameter	Concentration		
	Max	Min	Av
Chromium, mg/L	0.018	<0.010	0.012
Chrysene, μg/L	<10	<10	<10
Copper, mg/L	<0.0040	<0.0040	<0.0040
Cyanide, mg/L	<0.1	<0.1	<0.1
Di-n-butylphthalate, μg/L	<10	<10	<10
Dibenz(a,h)anthracene, μg/L	<10	<10	<10
Dibromochloromethane, μg/L	<5	<5	<5
Diethylphthalate, μg/L	<10	<10	<10
Dimethylphthalate, μg/L	<10	<10	<10
Dissolved solids, mg/L	194	108	150
Ethylbenzene, μg/L	<5	<5	<5
Fluoranthene, μg/L	<10	<10	<10
Fluorene, μg/L	<10	<10	<10
Fluoride, mg/L	<0.1	<0.1	<0.1
Hexachlorobenzene, μg/L	<10	<10	<10
Hexachlorobutadiene, μg/L	<10	<10	<10
Hexachlorocyclopentadiene, μg/L	<10	<10	<10
Hexachloroethane, μg/L	<10	<10	<10
Indeno(1,2,3-cd)pyrene, μg/L	<10	<10	<10
Isophorone, μg/L	<10	<10	<10
Lead, mg/L	<0.004	<0.004	<0.004
Manganese, mg/L	0.21	0.075	0.146
Mercury, mg/L	<0.0002	<0.0002	<0.0002
Methylene chloride, μg/L	<10	<10	<10
N-nitroso-di-n-propylamine, μg/L	<10	<10	<10
N-nitrosodimethylamine, μg/L	<10	<10	<10
N-nitrosodiphenylamine, μg/L	<10	<10	<10
Naphthalene, μg/L	<10	<10	<10
Nickel, mg/L	0.015	<0.01	<0.011
Nitrate nitrogen, mg/L	0.5	0.20	0.3
Nitrobenzene, μg/L	<10	<10	<10
Pentachlorophenol, μg/L	<50	<50	<50
Phenanthrene, μg/L	<10	<10	<10
Phenol, μg/L	<10	<10	<10
Pyrene, μg/L	<10	<10	<10
Sodium, mg/L	5.7	3	4.2
Sulfate, mg/L	48	31	37
Suspended solids, mg/L	24	11	16
Tetrachloroethene, μg/L	<5	<5	<5
Toluene, μg/L	<5	<5	<5
Trichloroethene, μg/L	<5	<5	<5
Vinyl chloride, μg/L	<10	<10	<10
Zinc, mg/L	0.011	<0.001	<0.004
bis(2-Chloroethoxy)methane, μg/L	<10	<10	<10
bis(2-Chloroethyl)ether, μg/L	<10	<10	<10
bis(2-Chloroisopropyl)ether, μg/L	<10	<10	<10
bis(2-Ethylhexyl)phthalate, μg/L	<10	<10	<10
cis-1,3-Dichloropropene, μg/L	<5	<5	<5
di-n-Octylphthalate, μg/L	<10	<10	<10
pH, standard units	8.1	7.5	
trans-1,2-Dichloroethene, μg/L	<5	<5	<5
trans-1,3-Dichloropropene, μg/L	<5	<5	<5

Table 3.4. 1990 K-25 Site concentrations at Clinch River

Parameter	Concentration		
	Max	Min	Av
1,1,1-Trichloroethane, µg/L	<5	<5	<5
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5
1,1,2-Trichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethene, µg/L	<5	<5	<5
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10
1,2-Dichlorobenzene, µg/L	<10	<10	<10
1,2-Dichloroethane, µg/L	<5	<5	<5
1,2-Dichloropropane, µg/L	<5	<5	<5
1,3-Dichlorobenzene, µg/L	<10	<10	<10
1,4-Dichlorobenzene, µg/L	<10	<10	<10
2,4,6-Trichlorophenol, µg/L	<10	<10	<10
2,4-Dichlorophenol, µg/L	<10	<10	<10
2,4-Dimethylphenol, µg/L	<10	<10	<10
2,4-Dinitrophenol, µg/L	<10	<10	<10
2,4-Dinitrotoluene, µg/L	<10	<10	<10
2,6-Dinitrotoluene, µg/L	<10	<10	<10
2-Chloroethylvinyl ether, µg/L	<10	<10	<10
2-Chloronaphthalene, µg/L	<10	<10	<10
2-Chlorophenol, µg/L	<10	<10	<10
2-Nitrophenol, µg/L	<10	<10	<10
3,3'-Dichlorobenzidine, µg/L	<20	<20	<20
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50
4-Bromophenyl-phenylether, µg/L	<10	<10	<10
4-Chloro-3-methylphenol, µg/L	<10	<10	<10
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10
4-Nitrophenol, µg/L	<50	<50	<50
Acenaphthene, µg/L	<10	<10	<10
Acenaphthylene, µg/L	<10	<10	<10
Ammonia nitrogen, mg/L	0.6	<0.2	0.3
Anthracene, µg/L	<10	<10	<10
Arsenic, mg/L	<0.005	<0.005	<0.005
Benzene, µg/L	<5	<5	<5
Benzidine, µg/L	<10	<10	<10
Benzo(a)anthracene, µg/L	<10	<10	<10
Benzo(a)pyrene, µg/L	<10	<10	<10
Benzo(b)fluoranthene, µg/L	<10	<10	<10
Benzo(g,h,i)perylene, µg/L	<10	<10	<10
Benzo(k)fluoranthene, µg/L	<10	<10	<10
Bromodichloromethane, µg/L	<5	<5	<5
Bromoform, µg/L	<5	<5	<5
Bromomethane, µg/L	<10	<10	<10
Butylbenzylphthalate, µg/L	<10	<10	<10
Cadmium, mg/L	<0.002	<0.002	<0.002
Carbon tetrachloride, µg/L	<5	<5	<5
Chemical oxygen demand (COD), mg/L	<5	<5	<5
Chlorobenzene, µg/L	<5	<5	<5
Chloroethane, µg/L	<10	<10	<10
Chloroform, µg/L	<5	<5	<5
Chloromethane, µg/L	<10	<10	<10

Table 3.4 (continued)

Parameter	Concentration		
	Max	Min	Av
Chromium, mg/L	0.44	<0.010	0.018
Chrysene, µg/L	<10	<10	<10
Copper, mg/L	0.0074	<0.0040	<0.0040
Cyanide, mg/L	<0.1	<0.1	<0.1
Di-n-butylphthalate, µg/L	<10	<10	<10
Dibenz(a,h)anthracene, µg/L	<10	<10	<10
Dibromochloromethane, µg/L	<5	<5	<5
Diethylphthalate, µg/L	<10	<10	<10
Dimethylphthalate, µg/L	<10	<10	<10
Dissolved solids, mg/L	148	136	142
Ethylbenzene, µg/L	<5	<5	<5
Fluoranthene, µg/L	<10	<10	<10
Fluorene, µg/L	<10	<10	<10
Fluoride, mg/L	<0.1	<0.1	<0.1
Hexachlorobenzene, µg/L	<10	<10	<10
Hexachlorobutadiene, µg/L	<10	<10	<10
Hexachlorocyclopentadiene, µg/L	<10	<10	<10
Hexachloroethane, µg/L	<10	<10	<10
Indeno(1,2,3-cd)pyrene, µg/L	<10	<10	<10
Isophorone, µg/L	<10	<10	<10
Lead, mg/L	<0.0040	<0.0040	<0.0040
Manganese, mg/L	0.094	0.025	0.049
Mercury, mg/L	<0.0002	<0.0002	<0.0002
Methylene chloride, µg/L	<5	<5	<5
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10
N-nitrosodimethylamine, µg/L	<10	<10	<10
N-nitrosodiphenylamine, µg/L	<10	<10	<10
Naphthalene, µg/L	<10	<10	<10
Nickel, mg/L	0.021	<0.01	0.012
Nitrate nitrogen, mg/L	0.50	0.20	0.325
Nitrobenzene, µg/L	<10	<10	<10
Pentachlorophenol, µg/L	<50	<50	<50
Phenanthrene, µg/L	<10	<10	<10
Phenol, µg/L	<10	<10	<10
Pyrene, µg/L	<10	<10	<10
Sodium, mg/L	4.6	4.1	4.3
Sulfate, mg/L	21	19	19.75
Suspended solids, mg/L	13	4	8
Tetrachloroethene, µg/L	<5	<5	<5
Toluene, µg/L	<5	<5	<5
Trichloroethene, µg/L	<5	<5	<5
Vinyl chloride, µg/L	<10	<10	<10
Zinc, mg/L	0.0058	<0.001	0.002
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10
bis(2-Ethylhexyl)phthalate, µg/L	<10	<10	<10
cis-1,3-Dichloropropene, µg/L	<5	<5	<5
di-n-Octylphthalate, µg/L	<10	<10	<10
pH, standard units	8.6	8.05	
trans-1,2-Dichloroethene, µg/L	<5	<5	<5
trans-1,3-Dichloropropene, µg/L	<5	<5	<5

Table 3.5. 1990 K-25 Site concentrations at K-716

Parameter	Concentration		
	Max	Min	Av
1,1,1-Trichloroethane, µg/L	<5	<5	<5
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5
1,1,2-Trichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethene, µg/L	<5	<5	<5
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10
1,2-Dichlorobenzene, µg/L	<10	<10	<10
1,2-Dichloroethane, µg/L	<5	<5	<5
1,2-Dichloropropane, µg/L	<5	<5	<5
1,3-Dichlorobenzene, µg/L	<10	<10	<10
1,4-Dichlorobenzene, µg/L	<10	<10	<10
2,4,6-Trichlorophenol, µg/L	<10	<10	<10
2,4-Dichlorophenol, µg/L	<10	<10	<10
2,4-Dimethylphenol, µg/L	<10	<10	<10
2,4-Dinitrophenol, µg/L	<10	<10	<10
2,4-Dinitrotoluene, µg/L	<10	<10	<10
2,6-Dinitrotoluene, µg/L	<10	<10	<10
2-Chloroethylvinyl ether, µg/L	<10	<10	<10
2-Chloronaphthalene, µg/L	<10	<10	<10
2-Chlorophenol, µg/L	<10	<10	<10
2-Nitrophenol, µg/L	<10	<10	<10
3,3'-Dichlorobenzidine, µg/L	<20	<20	<20
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50
4-Bromophenyl-phenylether, µg/L	<10	<10	<10
4-Chloro-3-methylphenol, µg/L	<10	<10	<10
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10
4-Nitrophenol, µg/L	<50	<50	<50
Acenaphthene, µg/L	<10	<10	<10
Acenaphthylene, µg/L	<10	<10	<10
Aluminum, mg/L	5.4	5.4	5.4
Ammonia nitrogen, mg/L	0.28	<0.2	0.209
Anthracene, µg/L	<10	<10	<10
Antimony, mg/L	<0.05	<0.05	<0.05
Arsenic, mg/L	<0.005	<0.005	<0.005
Barium, mg/L	0.059	0.059	0.059
Benzene, µg/L	<5	<5	<5
Benzidine, µg/L	<10	<10	<10
Benzo(a)anthracene, µg/L	<10	<10	<10
Benzo(a)pyrene, µg/L	<10	<10	<10
Benzo(b)fluoranthene, µg/L	<10	<10	<10
Benzo(g,h,i)perylene, µg/L	<10	<10	<10
Benzo(k)fluoranthene, µg/L	<10	<10	<10
Beryllium, mg/L	<0.0003	<0.0003	<0.0003
Bicarbonate, mg/L	67	67	67
Boron, mg/L	0.016	0.016	0.016
Bromodichloromethane, µg/L	<5	<5	<5
Bromoform, µg/L	<5	<5	<5
Bromomethane, µg/L	<10	<10	<10
Butylbenzylphthalate, µg/L	<10	<10	<10
Cadmium, mg/L	<0.002	<0.002	<0.002
Calcium, mg/L	19	19	19
Carbon tetrachloride, µg/L	<5	<5	<5
Chemical oxygen demand (COD), mg/L	11	<5	6.25

Table 3.5 (continued)

Parameter	Concentration		
	Max	Min	Av
Chlorobenzene, μg/L	<5	<5	<5
Chloroethane, μg/L	<10	<10	<10
Chloroform, μg/L	<5	<5	<5
Chloromethane, μg/L	<10	<10	<10
Chromium, mg/L	0.037	<0.010	<0.012
Chrysene, μg/L	<10	<10	<10
Copper, mg/L	0.069	<0.0040	<0.010
Cyanide, mg/L	<0.1	<0.1	<0.1
Di-n-butylphthalate, μg/L	<10	<10	<10
Dibenz(a,h)anthracene, μg/L	<10	<10	<10
Dibromochloromethane, μg/L	<5	<5	<5
Diethylphthalate, μg/L	<10	<10	<10
Dimethylphthalate, μg/L	<10	<10	<10
Dissolved solids, mg/L	174	96	144.5
Ethylbenzene, μg/L	<5	<5	<5
Fluoranthene, μg/L	<10	<10	<10
Fluorene, μg/L	<10	<10	<10
Fluoride, mg/L	100	<0.10	8.477
Hexachlorobenzene, μg/L	<10	<10	<10
Hexachlorobutadiene, μg/L	<10	<10	<10
Hexachlorocyclopentadiene, μg/L	<10	<10	<10
Hexachloroethane, μg/L	<10	<10	<10
Indeno(1,2,3-cd)pyrene, μg/L	<10	<10	<10
Iron, mg/L	5.7	5.7	5.7
Isophorone, μg/L	<10	<10	<10
Lead, mg/L	0.0053	<0.0040	<0.004
Lithium, mg/L	0.0082	0.0082	0.0082
Magnesium, mg/L	5.9	5.9	5.9
Manganese, mg/L	0.26	0.053	0.107
Mercury, mg/L	0.0056	<0.0002	<0.0016
Methylene chloride, μg/L	5	<0.9	3.975
N-nitroso-di-n-propylamine, μg/L	<10	<10	<10
N-nitrosodimethylamine, μg/L	<10	<10	<10
N-nitrosodiphenylamine, μg/L	<10	<10	<10
Naphthalene, μg/L	<10	<10	<10
Nickel, mg/L	<0.05	<0.05	<0.05
Nitrate nitrogen, mg/L	0.7	0.4	0.59
Nitrobenzene, μg/L	<10	<10	<10
Pentachlorophenol, μg/L	<50	<50	<50
Phenanthrene, μg/L	<10	<10	<10
Phenol, μg/L	<10	<10	<10
Potassium	3	3	3
Pyrene, μg/L	<10	<10	<10
Selenium, mg/L	<0.005	<0.005	<0.005
Silver, mg/L	<0.006	<0.006	<0.006
Sodium, mg/L	7.3	2.9	5.0
Sulfate, mg/L	31	21	25
Suspended solids, mg/L	130	6	34
Tetrachloroethene, μg/L	<5	<5	<5
Toluene, μg/L	<5	<5	<5
Trichloroethene, μg/L	<5	<5	<5
Vinyl chloride, μg/L	<10	<10	<10
Zinc, mg/L	0.034	<0.001	<0.015

Table 3.5 (continued)

Parameter	Concentration		
	Max	Min	Av
bis(2-Chloroethoxy)methane, μg/L	<10	<10	<10
bis(2-Chloroethyl)ether, μg/L	<10	<10	<10
bis(2-Chloroisopropyl)ether, μg/L	<10	<10	<10
bis(2-Ethylhexyl)phthalate, μg/L	170	<10	<33
cis-1,3-Dichloropropene, μg/L	<5	<5	<5
di-n-Octylphthalate, μg/L	<10	<10	<10
pH, standard units	8.5	7.6	
trans-1,2-Dichloroethene, μg/L	<5	<5	<5
trans-1,3-Dichloropropene, μg/L	<5	<5	<5

Table 3.6. 1990 K-25 Site concentrations at K-1513

Parameter	Concentration		
	Max	Min	Av
1,1,1-Trichloroethane, μg/L	<5	<5	<5
1,1,2,2-Tetrachloroethane, μg/L	<5	<5	<5
1,1,2-Trichloroethane, μg/L	<5	<5	<5
1,1-Dichloroethane, μg/L	<5	<5	<5
1,1-Dichloroethene, μg/L	<5	<5	<5
1,2,4-Trichlorobenzene, μg/L	<10	<10	<10
1,2-Dichlorobenzene, μg/L	<10	<10	<10
1,2-Dichloroethane, μg/L	<5	<5	<5
1,2-Dichloropropane, μg/L	<5	<5	<5
1,3-Dichlorobenzene, μg/L	<10	<10	<10
1,4-Dichlorobenzene, μg/L	<10	<10	<10
2,4,6-Trichlorophenol, μg/L	<10	<10	<10
2,4-Dichlorophenol, μg/L	<10	<10	<10
2,4-Dimethylphenol, μg/L	<10	<10	<10
2,4-Dinitrophenol, μg/L	<10	<10	<10
2,4-Dinitrotoluene, μg/L	<10	<10	<10
2,6-Dinitrotoluene, μg/L	<10	<10	<10
2-Chloroethylvinyl ether, μg/L	<10	<10	<10
2-Chloronaphthalene, μg/L	<10	<10	<10
2-Chlorophenol, μg/L	<10	<10	<10
2-Nitrophenol, μg/L	<10	<10	<10
3,3'-Dichlorobenzidine, μg/L	<20	<20	<20
4,6-Dinitro-2-methylphenol, μg/L	<50	<50	<50
4-Bromophenyl-phenylether, μg/L	<10	<10	<10
4-Chloro-3-methylphenol, μg/L	<10	<10	<10
4-Chlorophenyl-phenylether, μg/L	<10	<10	<10
4-Nitrophenol, μg/L	<50	<50	<50
Acenaphthene, μg/L	<10	<10	<10
Acenaphthylene, μg/L	<10	<10	<10
Aluminum, mg/L	0.2	0.2	0.2
Ammonia nitrogen, mg/L	<0.2	<0.2	<0.2
Anthracene, μg/L	<10	<10	<10
Antimony, mg/L	<0.05	<0.05	<0.05
Arsenic, mg/L	<0.005	<0.005	<0.005
Barium, mg/L	0.028	0.028	0.028
Benzene, μg/L	<5	<5	<5
Benzidine, μg/L	<10	<10	<10
Benzo(a)anthracene, μg/L	<10	<10	<10
Benzo(a)pyrene, μg/L	<10	<10	<10
Benzo(b)fluoranthene, μg/L	<10	<10	<10
Benzo(g,h,i)perylene, μg/L	<10	<10	<10
Benzo(k)fluoranthene, μg/L	<10	<10	<10
Beryllium, mg/L	<0.0003	<0.0003	<0.0003
Bromodichloromethane, μg/L	<5	<5	<5
Bromoform, μg/L	<5	<5	<5
Bromomethane, μg/L	<10	<10	<10
Butylbenzylphthalate, μg/L	<10	<10	<10
Cadmium, mg/L	<0.002	<0.002	<0.002
Calcium, mg/L	30	30	30
Carbon tetrachloride, μg/L	<5	<5	<5

Table 3.6 (continued)

Parameter	Concentration		
	Max	Min	Av
Chemical oxygen demand (COD), mg/L	7	<5	<5.2
Chlorobenzene, µg/L	<5	<5	<5
Chloroethane, µg/L	<10	<10	<10
Chloroform, µg/L	<5	<5	<5
Chloromethane, µg/L	<10	<10	<10
Chromium, mg/L	<0.010	<0.010	<0.010
Chrysene, µg/L	<10	<10	<10
Copper, mg/L	0.012	<0.0040	0.004
Cyanide, mg/L	<0.1	<0.1	<0.1
Di-n-butylphthalate, µg/L	<10	<10	<10
Dibenz(a,h)anthracene, µg/L	<10	<10	<10
Dibromochloromethane, µg/L	<5	<5	<5
Diethylphthalate, µg/L	<10	<10	<10
Dimethylphthalate, µg/L	<10	<10	<10
Dissolved solids, mg/L	164	110	146.5
Ethylbenzene, µg/L	<5	<5	<5
Fluoranthene, µg/L	<10	<10	<10
Fluorene, µg/L	<10	<10	<10
Fluoride, mg/L	0.1	<0.10	0.10
Hexachlorobenzene, µg/L	<10	<10	<10
Hexachlorobutadiene, µg/L	<10	<10	<10
Hexachlorocyclopentadiene, µg/L	<10	<10	<10
Hexachloroethane, µg/L	<10	<10	<10
Indeno(1,2,3-cd)pyrene, µg/L	<10	<10	<10
Iron, mg/L	0.22	0.22	0.22
Isophorone, µg/L	<10	<10	<10
Lead, mg/L	<0.004	<0.0040	<0.004
Lithium, mg/L	<0.004	<0.004	<0.004
Magnesium, mg/L	8.5	8.5	8.5
Manganese, mg/L	0.066	0.012	0.031
Mercury, mg/L	<0.0002	<0.0002	<0.0002
Methylene chloride, µg/L	<5	<5	<5
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10
N-nitrosodimethylamine, µg/L	<10	<10	<10
N-nitrosodiphenylamine, µg/L	<10	<10	<10
Naphthalene, µg/L	<10	<10	<10
Nickel, mg/L	0.05	<0.01	0.02
Nitrate nitrogen, mg/L	0.50	0.20	0.40
Nitrobenzene, µg/L	<10	<10	<10
Pentachlorophenol, µg/L	<50	<50	<50
Phenanthrene, µg/L	<10	<10	<10
Phenol, µg/L	<10	<10	<10
Potassium, mg/L	1.6	1.6	1.6
Pyrene, µg/L	<10	<10	<10
Selenium, mg/L	<0.005	<0.005	<0.005
Silver, mg/L	<0.006	<0.006	<0.006
Sodium, mg/L	5.6	3.5	4.37
Sulfate, mg/L	23	18.0	20.0
Suspended solids, mg/L	11	2.0	5.58
Tetrachloroethene, µg/L	<5	<5	<5
Toluene, µg/L	<5	<5	<5
Trichloroethene, µg/L	<5	<5	<5
Vinyl chloride, µg/L	<10	<10	<10
Zinc, mg/L	0.02	<0.001	0.008

Table 3.6 (continued)

Parameter	Concentration		
	Max	Min	Av
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10
bis(2-Ethylhexyl)phthalate, µg/L	62	<5	<15
cis-1,3-Dichloropropene, µg/L	<5	<5	<5
di-n-Octylphthalate, µg/L	<10	<10	<10
pH, standard units	8.6	7.3	
trans-1,2-Dichloroethene, µg/L	<5	<5	<5
trans-1,3-Dichloropropene, µg/L	<5	<5	<5

Table 3.7. 1990 K-25 Site concentrations at K-1710

Parameter	Concentration		
	Max	Min	Av
1,1,1-Trichloroethane, µg/L	<5	<5	<5
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5
1,1,2-Trichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethene, µg/L	<5	<5	<5
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10
1,2-Dichlorobenzene, µg/L	<10	<10	<10
1,2-Dichloroethane, µg/L	<5	<5	<5
1,2-Dichloropropane, µg/L	<5	<5	<5
1,3-Dichlorobenzene, µg/L	<10	<10	<10
1,4-Dichlorobenzene, µg/L	<10	<10	<10
2,4,6-Trichlorophenol, µg/L	<10	<10	<10
2,4-Dichlorophenol, µg/L	<10	<10	<10
2,4-Dimethylphenol, µg/L	<10	<10	<10
2,4-Dinitrophenol, µg/L	<10	<10	<10
2,4-Dinitrotoluene, µg/L	<10	<10	<10
2,6-Dinitrotoluene, µg/L	<10	<10	<10
2-Chloroethylvinyl ether, µg/L	<10	<10	<10
2-Chloronaphthalene, µg/L	<10	<10	<10
2-Chlorophenol, µg/L	<10	<10	<10
2-Nitrophenol, µg/L	<10	<10	<10
3,3'-Dichlorobenzidine, µg/L	<20	<20	<20
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50
4-Bromophenyl-phenylether, µg/L	<10	<10	<10
4-Chloro-3-methylphenol, µg/L	<10	<10	<10
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10
4-Nitrophenol, µg/L	<50	<50	<50
Acenaphthene, µg/L	<10	<10	<10
Acenaphthylene, µg/L	<10	<10	<10
Ammonia nitrogen, mg/L	0.28	<0.2	0.206
Anthracene, µg/L	<10	<10	<10
Arsenic, mg/L	<0.005	<0.005	<0.005
Benzene, µg/L	<5	<5	<5
Benzidine, µg/L	<10	<10	<10
Benzo(a)anthracene, µg/L	<10	<10	<10
Benzo(a)pyrene, µg/L	<10	<10	<10
Benzo(b)fluoranthene, µg/L	<10	<10	<10
Benzo(g,h,i)perylene, µg/L	<10	<10	<10
Benzo(k)fluoranthene, µg/L	<10	<10	<10
Bromodichloromethane, µg/L	<5	<5	<5
Bromoform, µg/L	<5	<5	<5
Bromomethane, µg/L	<10	<10	<10
Butylbenzylphthalate, µg/L	<10	<10	<10
Cadmium, mg/L	<0.002	<0.002	<0.002
Carbon tetrachloride, µg/L	<5	<5	<5
Chemical oxygen demand (COD), mg/L	15	<5	7
Chlorobenzene, µg/L	<5	<5	<5
Chloroethane, µg/L	<10	<10	<10
Chloroform, µg/L	<5	<5	<5
Chloromethane, µg/L	<10	<10	<10

Table 3.7 (continued0

Parameter	Concentration		
	Max	Min	Av
Chromium, mg/L	0.011	<0.010	0.010
Chrysene, µg/L	<10	<10	<10
Copper, mg/L	0.0057	<0.0040	<0.004
Cyanide, mg/L	<0.1	<0.1	<0.1
Di-n-butylphthalate, µg/L	<10	<10	<10
Dibenz(a,h)anthracene, µg/L	<10	<10	<10
Dibromochloromethane, µg/L	<5	<5	<5
Diethylphthalate, µg/L	<10	<10	<10
Dimethylphthalate, µg/L	<10	<10	<10
Dissolved solids, mg/L	222	86	153.5
Ethylbenzene, µg/L	<5	<5	<5
Fluoranthene, µg/L	<10	<10	<10
Fluorene, µg/L	<10	<10	<10
Fluoride, mg/L	0.6	<0.10	0.269
Hexachlorobenzene, µg/L	<10	<10	<10
Hexachlorobutadiene, µg/L	<10	<10	<10
Hexachlorocyclopentadiene, µg/L	<10	<10	<10
Hexachloroethane, µg/L	<10	<10	<10
Indeno(1,2,3-cd)pyrene, µg/L	<10	<10	<10
Isophorone, µg/L	<10	<10	<10
Lead, mg/L	0.0051	<0.0040	<0.004
Manganese, mg/L	0.21	0.063	0.129
Mercury, mg/L	<0.0002	<0.0002	<0.0002
Methylene chloride, µg/L	<5	<5	<5
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10
N-nitrosodimethylamine, µg/L	<10	<10	<10
N-nitrosodiphenylamine, µg/L	<10	<10	<10
Naphthalene, µg/L	<10	<10	<10
Nickel, mg/L	<0.05	<0.05	<0.05
Nitrate nitrogen, mg/L	2.6	0.2	1.09
Nitrobenzene, µg/L	<10	<10	<10
Pentachlorophenol, µg/L	<50	<50	<50
Phenanthrene, µg/L	<10	<10	<10
Phenol, µg/L	<10	<10	<10
Pyrene, µg/L	<10	<10	<10
Sodium, mg/L	13	1.8	7.3
Sulfate, mg/L	44	20.0	33.4
Suspended solids, mg/L	140	42	5
Tetrachloroethene, µg/L	<5	<5	<5
Toluene, µg/L	<5	<5	<5
Trichloroethene, µg/L	<5	<5	<5
Vinyl chloride, µg/L	<10	<10	<10
Zinc, mg/L	0.027	<0.001	<0.012
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10
bis(2-Ethylhexyl)phthalate, µg/L	100	<5	<20
cis-1,3-Dichloropropene, µg/L	<5	<5	<5
di-n-Octylphthalate, µg/L	<10	<10	<10
pH, standard units	8.3	7.0	
trans-1,2-Dichloroethene, µg/L	<5	<5	<5
trans-1,3-Dichloropropene, µg/L	<5	<5	<5

Table 3.8. 1990 K-25 Site concentrations at K-1770

Parameter	Concentration		
	Max	Min	Av
1,1,1-Trichloroethane, µg/L	<5	<5	<5
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5
1,1,2-Trichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethene, µg/L	<5	<5	<5
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10
1,2-Dichlorobenzene, µg/L	<10	<10	<10
1,2-Dichloroethane, µg/L	<5	<5	<5
1,2-Dichloropropane, µg/L	<5	<5	<5
1,3-Dichlorobenzene, µg/L	<10	<10	<10
1,4-Dichlorobenzene, µg/L	<10	<10	<10
2,4,6-Trichlorophenol, µg/L	<10	<10	<10
2,4-Dichlorophenol, µg/L	<10	<10	<10
2,4-Dimethylphenol, µg/L	<10	<10	<10
2,4-Dinitrophenol, µg/L	<10	<10	<10
2,4-Dinitrotoluene, µg/L	<10	<10	<10
2,6-Dinitrotoluene, µg/L	<10	<10	<10
2-Chloroethylvinyl ether, µg/L	<10	<10	<10
2-Chloronaphthalene, µg/L	<10	<10	<10
2-Chlorophenol, µg/L	<10	<10	<10
2-Nitrophenol, µg/L	<10	<10	<10
3,3'-Dichlorobenzidine, µg/L	<20	<20	<20
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50
4-Bromophenyl-phenylether, µg/L	<10	<10	<10
4-Chloro-3-methylphenol, µg/L	<10	<10	<10
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10
4-Nitrophenol, µg/L	<50	<50	<50
Acenaphthene, µg/L	<10	<10	<10
Acenaphthylene, µg/L	<10	<10	<10
Aluminum	0.54	0.54	0.54
Ammonia nitrogen, mg/L	<0.2	<0.2	<0.2
Anthracene, µg/L	<10	<10	<10
Arsenic, mg/L	<0.005	<0.005	<0.005
Barium	0.33	0.033	0.033
Benzene, µg/L	<5	<5	<5
Benzidine, µg/L	<10	<10	<10
Benzo(a)anthracene, µg/L	<10	<10	<10
Benzo(a)pyrene, µg/L	<10	<10	<10
Benzo(b)fluoranthene, µg/L	<10	<10	<10
Benzo(g,h,i)perylene, µg/L	<10	<10	<10
Benzo(k)fluoranthene, µg/L	<10	<10	<10
Beryllium	<0.0003	<0.0003	<0.0003
Bicarbonate	99	99	99
Boron	0.023	0.023	0.023
Bromodichloromethane, µg/L	<5	<5	<5
Bromoform, µg/L	<5	<5	<5
Bromomethane, µg/L	<10	<10	<10
Butylbenzylphthalate, µg/L	<10	<10	<10
Cadmium, mg/L	<0.002	<0.002	<0.002
Calcium	29	29	29
Chloride	3.7	3.7	3.7
Carbon tetrachloride, µg/L	<5	<5	<5

Table 3.8 (continued)

Parameter	Concentration		
	Max	Min	Av
Chemical oxygen demand (COD), mg/L	7	<5	5.17
Chlorobenzene, μg/L	<5	<5	<5
Chloroethane, μg/L	<10	<10	<10
Chloroform, μg/L	<5	<5	<5
Chloromethane, μg/L	<10	<10	<10
Chromium, mg/L	0.014	<0.010	0.010
Chrysene, μg/L	<10	<10	<10
Cobalt	<0.005	<0.005	<0.005
Copper, mg/L	0.014	<0.0040	0.004
Cyanide, mg/L	0.1	<0.002	<0.091
Di-n-butylphthalate, μg/L	<10	<10	<10
Dibenz(a,h)anthracene, μg/L	<10	<10	<10
Dibromochloromethane, μg/L	<5	<5	<5
Diethylphthalate, μg/L	<10	<10	<10
Dimethylphthalate, μg/L	<10	<10	<10
Dissolved solids, mg/L	158	126	143.67
Ethylbenzene, μg/L	<5	<5	<5
Fluoranthene, μg/L	<10	<10	<10
Fluorene, μg/L	<10	<10	<10
Fluoride, mg/L	0.1	<0.10	0.1
Hexachlorobenzene, μg/L	<10	<10	<10
Hexachlorobutadiene, μg/L	<10	<10	<10
Hexachlorocyclopentadiene, μg/L	<10	<10	<10
Hexachloroethane, μg/L	<10	<10	<10
Indeno(1,2,3-cd)pyrene, μg/L	<10	<10	<10
Iron	0.66	0.66	0.66
Isophorone, μg/L	<10	<10	<10
Lead, mg/L	<0.004	<0.0040	<0.004
Lithium	<0.004	<0.004	<0.004
Manganese, mg/L	0.066	0.018	0.035
Magnesium	8.2	8.2	8.2
Mercury, mg/L	<0.0002	<0.0002	<0.0002
Methylene chloride, μg/L	<5	<5	<5
N-nitroso-di-n-propylamine, μg/L	<10	<10	<10
N-nitrosodimethylamine, μg/L	<10	<10	<10
N-nitrosodiphenylamine, μg/L	<10	<10	<10
Naphthalene, μg/L	<10	<10	<10
Nickel, mg/L	0.05	<0.05	0.02
Nitrate nitrogen, mg/L	0.7	0.3	0.458
Nitrobenzene, μg/L	<10	<10	<10
Pentachlorophenol, μg/L	<50	<50	<50
Phenanthrene, μg/L	<10	<10	<10
Phenol, μg/L	<10	<10	<10
Potassium	1.7	1.7	1.7
Pyrene, μg/L	<10	<10	<10
Selenium	<0.005	<0.005	<0.005
Silver	<0.006	<0.006	<0.006
Sodium, mg/L	5.2	0.3	4.18
Sulfate, mg/L	23	18	20.83
Suspended solids, mg/L	18	2	8.33
Temperature (°C)	22.1	7.9	16.88
Thallium	<0.01	<0.01	<0.01
Tin	<0.01	<0.01	<0.01
Titanium	0.011	0.011	0.011

Table 3.8 (continued)

Parameter	Concentration		
	Max	Min	Av
Tetrachloroethene, μg/L	<5	<5	<5
Toluene, μg/L	<5	<5	<5
Trichloroethene, μg/L	<5	<5	<5
Vinyl chloride, μg/L	<10	<10	<10
Zinc, mg/L	0.02	<0.001	0.008
bis(2-Chloroethoxy)methane, μg/L	<10	<10	<10
bis(2-Chloroethyl)ether, μg/L	<10	<10	<10
bis(2-Chloroisopropyl)ether, μg/L	<10	<10	<10
bis(2-Ethylhexyl)phthalate, μg/L	370	<10	<40
cis-1,3-Dichloropropene, μg/L	<5	<5	<5
di-n-Octylphthalate, μg/L	<10	<10	<10
pH, standard units	8.8	7.1	
trans-1,2-Dichloroethene, μg/L	<5	<5	<5
trans-1,3-Dichloropropene, μg/L	<5	<5	<5

Table 3.9. 1990 K-25 Site concentrations at Mitchell Branch

Parameter	Concentration		
	Max	Min	Av
1,1,1-Trichloroethane, µg/L	<5	<5	<5
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5
1,1,2-Trichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethane, µg/L	<5	<5	<5
1,1-Dichloroethene, µg/L	<5	<5	<5
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10
1,2-Dichlorobenzene, µg/L	<10	<10	<10
1,2-Dichloroethane, µg/L	<5	<5	<5
1,2-Dichloropropane, µg/L	<5	<5	<5
1,3-Dichlorobenzene, µg/L	<10	<10	<10
1,4-Dichlorobenzene, µg/L	<10	<10	<10
2,4,6-Trichlorophenol, µg/L	<10	<10	<10
2,4-Dichlorophenol, µg/L	<10	<10	<10
2,4-Dimethylphenol, µg/L	<10	<10	<10
2,4-Dinitrophenol, µg/L	<10	<10	<10
2,4-Dinitrotoluene, µg/L	<10	<10	<10
2,6-Dinitrotoluene, µg/L	<10	<10	<10
2-Chloroethylvinyl ether, µg/L	<10	<10	<10
2-Chloronaphthalene, µg/L	<10	<10	<10
2-Chlorophenol, µg/L	<10	<10	<10
2-Nitrophenol, µg/L	<10	<10	<10
3,3'-Dichlorobenzidine, µg/L	<20	<20	<20
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50
4-Bromophenyl-phenylether, µg/L	<10	<10	<10
4-Chloro-3-methylphenol, µg/L	<10	<10	<10
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10
4-Nitrophenol, µg/L	<50	<50	<50
Acenaphthene, µg/L	<10	<10	<10
Acenaphthylene, µg/L	<10	<10	<10
Ammonia nitrogen, mg/L	0.2	<0.2	<0.2
Anthracene, µg/L	<10	<10	<10
Arsenic, mg/L	<0.005	<0.005	<0.005
Benzene, µg/L	<5	<5	<5
Benzidine, µg/L	<10	<10	<10
Benzo(a)anthracene, µg/L	<10	<10	<10
Benzo(a)pyrene, µg/L	<10	<10	<10
Benzo(b)fluoranthene, µg/L	<10	<10	<10
Benzo(g,h,i)perylene, µg/L	<10	<10	<10
Benzo(k)fluoranthene, µg/L	<10	<10	<10
Bromodichloromethane, µg/L	<5	<5	<5
Bromoform, µg/L	<5	<5	<5
Bromomethane, µg/L	<10	<10	<10
Butylbenzylphthalate, µg/L	<10	<10	<10
Cadmium, mg/L	<0.002	<0.002	<0.002
Carbon tetrachloride, µg/L	<5	<5	<5
Chemical oxygen demand (COD), mg/L	7	<5	5
Chlorobenzene, µg/L	<5	<5	<5
Chloroethane, µg/L	<10	<10	<10
Chloroform, µg/L	<5	<5	<5
Chloromethane, µg/L	<10	<10	<10

Table 3.9 (continued)

Parameter	Concentration		
	Max	Min	Av
Chromium, mg/L	0.012	<0.010	0.010
Chrysene, μg/L	<10	<10	<10
Copper, mg/L	<0.004	<0.004	<0.004
Cyanide, mg/L	<0.1	<0.1	<0.1
Di-n-butylphthalate, μg/L	<10	<10	<10
Dibenz(a,h)anthracene, μg/L	<10	<10	<10
Dibromochloromethane, μg/L	<5	<5	<5
Diethylphthalate, μg/L	<10	<10	<10
Dimethylphthalate, μg/L	<10	<10	<10
Dissolved solids, mg/L	110	24	74
Ethylbenzene, μg/L	<5	<5	<5
Fluoranthene, μg/L	<10	<10	<10
Fluorene, μg/L	<10	<10	<10
Fluoride, mg/L	<0.10	<0.10	<0.10
Hexachlorobenzene, μg/L	<10	<10	<10
Hexachlorobutadiene, μg/L	<10	<10	<10
Hexachlorocyclopentadiene, μg/L	<10	<10	<10
Hexachloroethane, μg/L	<10	<10	<10
Indeno(1,2,3-cd)pyrene, μg/L	<10	<10	<10
Isophorone, μg/L	<10	<10	<10
Lead, mg/L	<0.004	<0.0040	<0.004
Manganese, mg/L	0.18	0.029	0.09
Mercury, mg/L	<0.0002	<0.0002	<0.0002
Methylene chloride, μg/L	<5	<5	<5
N-nitroso-di-n-propylamine, μg/L	<10	<10	<10
N-nitrosodimethylamine, μg/L	<10	<10	<10
N-nitrosodiphenylamine, μg/L	<10	<10	<10
Naphthalene, μg/L	<10	<10	<10
Nickel, mg/L	<0.01	<0.01	<0.01
Nitrate nitrogen, mg/L	<0.2	<0.2	<0.2
Nitrobenzene, μg/L	<10	<10	<10
Pentachlorophenol, μg/L	<50	<50	<50
Phenanthrene, μg/L	<10	<10	<10
Phenol, μg/L	<10	<10	<10
Pyrene, μg/L	<10	<10	<10
Sodium, mg/L	1.1	0.6	0.78
Sulfate, mg/L	5	2	3.2
Suspended solids, mg/L	42	2	12.75
Tetrachloroethene, μg/L	<5	<5	<5
Toluene, μg/L	<5	<5	<5
Trichloroethene, μg/L	<5	<5	<5
Vinyl chloride, μg/L	<10	<10	<10
Zinc, mg/L	0.0068	<0.001	<0.002
bis(2-Chloroethoxy)methane, μg/L	<10	<10	<10
bis(2-Chloroethyl)ether, μg/L	<10	<10	<10
bis(2-Chloroisopropyl)ether, μg/L	<10	<10	<10
bis(2-Ethylhexyl)phthalate, μg/L	370	<10	<40
cis-1,3-Dichloropropene, μg/L	<5	<5	<5
di-n-Octylphthalate, μg/L	<10	<10	<10
pH, standard units	8.1	7.3	
trans-1,2-Dichloroethene, μg/L	<5	<5	<5
trans-1,3-Dichloropropene, μg/L	<5	<5	<5

Table 3.10. NPDES-permitted outfalls

Outfall	Effluent description
	Oak Ridge Y-12 Plant *NPDES Permit Number TN 0002968*
301	Kerr Hollow Quarry
302	Rogers Quarry
304	Bear Creek
305 ILSF	Interim Liquid Storage Facility
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
401–422	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
	Oak Ridge National Laboratory *NPDES Permit Number TN 0002941*
X01	ORNL sewage treatment plant
X02	Coal Yard Runoff Treatment Facility
X06A	1500/2000/190 Ponds
X07	Process Waste Treatment Plant (3544)
X09A	TRU/HFIR ponds
X11	Acid neutralization facility (3518)
X12	Nonradiological Wastewater Treatment Facility
X13	Melton Branch (ambient station)
X14	White Oak Creek (ambient station)
X15	White Oak Dam (ambient station)
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 3.10 (continued)

Outfall	Effluent description
	Oak Ridge K-25 Site *NPDES Permit Number TN 0002950*
K-1700 (001)	K-1407-E/F effluent, surface runoff, once-through cooling
K-1203 (005)	Sanitary wastewaters, organic industrial wastewaters
K-1007-B (006)	Potable water from once-through cooling systems, firewater from once-through systems, surface runoff, laboratory rinse waters
K-901-A (007)	Lime-softening sludges from firewater makeup treatment, surface runoff
K-710-A (008)	Sanitary wastewater (inactive)
K-1515-C (009)	Water from sludge and backwash systems associated with the potable water plant,, surface runoff
K-1407-E (010) and K-1407-F	Steam plant and coal yard effluent (since November 1988)
K-1407-J (011)	Central neutralization facility effluent (since November 1988)

Table 3.11. Radionuclide concentrations at ORNL NPDES locations in 1990

Radionuclide	Number of samples	Concentrations (pCi/L)[a]					Percentage of DCG[e]
		Max	Min	Av[b]	Standard error[c]	DCG[d]	
				Sewage Treatment Plant (X01)			
^{60}Co	12	38	−30	5.9	5.1	5,000	*f*
^{137}Cs	12	54	−38	6.7	6.7	3,000	*f*
Gross beta	12	510	150	270*	34	*f*	*f*
Total Sr[g]	12	270	62	130*	21	1,000	13
				190 Ponds, 1500 Area and 2000 Area (X06A)			
^{60}Co	2	24	19	22*	2.7	5,000	0.42
^{137}Cs	2	49	16	32	16	3,000	*f*
Gross alpha	2	30	−2.2	14	16	*f*	*f*
Gross beta	2	190	24	110	81	*f*	*f*
Total Sr[g]	2	78	15	47	32	1,000	*f*
				Process Waste Treatment Plant (X07)			
^{60}Co	3	180	24	86	46	5,000	*f*
^{137}Cs	3	2,100	1,300	1,700*	230	3,000	57
Gross alpha	3	210	43	120	48	*f*	*f*
Gross beta	3	2,000	1,500	1,800*	140	*f*	*f*
Total Sr[g]	3	540	1.1	260	160	1,000	*f*
				HFIR and REDC Ponds (X09A)			
^{60}Co	2	220	150	180	32	5,000	*f*
^{137}Cs	2	11	11	11*	0	3,000	0.36
Gross alpha	2	24	0.27	12	12	*f*	*f*
Gross beta	2	540	510	530*	14	*f*	*f*
Total Sr[g]	2	15	3.8	9.5	5.7	1,000	*f*
				Acid Neutralization Facility (X11)			
Gross alpha	2	76	7.3	41	34	*f*	*f*
Gross beta	2	78	19	49	30	*f*	*f*
				Nonradiological Wastewater Treatment Facility (X12)			
^{60}Co	11	78	−54	14	13	5,000	*f*
^{137}Cs	11	1,100	590	770*	48	3,000	26
Gross alpha	11	26	5.4	13*	2.0	*f*	*f*
Gross beta	11	860	250	620*	55	*f*	*f*
Total Sr[g]	11	32	8.4	20*	2.9	1,000	2.0
^{3}H	11	30,000	14,000	24,000*	1,300	2,000,000	1.2
				Melton Branch 1 (X13)			
^{60}Co	12	51	−16	18*	7.1	5,000	0.35
^{137}Cs	12	49	−24	10	7.6	3,000	*f*
Total Sr[g]	12	920	250	460*	53	1,000	46
^{3}H	12	1,600,000	300,000	810,000*	92,000	2,000,000	40

Table 3.11 (continued)

Radionuclide	Number of samples	Concentrations (pCi/L)[a]					Percentage of DCG[e]
		Max	Min	Av[b]	Standard error[c]	DCG[d]	
				White Oak Creek (X14)			
^{60}Co	12	41	−59	−6.8	9.6	5,000	*f*
^{137}Cs	12	890	22	140*	69	3,000	4.6
Total Sr[g]	12	250	68	130*	14	1,000	13
^{3}H	12	180,000	9,700	73,000*	13,000	2,000,000	3.7
				White Oak Dam (X15)			
^{60}Co	52	62	−11	8.2*	1.4	5,000	0.16
^{137}Cs	52	380	7.8	47*	7.5	3,000	1.6
Gross alpha	52	30	−28	6.1*	1.2	*f*	*f*
Gross beta	52	780	27	420*	20	*f*	*f*
^{191}Os	1	89	89	89*	*f*	70,000	0.13
^{238}Pu	1	−0.081	−0.081	−0.081	*f*	40	*f*
^{239}Pu	1	−0.081	−0.081	−0.081	*f*	30	*f*
Total Sr[g]	12	300	140	200*	13	1,000	20
Total U (mg/L)	1	0.0036	0.0036	0.0036*	*f*	*f*	*f*
^{3}H	12	300,000	97,000	190,000*	19,000	2,000,000	9.6
^{234}U	1	5.1	5.1	5.1*	*f*	500	1.0
^{235}U	1	1.7	1.7	1.7*	*f*	600	0.29
^{238}U	1	0.92	0.92	0.92*	*f*	600	0.15

[a]Multiply pCi/L by 0.037 to convert to Bq/L.

[b]Mean concentrations significantly greater than zero are identified by an asterisk (*).

[c]Standard error of the mean.

[d]Derived concentration guide (DCG) for ingestion of water (from DOE Order 5400.5).

[e]Mean concentration as a percentage of the derived concentration guide, calculated only when a DCG exists and mean concentration is significantly greater than zero.

[f]Not applicable.

[g]Total radioactive Sr ($^{89}Sr + ^{90}Sr$).

Table 3.12. 1990 K-25 Site radiological effluent at K-1203

Radionuclide	Emission source (Ci)	DCG (pCi/L)	Average concentration (pCi/L)	Percentage of DCG
^{99}Tc	-6.41×10^{-3a}	100,000	-6.10×10^{1a}	<0.01
^{234}U	3.46×10^{-3}	500	3.29×10^{1}	0.07
^{235}U	1.11×10^{-4}	600	1.06	0.02
^{236}U	1.88×10^{-3}	500	1.79×10^{1}	3.57
^{238}U	1.85×10^{-3}	600	1.76×10^{1}	2.94

[a]Because of the intrinsic uncertainties associated with making radiation measurements, it is possible to subtract a background value from a sample result and obtain a negative number. Statistical summaries previously used detection limits to represent sample results even when samples were less than detection limits, which resulted in high biases. To remove these biases and to enable statistical summaries to be equally representative of all component values, recent changes in reporting methods include accepting all results at face value.

Table 3.13. 1990 K-25 Site radiological effluent at K-1700

Radionuclide	Emission source (Ci)	DCG (pCi/L)	Average concentration (pCi/L)	Percentage of DCG
^{237}Np	4.95×10^{-4}	30	5.19	17.30
^{239}Pu	1.07×10^{-3}	30	1.12×10^{1}	37.40
^{99}Tc	1.17×10^{-1}	100,000	1.23×10^{3}	1.23
^{137}C	-8.09×10^{-3a}	3,000	-8.49×10^{1a}	<0.01
^{234}U	2.63×10^{-3}	500	2.76×10^{1}	5.52
^{235}U	8.97×10^{-5}	600	9.41×10^{-1}	0.16
^{236}U	4.62×10^{-5}	500	4.85×10^{-1}	0.10
^{238}U	1.40×10^{-3}	600	1.47×10^{1}	2.45

[a]Because of the intrinsic uncertainties associated with making radiation measurements, it is possible to subtract a background value from a sample result and obtain a negative number. Statistical summaries previously used detection limits to represent sample results even when samples were less than detection limits, which resulted in high biases. To remove these biases and to enable statistical summaries to be equally representative of all component values, recent changes in reporting methods include accepting all results at face value.

Table 3.14. 1990 K-25 Site radiological effluent at K-1007-B

Radionuclide	Emission source (Ci)	DCG (pCi/L)	Average concentration (pCi/L)	Percentage of DCG
^{237}Np	-3.50×10^{-3}[a]	30	−4.35[a]	<0.01
^{239}Pu	5.50×10^{-5}	30	6.84×10^{-2}	0.02
^{99}Tc	1.19×10^{-1}	100,000	1.48×10^{2}	0.01
^{137}Cs	-2.55×10^{-3}[a]	3,000	−3.17[a]	<0.01
^{234}U	1.70×10^{-3}	500	7.04×10^{-1}	0.01
^{235}U	5.71×10^{-5}	600	2.37×10^{-2}	<0.01
^{236}U	1.01×10^{-5}	500	4.18×10^{-3}	<0.01
^{238}U	9.07×10^{-4}	600	3.76×10^{-1}	0.06

[a]Because of the intrinsic uncertainties associated with making radiation measurements, it is possible to subtract a background value from a sample result and obtain a negative number. Statistical summaries previously used detection limits to represent sample results even when samples were less than detection limits, which resulted in high biases. To remove these biases and to enable statistical summaries to be equally representative of all component values, recent changes in reporting methods include accepting all results at face value.

Table 3.15. 1990 K-25 Site radiological effluent at K-901A

Radionuclide	Emission source (Ci)	DCG (pCi/L)	Average concentration (pCi/L)	Percentage of DCG
^{237}Np	-1.74×10^{-5}[a]	30	-8.00×10^{-2}[a]	<0.01
^{239}Pu	-2.88×10^{-4}[a]	30	−1.32[a]	<0.01
^{99}Tc	1.24×10^{-1}	100,000	5.69×10^{2}	0.57
^{137}Cs	1.56×10^{-4}	3,000	7.16×10^{-1}	0.02
^{234}U	5.14×10^{-4}	500	2.36	0.47
^{235}U	1.56×10^{-5}	600	7.14×10^{-2}	0.01
^{236}U	3.78×10^{-6}	500	1.73×10^{-2}	<0.001
^{238}U	2.75×10^{-4}	600	1.26	0.21

[a]Because of the intrinsic uncertainties associated with making radiation measurements, it is possible to subtract a background value from a sample result and obtain a negative number. Statistical summaries previously used detection limits to represent sample results even when samples were less than detection limits, which resulted in high biases. To remove these biases and to enable statistical summaries to be equally representative of all component values, recent changes in reporting methods include accepting all results at face value.

Table 3.16. 1990 K-25 Site radiological effluent at K-1407-J

Radionuclide	Emission source (Ci)	DCG (pCi/L)	Average concentration (pCi/L)	Percentage of DCG
^{237}Np	-3.11×10^{-5}[a]	30	−3.73[a]	<0.01
^{239}Pu	1.42×10^{-4}	30	1.71×10^{1}	56.90
^{99}Tc	9.37×10^{-2}	100,000	1.12×10^{4}	11.20
^{137}Cs	5.93×10^{-4}	3,000	7.11×10^{1}	2.37
^{234}U	1.44×10^{-3}	500	1.72×10^{2}	34.50
^{235}U	7.17×10^{-5}	600	8.59	1.43
^{236}U	1.80×10^{-5}	500	2.16	0.43
^{238}U	7.23×10^{-4}	600	8.67×10^{1}	14.50

[a]Because of the intrinsic uncertainties associated with making radiation measurements, it is possible to subtract a background value from a sample result and obtain a negative number. Statistical summaries previously used detection limits to represent sample results even when samples were less than detection limits, which resulted in high biases. To remove these biases and to enable statistical summaries to be equally representative of all component values, recent changes in reporting methods include accepting all results at face value.

Table 3.17. 1990 K-25 Site radiological effluent at K-1407-E/F[a]

Radionuclide	Emission source (Ci)	DCG (pCi/L)	Average concentration (pCi/L)	Percentage of DCG
^{237}Np	-2.21×10^{-6}[b]	30	-1.80×10^{-1}[b]	<0.01
^{239}Pu	-1.83×10^{-5}[b]	30	−1.49[b]	<0.01
^{99}Tc	-2.04×10^{-3}[b]	100,000	-1.66×10^{2}[b]	<0.01
^{137}Cs	2.94×10^{-4}	3,000	2.39×10^{1}	0.08
^{234}U	7.65×10^{-6}	500	6.22×10^{-1}	0.01
^{235}U	2.46×10^{-7}	600	2.00×10^{-2}	<0.01
^{236}U	8.69×10^{-8}	500	7.07×10^{-3}	<0.01
^{238}U	4.10×10^{-6}	600	3.33×10^{-1}	0.06

[a]Data are for December 1990 only.

[b]Because of the intrinsic uncertainties associated with making radiation measurements, it is possible to subtract a background value from a sample result and obtain a negative number. Statistical summaries previously used detection limits to represent sample results even when samples were less than detection limits, which resulted in high biases. To remove these biases and to enable statistical summaries to be equally representative of all component values, recent changes in reporting methods include accepting all results at face value.

Table 3.18. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 301[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Total suspended solids	13	<5	<5	<5	0
Mercury	14	0.0009	<0.0002	<0.0003	0.0001
Lithium	14	0.022	<0.001	<0.013	0.002
Zirconium	14	<0.01	<0.002	<0.003	0.001
Potassium	14	1.3	<0.5	<0.9	0.1
Sodium	14	0.79	0.58	0.63	0.01
pH, standard units	14	8.3	7.2	*b*	0.1
Arsenic	14	<0.04	<0.04	<0.04	0.00
Cadmium	14	<0.004	<0.003	<0.003	0.000
Chromium	14	<0.006	<0.006	<0.006	0.000
Copper	14	<0.006	<0.002	<0.002	0.000
Iron	14	0.14	0.04	0.07	0.01
Nickel	14	0.11	<0.007	<0.014	0.007
Selenium	13	<0.002	<0.0004	<0.0018	0.0002
Zinc	14	0.012	<0.001	<0.006	0.001
Lead	14	<0.02	<0.02	<0.02	0.00
Temperature, °C	14	14	7.9	10.3	0.5
Flow, GPM[c]	13	1680	8	247	124

[a]Y-12 Plant, Kerr Hollow Quarry.
[b]Not applicable.
[c]Flow during operations and/or discharging.

Table 3.19. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 302[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Total suspended solids	52	10.0	<5.0	<5.3	0.1
Chemical oxygen demand (COD)	52	16	<5	<6	0
Sulfate	52	49	23	32	1
Oil and grease	52	18	<2	<3	0
Settleable solids, ml/L	52	<0.1	<0.1	<0.1	0.0
Selenium	52	0.007	<0.002	<0.004	0.000
Mercury	52	0.0039	<0.0002	<0.0003	0.0001
Arsenic	52	0.08	<0.04	<0.05	0.00
Cadmium	52	<0.004	<0.003	<0.003	0.000
Chromium	52	<0.006	<0.006	<0.006	0.000
Copper	52	0.021	<0.002	<0.004	0.000
Iron	52	0.99	<0.02	<0.11	0.02
Nickel	52	0.111	<0.007	<0.009	0.002
Zinc	52	0.216	<0.001	<0.008	0.004
Lead	52	<0.02	<0.02	<0.02	0.00
pH, standard units	52	9.0	7.1	*b*	0.1
Temperature, °C	52	28.4	5.5	17.9	1.0
Turbidity, NTU	52	12.00	0.40	2.25	0.29
Flow, Mgd[c]	365	10.46	0.09	1.00	0.07

[a]Y-12 Plant, Roger's Quarry.
[b]Not applicable.
[c]Flow during operations and/or discharging.

Table 3.20. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 304[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Oil and grease	52	23.0	<2.0	<3.0	0.5
Biochemical oxygen demand	51	5.3	<5.0	<5.0	0.0
Chemical oxygen demand	52	23	<5	<7	1
Total dissolved solids	52	2300	100	251	43
Total suspended solids	59	280.0	5.0	25.2	7.5
Nitrate (as N)	52	37.0	0.6	5.2	0.76
Conductivity, μmhos/cm	52	460	180	317	10
Dissolved oxygen	56	12.8	6.2	9.2	0.2
Turbidity, NTU	50	30.0	2.2	6.2	0.7
pH, standard units	73	8.4	7.2	*b*	0.0
Flow, Mgd[c]	362	31.54	0.01	5.48	0.34

[a]Y-12 Plant, Bear Creek.
[b]Not applicable.
[c]Flow during operations and/or discharging.

Table 3.21. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 305 ILSF[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Oil and grease	8	<2	<2	<2	0
Total suspended solids	8	<5	<5	<5	0
Mercury	8	<0.0002	<0.0002	<0.0002	0.0000
pH, standard units	8	8.7	7.0	*b*	0.2
Beryllium	8	<0.0001	<0.0001	<0.0001	0.0000
Cadmium	8	<0.003	<0.003	<0.003	0.000
Lead	8	<0.02	<0.02	<0.02	0.00
Silver	8	<0.004	<0.004	<0.004	0.000
Flow, GPM[c]	8	46.24	35.14	40.39	1.76

[a]Y-12 Plant, Interim Liquid Storage Facility.
[b]Not applicable.
[c]Flow during operations and/or discharging.

Table 3.22. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 307[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
pH, standard units	4	8.9	7	*b*	0.4
Ammonia (as N)	4	0.64	<0.02	<0.31	0.11
Total suspended solids	4	48	<5	<18	10
Total organic carbon	4	9.5	<2.0	<4.3	1.7
Chemical oxygen demand	4	38	6	15	8
Biochemical oxygen demand	3	22	<5	<11	6
Color, ACU	4	250	10	95	55
Oil and grease	4	3	2	2	0
Flow, GPM[c]	1	15.85	15.85	15.85	*b*

[a]Y-12 Plant, West Borrow Area.
[b]Not applicable.
[c]Flow during operations and/or discharging.

Table 3.23. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 308[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
pH, standard units	4	8.2	7.5	*b*	0.2
Ammonia, as N	4	<0.2	<0.2	<0.2	0
Total suspended solids	4	19	<5	<14	3
Total organic carbon	4	8.6	<2.0	<3.9	1.6
Chemical oxygen demand	4	16	<5	<8	3
Biochemical oxygen demand	3	<5	<5	<5	0
Color, ACU	4	100	10	65	22
Oil and grease	4	2	<2	<2	0
Flow, GPM[c]	2	5.28	0.33	2.81	2.48

[a]Y-12 Plant, East Borrow Area.

[b]Not applicable.

[c]Flow during operations and/or discharging.

Table 3.24. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 501[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Oil and grease	45	91	<2	<7	2
Cyanide	45	0.029	<0.002	<0.004	0.001
Copper	45	0.087	<0.002	<0.016	0.003
Chromium	45	<0.030	<0.006	<0.007	0.001
Lead	45	<0.10	<0.02	<0.02	0.00
Nickel	45	1.710	0.008	0.433	0.058
Temperature, °C	45	28.31	1.12	1.6	0.6
Cadmium	45	<0.020	<0.003	<0.004	0.000
Zinc	45	1.010	<0.001	<0.089	0.024
Total toxic organics	45	2.000	<0.010	<0.099	0.048
Total suspended solids	45	94.0	<5.0	<10.0	2.0
Silver	45	<0.030	<0.004	<0.005	0.001
pH, standard units	46	10.1	6.1	*b*	0.1
Color, ACU	45	100	<5	<26	4
Sodium	45	981.0	24.9	250.8	29.3
Nitrate (as N)	45	4.10	<0.10	<0.43	0.13
Surfactants, as MBAS	45	0.18	<0.05	<0.05	0.00
Beryllium	45	<0.0020	<0.0001	<0.0002	0.0000
Phosphorus	45	223.00	<0.10	<10.96	6.16
Chlorides	44	540	10	165	19
Phenols	45	0.150	<0.001	<0.013	0.004
Sulfates	45	4,300	1,100	2,013	88
Fluorides	45	3.80	0.16	0.98	0.11
Aluminum	45	1.33	<0.01	<0.22	0.04
Iron	45	9.93	<0.02	<1.36	0.30
Mercury	45	0.0077	<0.0002	<0.0004	0.0002
Flow, GPD[c]	45	20,963	482	11,570	555

[a]Y-12 Plant, Central Pollution Control Facility.

[b]Not applicable.

[c]Flow during operations and/or discharging.

Table 3.25. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 502[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Silver	83	<0.030	<0.004	<0.020	0.001
Cadmium	83	<0.020	<0.003	<0.017	0.001
Cyanide	80	0.980	<0.002	<0.068	0.018
Chromium	83	<0.030	<0.006	<0.026	0.001
Copper	83	1.880	0.003	0.176	0.032
Nickel	83	5.27	0.30	1.26	0.09
Lead	83	0.32	<0.02	<0.09	0.00
Zinc	83	1.880	0.052	0.334	0.034
Total toxic organics	26	0.900	<0.010	<0.081	0.042
Total suspended solids	83	73.0	<5.0	<23.0	2.3
Oil and grease	77	240	<2	<6	3
Temperature, °C	78	29.8	12.6	21.9	0.5
pH, standard units	78	8.9	7.5	*b*	0.0
Arsenic	83	0.20	<0.02	<0.18	0.01
Aluminum	83	4.47	0.12	1.04	0.08
Mercury	83	0.0022	<0.0002	<0.0003	0.0000
Beryllium	83	0.0020	<0.0001	<0.0009	0.0001
Sulfate	83	30,000	16,000	21,530	392
Barium	83	0.092	<0.002	<0.029	0.003
Nitrates	83	8.50	<0.10	<0.28	0.10
Fluorides	83	140	46	70	2
Calcium	83	105.00	3.54	17.49	1.41
Residual chlorine	77	<0.10	0.01	<0.08	0.00
Phosphorus	83	28.00	<0.06	<8.19	0.57
Iron	83	1.90	<0.02	<0.44	0.03
Cobalt	83	0.150	0.010	0.045	0.003
Magnesium	83	64.7	8.0	37.8	1.6
Manganese	83	0.283	0.007	<0.052	0.005
Molybdenum	83	1.35	0.12	0.67	0.04
Sodium	83	16,100	9,050	11,240	166
Chloride	83	1,700	980	1,414	17
Potassium	83	534	62	309	9
Flow, GPD[c]	94	29,200	700	17,445	778

[a]Y-12 Plant, West End Treatment Facility.

[b]Not applicable.

[c]Flow during operations and/or discharging.

Table 3.26. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 503[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Oil and grease	156	16	<2	<2	0
Phenols	156	0.018	<0.001	<0.003	0.000
Mercury	157	0.0033	<0.0002	<0.0002	0.0000
Selenium	157	0.023	<0.0004	<0.002	0.000
Chloride	157	920	48	288	13
Fluoride	157	18.0	<0.9	<2.8	0.1
Total suspended solids	157	50	<5	<7	0
Sulfate	157	2,600	430	1,449	34
Sulfide	156	1.7	<1	<1	0
Temperature, °C	159	29.4	12.9	22.0	0.3
pH, standard units	159	11.0	6.2	*b*	0
Aluminum	158	4.20	<0.01	<0.38	0.05
Arsenic	158	<0.20	<0.04	<0.06	0.00
Barium	158	0.168	0.022	0.092	0.003
Beryllium	158	<0.0020	<0.0001	<0.0003	0.0000
Boron	158	0.120	0.014	0.043	0.001
Cadmium	158	<0.020	<0.003	<0.005	0.000
Calcium	158	1,118	128	594	15
Cerium	158	<0.08	<0.02	<0.03	0.00
Chromium	158	<0.030	<0.006	<0.008	0.001
Cobalt	158	0.010	<0.002	<0.003	0.000
Copper	158	<0.030	<0.002	<0.008	0.001
Gallium	158	<0.09	<0.01	<0.02	0.00
Iron	158	1.84	<0.06	<0.36	0.02
Lanthanum	12	<0.003	<0.003	<0.003	0.000
Lead	158	<0.20	<0.02	<0.03	0.00
Lithium	158	0.123	0.003	<0.044	0.002
Magnesium	158	36.30	0.21	5.60	0.54
Manganese	158	0.036	<0.001	<0.009	0.001
Molybdenum	158	0.179	<0.006	<0.010	0.001
Nickel	158	0.346	<0.007	<0.015	0.003
Niobium	158	<0.05	<0.01	<0.01	0.00
Phosphorus	158	3.20	<0.06	<0.88	0.03
Potassium	158	17.0	2.5	8.3	0.2
Scandium	158	<0.0020	<0.0004	<0.0006	0.0000
Silver	158	<0.030	<0.004	<0.007	0.001
Sodium	158	543	91	228	6
Strontium	158	0.924	0.123	0.555	0.013
Thorium	158	<0.05	<0.01	<0.01	0.00
Titanium	158	<0.060	<0.002	<0.009	0.001
Vanadium	158	<0.020	<0.004	<0.006	0.000
Zinc	158	0.380	<0.001	<0.024	0.003
Zirconium	157	<0.050	<0.002	<0.008	0.001
Flow, gal/d[c]	362	332,800	9,000	131,480	3,329

[a]Y-12 Plant, Steam Plant Wastewater Treatment Facility.

[b]Not applicable.

[c]Flow during operations and/or discharging.

Table 3.27. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 504[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Silver	20	<0.006	<0.004	<0.005	0.000
Cadmium	20	<0.004	<0.003	<0.003	0.000
Cyanide	20	0.014	<0.002	<0.004	0.001
Chromium	20	<0.006	<0.006	<0.006	0.000
Copper	20	0.021	<0.002	<0.008	0.001
Nickel	20	1.610	0.011	0.404	0.106
Lead	20	<0.02	<0.02	<0.02	0.00
Zinc	20	0.312	0.004	0.072	0.022
Total toxic organics	20	0.50	<0.01	<0.07	0.03
Total suspended solids	20	18.0	<5.0	<6.1	0.7
Oil and grease	20	6.0	<2.0	<2.3	0.2
Temperature, °C	20	29.0	18.8	24.7	0.6
pH, standard units	20	8.5	6.3	*b*	0.1
Aluminum	20	2.44	0.06	0.29	0.12
Mercury	20	0.0004	<0.0002	<0.0002	0.0000
Beryllium	20	<0.0004	<0.0001	<0.0002	0.0000
Sulfate	20	630	42	176	33
Nitrate (as N)	20	4.90	<0.10	<0.91	0.26
Fluoride	20	1.40	0.41	0.80	0.06
Phosphorus	20	32.40	0.10	2.77	1.61
Iron	20	5.55	0.10	1.08	0.33
Sodium	20	281.0	17.2	62.3	12.5
Chloride	20	95	5	32	5
Potassium	20	47.3	1.5	9.7	2.4
Flow, gal/d[c]	20	29,560	1,705	20,374	1,338

[a]Y-12 Plant, Plating Rinsewater Treatment Facilities.

[b]Not applicable.

[c]Flow during operations and/or discharging.

Table 3.28. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 501/504[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Oil and grease	8	3	<2	<2	0
Cyanide	8	0.006	<0.002	<0.003	0.001
Chromium	8	<0.030	<0.006	<0.009	0.003
Copper	8	0.032	<0.002	<0.017	0.004
Lead	8	<0.10	<0.02	<0.03	0.01
Nickel	8	0.848	<0.040	<0.358	0.112
Temperature, °C	8	26.3	18.7	24.1	0.8
Cadmium	8	<0.020	<0.003	<0.005	0.002
Zinc	8	0.187	0.009	0.081	0.024
Total toxic organics	8	0.023	<0.010	<0.013	0.002
Total suspended solids	8	16	<5	<7	1
Silver	8	<0.030	<0.004	<0.007	0.003
pH, standard units	8	8.4	6.3	*b*	0.2
Potassium	8	132.0	10.8	62.0	15.0
Sodium	8	326.0	73.5	143.6	28.6
Nitrate (as N)	8	20.00	<0.10	<2.84	2.46
Fluorides	8	2.10	0.73	1.22	0.16
Aluminum	8	0.30	<0.01	<0.13	0.03
Iron	8	6.55	0.08	<1.17	0.77
Mercury	8	0.0003	<0.0002	<0.0002	0.0000
Beryllium	8	<0.0020	<0.0001	<0.0003	0.0002
Potassium	8	14.00	0.50	3.67	2.03
Chlorides	8	2,203	1	83	21
Sulfates	8	2,300	460	956	205
Phenols	8	0.027	<0.001	<0.009	0.004
Color, ACU	8	50	<5	<24	6
Flow, GPD	8	36,204	8,930	23,034	3,804

[a]Y-12 Plant, Central Pollution Control Facility/Plating Rinsewater Treatment Facility.
[b]Not applicable.
[c]Flow during operations and/or discharging.

Table 3.29. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 506[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Oil and grease	53	9	<2	<2	0
pH, standard units	53	8.4	7.2	*b*	0.0
Temperature, °C	54	32.1	20.4	25.1	0.3
Flow, GPM[c]	54	50	50	50	0

[a]Y-12 Plant, Building 9204-3 Sump Pump Oil Separator.
[b]Not applicable.
[c]Flow during operations and/or discharging.

Table 3.30. CY 1990 NPDES Permit Number TN 002968

Cooling towers[a]

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		602				
Temperature, °C	4		25.8	24.1	25.1	0.4
pH, standard units	4		8.4	8.1	*b*	0.1
Free chlorine	4		0.20	0.10	0.16	0.03
Chromium	4		<0.006	<0.006	<0.006	0.000
Copper	4		0.046	0.018	0.029	0.007
Zinc	4		0.07	0.04	0.05	0.01
Flow, gal/d[c]	4		18,934	6,920	11,530	2,617
		604				
Temperature, °C	4		24.1	14.9	18.3	2.0
pH, standard units	4		8.4	8.2	*b*	0.1
Free chlorine	4		<0.10	0.02	<0.06	0.03
Chromium	4		<0.0006	<0.006	<0.006	0.000
Copper	4		0.014	0.011	0.013	0.007
Zinc	4		0.85	0.03	0.35	0.01
Flow, gal/d[c]	4		37,843	4,244	19,798	7,420
		610				
Temperature, °C	4		29.3	26.3	28.0	0.6
pH, standard units	4		8.4	8.3	*b*	0.0
Free chlorine	4		<0.10	0.01	<0.06	0.02
Chromium	4		<0.006	<0.006	<0.006	0.000
Copper	4		0.023	0.013	0.017	0.002
Zinc	4		0.10	0.04	0.08	0.01
Flow, gal/d[c]	4		17,290	8,625	13,106	1,785
		612				
Temperature, °C	4		24.6	13.0	18.8	5.8
pH, standard units	4		8.4	8.4	*b*	0.0
Free chlorine	4		0.04	0.02	0.03	0.01
Chromium	4		<0.006	<0.006	<0.006	0.000
Copper	4		0.017	0.011	0.014	0.003
Zinc	4		0.13	0.11	0.12	0.01
Flow, gal/d[c]	2		53,820	15,377	34,599	19,222
		613				
Temperature, °C	3		26.4	23.9	25.0	0.7
pH, standard units	3		8.5	8.2	*b*	0.1
Free chlorine	4		0.20	0.05	0.11	0.03
Chromium	4		<0.006	<0.006	<0.006	0.000
Copper	4		0.023	0.016	0.021	0.002
Zinc	4		0.10	0.05	0.06	0.01
Flow, gal/d[c]	4		40,270	21,015	33,721	4,314

Table 3.30 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		615				
Temperature, °C	4		24.5	16.5	19.9	1.7
pH, standard units	4		8.5	8.1	*b*	0.1
Free chlorine	4		0.15	0.02	0.08	0.03
Chromium	4		<0.006	<0.006	<0.006	0.000
Copper	4		0.048	0.016	0.031	0.007
Zinc	4		0.27	0.11	0.19	0.03
Flow, gal/d[c]	4		8,930	2,587	4,678	1,438
		617				
Temperature, °C	4		26.2	13.7	20.1	2.6
pH, standard units	4		8.5	8.2	*b*	0.1
Free chlorine	4		0.10	0.02	0.07	0.02
Chromium	4		0.008	<0.006	<0.007	0.000
Copper	4		0.035	0.022	0.028	0.003
Zinc	4		0.12	0.04	0.07	0.02
Flow, gal/d[c]	4		12,280	3,565	6,220	2,033
		618				
Temperature, °C	4		26.9	25.5	26.1	0.3
pH, standard units	4		8.3	8.0	*b*	0.1
Free chlorine	4		0.43	0.01	0.15	0.10
Chromium	4		0.006	<0.006	<0.006	0.000
Copper	4		0.049	0.031	0.038	0.004
Zinc	4		0.10	0.04	0.07	0.01
Flow, gal/d[c]	4		19,863	12,290	15,817	1,736
		619				
Temperature, °C	3		25.1	22.4	24.1	0.8
pH, standard units	3		8.1	2.6	*b*	1.8
Free chlorine	3		0.10	0.01	0.04	0.03
Chromium	3		0.024	<0.006	<0.012	0.006
Copper	3		0.217	0.050	0.109	0.054
Zinc	3		1.03	0.08	0.41	0.31
Flow, gal/d[c]	2		14,969	11,592	13,281	1,689
		620				
Temperature, °C	4		26.5	22.2	24.1	0.9
pH, standard units	4		8.5	7.2	*b*	0.3
Free chlorine	3		0.20	0.01	0.08	0.06
Chromium	4		<0.006	<0.006	<0.006	0.000
Copper	4		0.078	0.029	0.052	0.013
Zinc	4		1.65	0.13	0.70	0.33
Flow, gal/d[c]	3		15,810	1,771	6,563	4,625

Table 3.30 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		622				
Temperature, °C	4		30.3	20.0	25.5	2.1
pH, standard units	4		8.5	8.1	*b*	0.1
Free chlorine	4		<0.10	0.03	<0.07	0.02
Chromium	4		<0.006	<0.006	<0.006	0.000
Copper	4		0.020	0.009	0.013	0.002
Zinc	4		0.07	0.04	0.05	0.01
Flow, gal/d[c]	4		43,550	10,008	22,866	7,682
		626				
Temperature, °C	3		24.9	15.1	19.7	1.9
pH, standard units	3		8.3	8.2	*b*	0.0
Free chlorine	3		<0.10	0.02	<0.05	0.03
Chromium	3		0.117	0.075	0.093	0.013
Copper	3		0.052	0.034	0.044	0.005
Zinc	3		0.10	0.10	0.10	0.00
Flow, gal/d[c]	4		29,380	5,655	12,839	5,617
		628				
Temperature, °C	3		31.1	25.4	28.8	1.7
pH, standard units	3		8.4	7.9	*b*	0.2
Free chlorine	3		<0.10	0.01	<0.07	0.03
Chromium	3		0.076	0.011	0.033	0.022
Copper	3		0.058	0.020	0.035	0.012
Zinc	3		0.18	0.06	0.11	0.04
Flow, gal/d[c]	4		15,093	3,570	11,611	2,623
		630				
Temperature, °C	4		24.1	20.2	21.8	0.9
pH, standard units	4		8.4	7.9	*b*	0.1
Free chlorine	4		0.15	0.02	0.09	0.03
Chromium	3		<0.020	0.009	<0.013	0.001
Copper	4		0.027	0.017	0.024	0.002
Zinc	4		0.10	0.07	0.08	0.01
Flow, gal/d[c]	4		12,160	2,300	5,302	2,300
		634				
Temperature, °C	4		25.5	21.4	23.8	0.9
pH, standard units	4		8.5	8.1	*b*	0.1
Free chlorine	4		0.15	0.02	0.08	0.03
Chromium	4		<0.006	<0.006	<0.006	0.000
Copper	4		0.029	0.005	0.015	0.005
Zinc	4		0.13	0.03	0.08	0.02
Flow, gal/d[c]	4		73,600	8,406	44,574	15,493

[a]Y-12 Plant.
[b]Not applicable.
[c]Flow during operations and/or discharging.

Table 3.31. CY 1990 NPDES Permit Number TN 002968

Discharge Point = 623[a]

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
pH, standard units	44	8.5	4.3	*b*	0.1
Flow, gpd[c]	167	1,656,000	34,500	402,707	28,386

[a]Y-12 Plant, Kerr Hollow Quarry.
[b]Not applicable.
[c]Flow during operations and/or discharging.

Table 3.32. CY 1990 Permit Number Tn. 0002968

Category I Outfalls[a]

Outfall	Number of samples	pH (standard units)				Flow[b] (GPD)			
		Max	Min	Av	Standard error	Max	Min	Av	Standard error
01	0	*c*	*c*	*c*	*d*	*c*	*c*	*c*	*d*
03	0	*c*	*c*	*c*	*d*	*c*	*c*	*c*	*d*
06	0	*c*	*c*	*c*	*d*	*c*	*c*	*c*	*d*
07	0	*c*	*c*	*c*	*d*	*c*	*c*	*c*	*d*
09	0	*c*	*c*	*c*	*d*	*c*	*c*	*c*	*d*
11	0	*c*	*c*	*c*	*d*	*c*	*c*	*c*	*d*
12	0	*c*	*c*	*c*	*d*	*c*	*c*	*c*	*d*
15	0	*c*	*c*	*c*	*d*	*c*	*c*	*c*	*d*
17	1	7.5	7.5	*d*	0	28,600	28,600	28,600	0
18	1	7.9	7.9	*d*	0	95	95	95	0
19	1	7.8	7.8	*d*	0	5,707	5,707	5,707	0
41	1	7.8	7.8	*d*	0	2,282	2,282	2,282	0
57	1	7.8	7.8	*d*	0	761	761	761	0
62	1	7.9	7.9	*d*	0	1,500	1,500	1,500	0
63	0			*d*	0				
86	1	7.4	7.4	*d*	0	3,804	3,804	3,804	0
108	1	8.0	8.0	*d*	0	190	190	190	0
134	1	8.0	8.0	*d*	0	2,282	2,282	2,282	0
202	1	7.1	7.1	*d*	0	1,141	1,141	1,141	0
224	1	7.7	7.7	*d*	0	8,409	8,409	8,409	0
235	1	8.3	8.3	*d*	0	1,522	1,522	1,522	0
236	1	8.4	8.4	*d*	0	11,822	11,822	11,822	0

[a]Y-12 Plant, Category I Outfalls.
[b]Flow during operations and/or discharging.
[c]No flow.

Table 3.33. CY 1990 NPDES Permit Number TN 0002968

Category II Outfalls[a]

Outfall	Number of samples	pH (standard units)				Number of samples	Temperature (°C)				Number of samples	Flow[b] (gal/d)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error		Max	Min	Av	Standard error
16	4	8.00	7.70	*c*	0.1	4	24.5	6.6	12.2	1.1	4	190	95	143	141.6
20	4	8.30	7.80	*c*	0.1	4	24.6	6.6	12.8	0.5	4	761	180	473	537.0
23	2	8.10	7.40	*c*	0.4	2	36	33	35.0	0.3	2	380	380	285	95.5
25	2	7.40	6.90	*c*	0.3	2	30.5	26.5	28.5	0.4	2	190	95	143	113.0
35	3	8.00	7.50	*c*	0.2	3	19.6	16.3	17.8	0.0	3	3,804	761	1,902	3,223.6
43	1	7.50	7.50	*c*	0.0	1	11.1	11.1	11.1	0.0	1	570	570	570	0.0
46	3	8.40	8.10	*c*	0.1	3	32.1	25.9	30.0	0.2	3	380	0.264	253	526.8
54	3	8.00	6.10	*c*	0.6	3	24.2	18.5	21.1	0.0	3	31,560	55	10,712	17,671.8
58	3	8.20	6.50	*c*	0.5	3	24.3	6.2	16.0	0.2	3	3,424	380	1,458	1,808.8
60	2	7.80	6.70	*c*	0.7	2	26.3	8.7	17.5	1.2	2	190	47	119	105.5
66	2	8.30	6.70	*c*	0.8	2	26.5	19.6	23.1	0.2	2	1,141	360	750	519.2
68	4	8.10	7.30	*c*	0.2	4	45	23.6	32.9	0.7	4	761	360	470	313.6
73	4	8.10	7.90	*c*	0.0	4	24.6	14.1	18.2	0.1	4	3,804	95	1,831	6,542.0
75	2	7.80	7.20	*c*	0.3	2	28.2	21.3	24.8	0.3	2	1,141	761	951	412.5
77	1	7.70	7.70	*c*	0.0	1	21.6	21.6	21.6	0.0	1	24,533	24,533	24,533	0.0
81	2	7.80	7.80	*c*	0.0	2	27	20.1	23.6	0.2	2	761	190	476	0.0
87	4	8.10	7.40	*c*	0.1	4	24.1	7.7	14.2	0.2	4	2,282	95	1,212	2,261.6
96	1	8.20	8.00	*c*	0.1	1	10.6	7.8	9.2	0.5	1	32	5	19	50.8
98	2	8.20	8.10	*c*	0.1	2	24.9	19.9	22.4	0.1	2	4,506	1,522	3,014	7,934.9
111	1	8.20	8.20	*c*	0.0	1	26.5	26.5	26.5	0.0	1	2,663	2,663	2,663	0.0
117	3	8.10	6.60	*c*	0.5	3	31.5	28.7	29.9	0.1	3	761	190	444	326.4
131	2	8.30	7.80	*c*	0.3	2	12.9	11.2	12.1	0.4	2	62	47	55	17.8
133	4	7.8	7.4	*c*	0.1	4	26.2	8.3	18.5	0.5	4	540	95	254	474.3
144	2	7.90	7.90	*c*	0.0	2	12.8	12.8	12.8	0.0	2	15,218	10.6	7,614	0.0
185	2	8.00	7.80	*c*	0.1	2	33	14	23.5	1.2	2	550	380	465	319.7
201	4	8.20	7.50	*c*	0.1	4	25.4	11.2	18.5	0.1	4	11,413	2,282	6,086	7,100.9
203	2	7.20	7.10	*c*	0.0	2	27.7	7.7	17.7	0.3	2	6,005	1,522	3,764	11,921.0
204	4	8.10	7.60	*c*	0.1	4	25.7	9.4	18.2	0.3	4	2,282	761	1,807	1,528.6
213	1	7.80	7.80	*c*	0.0	1	12.6	12.6	12.6	0.0	1	2	2.110	2.11	0.0

Table 3.33 (continued)

Outfall	Number of samples	pH (standard units)				Number of samples	Temperature (°C)				Number of samples	Flow[b] (gal/d)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error		Max	Min	Av	Standard error
238	4	8.30	7.10	*c*	0.3	4	22.4	16.6	19.9	0.1	4	6,848	1.580	2,473	4,049.1
239	4	8.30	7.10	*c*	0.3	4	22.4	16.6	19.9	0.1	4	6,848	1.580	2,473	4,049.1
240	4	8.30	7.10	*c*	0.3	4	22.4	16.6	19.9	0.1	4	6,848	1.580	2,473	4,049.1
241	4	0.00	7.10	*c*	0.3	4	22.4	16.6	19.9	0.1	4	6,848	1.580	2,473	4,049.1

[a]Y-12 Plant, Category II outfalls. Outfalls not listed did not discharge during this period.
[b]Flow during operations and/or discharging.
[c]Not applicable.

Table 3.34. CY 1990 NPDES Permit Number TN 0002968

Category III Outfalls[a]

Outfall	Number of samples	pH (standard units)				Temperature (°C)				Flow[b] (gal/d)			
		Max	Min	Av	Standard error	Max	Min	Av	Standard error	Max	Min	Av	Standard error
2	4	8.2	7.5	*c*	0.1	17.9	7.2	11.4	2.3	228,270	22,827	95,199	50,463
71	4	7.6	6.9	*c*	0.1	20.1	10.9	13.9	2.5	79,892	26,600	60,052	134,328
135	4	8	7.7	*c*	0.1	29.8	25.4	24.2	1.5	660,000	587,700	485,475	18,613
147	9	8.4	7.6	*c*	0.1	25.3	13.9	20.5	1.7	18,261	380	69,219	2,456
150	4	8.4	7.7	*c*	0.2	28.2	18.6	20.8	2.2	1,980,000	634,600	1,109,305	361,084
157	3	8.4	7.7	*c*	0.2	28.2	19.1	23.5	2.8	9,400	761	217,033	2,583
160	4	8	7.9	*c*	0.1	25.6	20.1	24.0	1.2	204,600	56,000	97,840	33,121
163	4	7.9	7.7	*c*	0.1	27.2	24.3	22.7	3.0	290,100	180,900	240,050	30,295
169	4	7.9	7.5	*c*	0.1	25.6	17.5	22.0	1.7	790,000	287,100	419,333	126,637
181	3	7.5	7.5	*c*	0.1	23.2	19.8	19.1	2.5	317,600	48,900	320,000	109,696
192	3	6.7	6.7	*c*	0.0	23.1	13.6	16.3	2.9	6,007	1,900	110,304	2,755

[a]Y-12 Plant, Category III outfalls. Outfalls not listed did not discharge during this period.
[b]Flow during operations and/or discharging.
[c]Not applicable.

Table 3.35. CY 1990 NPDES Permit Number TN 002968

Category IV Outfalls[a]

Outfall	Number of samples	pH (standard units)				Number of flows	Flow[b] (gal/d)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error
401	0					*d*				
402	17	8.5	7.2	*c*	0.1	2	1.3	0.5	0.9	0.4
403	53	8.1	6.6	*c*	0.0	1	13.2	13.2	13.2	0
404	19	7.8	6.9	*c*	0.1	0			0	
405	47	9.5	7.3	*c*	0.1	3	143.0	3.8	54.2	44.5
406	6	8.4	6.9	*c*	0.2	0				0
407	0					*d*				
408	52	8.1	7.3	*c*	0.0	3	5.3	3.6	4.2	0.6
409	14	8.4	6.9	*c*	0.1	0				0
410	0					*d*				
411	21	7.8	6.8	*c*	0.1	0				0
412	19	7.6	6.9	*c*	0.0	0				0
413	19	7.7	6.6	*c*	0.1	0				0
414	21	7.9	7.0	*c*	0.1	2	2.6	2.0	2.3	0.3
415	0					*d*				
416	0					*d*				
417	0					*d*				
418	0					*d*				
419	0					*d*				
420	0					*d*				
421	0					*d*				
422	0					*d*				

[a]Y-12 Plant.
[b]Flow during operations and/or discharging.
[c]Not applicable.

Table 3.36. CY 1990 NPDES Permit Number TN 002968

Miscellaneous Discharge Points[a]

Parameter	Outfall	Number of samples	Concentration (mg/L)			
			Max	Min	Av	Standard error
Total suspended solids	702	0	*b*	*b*	*b*	*c*
pH, standard units		0	*b*	*b*	*b*	*c*
Total suspended solids	703	0	*b*	*b*	*b*	*c*
pH, standard units		0	*b*	*b*	*b*	*c*
Total suspended solids	704	0	*b*	*b*	*b*	*c*
pH, standard units		0	*b*	*b*	*b*	*c*

[a]Y-12 Plant.
[b]No flow.
[c]Not applicable.

Table 3.37. NPDES flows at ORNL in 1990

Serial # discharge	Effluent discharges		Flow[a] ($L \times 10^6$/d)	
X01	Sewage Treatment Plant	Av	0.84	(0.22)
		Max	1.8	(0.49)
X02	Coal yard runoff	Av	0.086	(0.023)
		Max	1.2	(0.31)
X06A	3539 and 3540 ponds	Av	0.65	(0.17)
		Max	0.79	(0.21)
X07	3544 Process Waste Treatment Plant	Av	0.41	(0.11)
		Max	0.95	(0.25)
X09A	TRU/TURF/HFIR storage tanks	Av	0.0083	(0.0022)
		Max	0.012	(0.0032)
X11	3518 Acid Neutralization Facility	Av	0.096	(0.026)
		Max	0.12	(0.032)
X12	Nonradiological Wastewater Treatment Facility	Av	1.7	(0.44)
		Max	2.4	(0.64)
X13	Melton Branch	Av	9.2	(2.4)
		Max	182	(48)
X14	White Oak Creek	Av	31	(8.2)
		Max	234	(62)
X15	White Oak Lake Dam	Av	40	(11)
		Max	385	(100)

[a]Flow in millions of gallons per day is given in parentheses.

Table 3.38. ORNL Sewage Treatment Plant (X01), 1990

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 3.39. ORNL coalyard runoff treatment facility (X02), 1990

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 3.40. ORNL 3539 and 3540 ponds (X06A), 1990[a]

Parameter	Collection frequency	Type	Analysis frequency
Flow	Weekly	Continuous	Weekly
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	Grab	2/month
Phosphorous	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
Iron, total	2/month	Grab	2/month
Lead, total	2/month	Grab	2/month
Mercury, total	2/month	Grab	2/month
Nickel, total	2/month	Grab	2/month
Selenium, total	2/month	Grab	2/month
Silver, total	2/month	Grab	2/month
Zinc, total	2/month	Grab	2/month

[a]Last discharge, February 3, 1990.

Table 3.41. ORNL Process Waste Treatment Plant (X07), 1990[a]

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

[a]Last discharge, February 3, 1990.

Table 3.42. TRU/TURF/HFIR Storage Tanks (X09A)—ORR, 1990[a]

Parameter	Collection frequency	Type	Analysis frequency
Flow	Per discharge	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

[a]Last discharge, February 6, 1990.

Table 3.43. ORNL 3518 Acid Neutralization Facility (X11), 1990[a]

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

[a]Last discharge, March 1, 1990.

Table 3.44. ORNL Nonradiological Wastewater Treatment Facility, 1990[a]

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	Continuous	Daily
pH	Daily	Grab	Daily
Downstream pH	Daily	Grab	Daily
Temperature	Weekly	Grab	Weekly
TSS	Weekly	24-h composite	Weekly
Oil and grease	Weekly	Grab	Weekly
TTO	Weekly	Grab	Weekly
Cyanide, total	Weekly	Grab	Weekly
Cadmium, total	Weekly	24-h composite	Weekly
Chromium, total	Weekly	24-h composite	Weekly
Copper, total	Weekly	24-h composite	Weekly
Lead, total	Weekly	24-h composite	Weekly
Nickel, total	Weekly	24-h composite	Weekly
Silver, total	Weekly	24-h composite	Weekly
Zinc, total	Weekly	24-h composite	Weekly
BOD	Weekly	24-h composite	Weekly
Nitrate	Weekly	24-h composite	Weekly
Sulfate	Weekly	24-h composite	Weekly
Phosphorus, total	Weekly	24-h composite	Weekly
Phenol, total	Weekly	Grab	Weekly
Fluoride	Weekly	24-h composite	Weekly
Arsenic, total	Weekly	24-h composite	Weekly
Iron, total	Weekly	24-h composite	Weekly
Mercury, total	Weekly	24-h composite	Weekly
Selenium, total	Weekly	24-h composite	Weekly
Benzene	Weekly	Grab	Weekly
Chlorobenzene	Weekly	Grab	Weekly
Chloroform	Weekly	Grab	Weekly
Dichlorobromomethane	Weekly	Grab	Weekly
Methylene chloride	Weekly	Grab	Weekly
Tetrachloroethylene	Weekly	Grab	Weekly
Trichloroethylene	Weekly	Grab	Weekly
1,1-Dichloroethane	Weekly	Grab	Weekly

[a]Note: Compliance date, April 1, 1990.

Table 3.45. ORNL Melton Branch (X13), 1990

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 3.46. ORNL White Oak Creek (X14), 1990

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 3.47. ORNL White Oak Lake (X15), 1990

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 3.48. ORNL category I outfalls (storm drains), 1990

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

Table 3.49. ORNL category II outfalls (parking lot drains, storage area drains, once-through water, condensate), 1990

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

Table 3.50. ORNL category III outfalls (process and/or lab drains), 1990

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

Table 3.51. ORNL steam plant (SP2519), 1990

Parameter	Collection frequency	Type	Analysis frequency
Flow	Quarterly	*a*	Quarterly
Temperature	Quarterly	Grab	Quarterly
pH	Quarterly	Grab	Quarterly

[a]Not applicable.

Table 3.52. ORNL vehicle cleaning facilities (VC7002), 1990[a]

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	Continuous	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

[a]Last discharge, March 7, 1990.

Table 3.53. ORNL equipment maintenance facility (EF7002), 1990[a]

Parameter	Collection frequency	Type	Analysis frequency
Oil and grease	Quarterly	Grab	Quarterly
pH	Quarterly	Grab	Quarterly

[a]Last discharge, March 7, 1990.

Table 3.54. ORNL cooling systems (cooling tower blowdown), 1990

Parameter	Collection frequency	Type	Analysis frequency
Flow	Quarterly	*a*	Quarterly
pH	Quarterly	Grab	Quarterly
Downstream pH	Quarterly	Grab	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

[a]Not applicable.

Table 3.55. NPDES Permit Number TN 0002941, 1990

Discharge point X01 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
Ammonia, as N	156	3.6	0.010	0.14	0.030
BOD	156	<5.0	<5.0	<5.0	0
Bromodichloromethane	13	<0.0050	J0.00080	J0.0039	0.00048
Chlorine, total residual	156	0.65	<0.010	<0.20	0.0089
Copper, total	15	0.010	<0.0050	<0.0075	0.00042
Cyanide, total	12	<0.0020	<0.0020	<0.0020	0
Downstream pH, standard units	52	8.3	6.6	*b*	*b*
Fecal coliform, col./100 mL	160	>600	<1.0	<1.6[c]	1.1
Flow, Mgd	251	0.49	<0.092	0.22	0.0030
Mercury, total	14	0.00010	<0.00005	<0.000054	0.0000036
Oil and grease	157	630	<2.0	<8.0	4.4
Oxygen, dissolved	250	18	4.5	8.9	0.11
pH, standard units	52	8.4	6.6	*b*	*b*
Recoverable phenolics, total	14	<0.050	<0.0010	<0.0051	0.0035
Silver, total	15	0.026	<0.0050	<0.0064	0.0014
TSS	156	87	<5.0	6.0	0.58
Trichloroethene	13	<0.0050	<0.0010	<0.0047	0.00031
Zinc, total	15	0.079	0.0091	0.053	0.0040

[a] > = exceeded detection limit; < = undetected; J = below detection limit, but estimated.

[b] Not applicable.

[c] Geometric mean.

Table 3.56. NPDES Permit Number TN 0002941, 1990

Discharge point X02 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
Arsenic, total	55	0.62	<0.050	<0.099	0.016
Cadmium, total	55	<0.0070	<0.0040	<0.0055	0.00013
Chromium, total	55	0.029	<0.0040	<0.011	0.00072
Copper, total	55	0.25	<0.0050	<0.017	0.0044
Downstream pH, standard units	250	8.4	6.6	*b*	*b*
Flow, Mgd	250	0.31	0	0.023	0.0022
Iron, total	55	1.3	<0.050	<0.28	0.035
Lead, total	55	<0.050	<0.030	<0.045	0.0012
Manganese, total	55	0.23	<0.0020	<0.044	0.0055
Nickel, total	55	0.028	<0.0040	<0.0081	0.00068
Oil and grease	52	88	<2.0	<3.9	1.7
pH, standard units	250	11	6.1	*b*	*b*
Selenium, total	55	0.14	<0.040	<0.055	0.0029
Silver, total	55	0.044	<0.0050	<0.0059	0.00072
Sulfate, as SO_4	12	2200	19	1300	200
TSS	52	60	<5.0	<10	1.3
Temperature, °C	250	30	5.2	18	0.44
Zinc, total	55	0.18	<0.0050	<0.024	0.0033

[a]< = undetected.

[b]Not applicable.

Table 3.57. NPDES Permit Number TN 0002941, 1990

Discharge point X06A at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
Arsenic, total	3	<0.050	<0.050	<0.050	0
Cadmium, total	3	<0.0070	<0.0040	<0.0050	0.0010
Chromium, total	3	0.016	<0.0040	<0.0087	0.0037
Copper, total	3	0.046	0.011	0.024	0.011
Downstream pH, standard units	6	7.8	7.0	*b*	*b*
Flow, Mgd	6	0.21	0.10	0.17	0.015
Iron, total	3	0.049	0.025	0.033	0.0078
Lead, total	3	<0.030	<0.030	<0.030	0
Mercury, total	3	0.00077	0.00063	0.00069	0.000042
Nickel, total	3	<0.020	<0.0090	<0.016	0.0037
Oil and grease	3	<2.0	<2.0	<2.0	0
Organic carbon, total	3	5.2	3.6	4.3	0.47
pH, standard units	6	8.3	6.2	*b*	*b*
Phosphorus, total	3	0.30	0.30	0.30	0
Selenium, total	3	<0.040	<0.040	<0.040	0
Silver, total	3	<0.0050	<0.0050	<0.0050	0
Sulfate, as SO_4	3	27	26	26	0.33
TSS	3	<5.0	<5.0	<5.0	0
Temperature, °C	6	14	9.4	13	0.72
Zinc, total	3	0.17	0.10	0.13	0.022

[a]< = undetected.
[b]Not applicable.

Table 3.58. NPDES Permit Number TN 0002941, 1990

Discharge point X07 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
Arsenic, total	3	<0.050	<0.050	<0.050	0
Cadmium, total	3	<0.0070	<0.0040	<0.0050	0.0010
Chromium, total	3	<0.0040	<0.0040	<0.0040	0
Copper, total	3	0.027	<0.0060	<0.018	0.0062
Downstream pH, standard units	6	7.7	7.1	*b*	*b*
Flow, Mgd	27	0.25	0.022	0.11	0.012
Lead, total	3	<0.030	<0.030	<0.030	0
Nickel, total	3	<0.020	<0.0090	<0.016	0.0037
Nitrate	3	<5.0	<5.0	<5.0	0
Oil and grease	3	<2.0	<2.0	<2.0	0
Organic carbon, total	3	6.0	1.8	3.4	1.3
pH, standard units	6	7.9	7.0	*b*	*b*
Silver, total	3	<0.0050	<0.0050	<0.0050	0
Sulfate, as SO_4	3	240	160	200	23
TSS	3	<5.0	<5.0	<5.0	0
Temperature, °C	6	18	12	14	0.82
Total toxic organics	3	B0.014	<0.010	<0.011	0.0013
Zinc, total	3	0.091	0.013	0.043	0.024

[a]< = undetected; B = found in the blank.

[b]Not applicable.

Table 3.59. NPDES Permit Number TN 0002941, 1990

Discharge point X09A at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
Arsenic, total	8	<0.050	<0.050	<0.050	0
Cadmium, total	8	<0.0070	<0.0040	<0.0055	0.00057
Chromium, total	8	0.014	<0.0040	<0.0059	0.0013
Copper, total	8	0.064	0.041	0.053	0.0027
Downstream pH, standard units	8	8.1	7.4	*b*	*b*
Flow, Mgd	8	0.0032	0.0017	0.0022	0.00018
Lead, total	8	<0.030	<0.030	<0.030	0
Nickel, total	8	<0.020	<0.0090	<0.015	0.0021
Nitrate	8	5.9	<5.0	<5.1	0.11
Oil and grease	8	2.0	<2.0	<2.0	0
Organic carbon, total	8	9.1	2.1	4.6	0.91
pH, standard units	8	8.2	6.9	*b*	*b*
Sulfate, as SO_4	8	34	24	30	1.2
TSS	8	8.0	<5.0	<5.4	0.38
Temperature, °C	8	20	12	16	0.85
Zinc, total	8	0.16	0.065	0.11	0.010

[a]< = undetected.

[b]Not applicable.

Table 3.60. NPDES Permit Number TN 0002941, 1990

Discharge point X11 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
Arsenic, total	4	0.19	0.067	0.13	0.027
Cadmium, total	4	<0.0070	<0.0040	<0.0055	0.00087
Chromium, total	4	0.029	<0.0040	<0.022	0.0059
Copper, total	4	0.024	0.012	0.017	0.0026
Downstream pH, standard units	9	8.0	7.2	*b*	*b*
Flow, Mgd	2	0.032	0.019	0.026	0.0067
Lead, total	4	<0.030	<0.030	<0.030	0
Nickel, total	4	<0.020	<0.0090	<0.016	0.0026
Nitrate	9	<5.0	<5.0	<5.0	0
Oil and grease	4	<2.0	<2.0	<2.0	0
Organic carbon, total	9	9.3	0.70	3.6	0.95
pH, standard units	9	7.4	6.2	*b*	*b*
Phosphorus, total	4	3.1	0.70	1.6	0.54
Sulfate, as SO_4	9	2600	330	1800	240
TSS	4	460	<5.0	<130	110
Temperature, °C	9	13	9.9	12	0.39
Zinc, total	4	1.3	0.24	0.76	0.23

[a]< = undetected.
[b]Not applicable.

Table 3.61. NPDES Permit Number TN 0002941, 1990

Discharge point X12 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
1,1-Dichloroethane	40	<0.0050	<0.0010	<0.0049	0.00010
Arsenic, total	43	<0.050	<0.050	<0.050	0
Benzene	40	<0.0050	<0.0010	<0.0049	0.00010
BOD	39	<5.0	<5.0	<5.0	0
Bromodichloromethane	40	<0.0050	<0.0010	<0.0049	0.00010
Cadmium, total	43	<0.0070	<0.0050	<0.0051	0.000079
Chlorobenzene	40	<0.0050	<0.0010	<0.0049	0.00010
Chloroform	40	<0.0050	J0.00080	<0.0041	0.00025
Chromium, total	43	0.018	<0.0040	<0.0051	0.00037
Copper, total	43	0.23	<0.0050	<0.013	0.0052
Cyanide, total	39	0.0030	<0.0020	<0.0020	0.000037
Downstream pH, standard units	186	8.6	7.1	*b*	*b*
Flow, Mgd	187	0.64	0.24	0.44	0.0051
Fluoride, total	39	<5.0	<1.0	<1.2	0.14
Iron, total	43	0.12	<0.010	<0.045	0.0029
Lead, total	43	<0.050	<0.030	<0.049	0.00079
Mercury, total	42	0.00020	<0.00005	<0.000056	0.000004
Methylene chloride	40	<0.0050	JB0.00040	<0.0041	0.00028
Nickel, total	43	0.0091	<0.0040	<0.0049	0.00022
Nitrate, as N	39	7.0	1.2	5.0	0.12
Oil and grease	39	4.0	<2.0	<2.1	0.057
pH, standard units	*c*	8.8	6.4	*b*	*b*
Phosphorus, total	39	1.0	0.20	0.40	0.024
Recoverable phenolics, total	39	<0.0010	<0.0010	<0.0010	0
Selenium, total	43	<0.050	<0.040	<0.049	0.00039
Silver, total	43	0.015	<0.0050	<0.0052	0.00023
Sulfate, as SO_4	39	440	80	140	10
TSS	39	<5.0	<5.0	<5.0	0
Temperature, °C	186	30	13	22	0.28
Tetrachloroethene	40	B0.0060	<0.0010	<0.0049	0.00010
Total toxic organics	39	0.24	<0.010	<0.029	0.0083
Trichloroethene	40	<0.0050	<0.0010	<0.0049	0.00010
Zinc, total	43	0.097	<0.0050	<0.026	0.0028

[a]< = undetected; J = below detection limit, but estimated; B = found in the blank; and JB = estimated and found in the blank.

[b]Not applicable.

[c]Continuous monitoring.

Table 3.62. NPDES Permit Number TN 0002941, 1990

Discharge point X13 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
Aluminum, total	14	5.3	<0.050	<1.0	0.46
Ammonia, as N	12	0.060	0.020	0.040	0.0036
Arsenic, total	14	0.066	<0.050	<0.051	0.0011
BOD	12	<5.0	<5.0	<5.0	0
Cadmium, total	15	<0.0050	<0.0020	<0.0026	0.00032
Chlorine, total residual	52	<0.010	<0.010	<0.010	0
Chloroform	12	<0.0050	J0.0010	J0.0045	0.00036
Chromium, total	14	0.016	<0.0040	<0.0080	0.00093
Conductivity, mS/cm	12	2.4	0.26	1.6	0.20
Copper, total	14	0.015	<0.0050	<0.0081	0.00081
Dissolved solids, total	12	530	130	280	37
Flow, Mgd	250	48	0.35	2.4	0.32
Fluoride, total	12	3.0	<1.0	<1.3	0.17
Iron, total	14	3.9	0.14	0.87	0.35
Lead, total	15	<0.050	<0.0040	<0.013	0.0049
Manganese, total	14	0.38	0.050	0.14	0.026
Mercury, total	14	0.00010	<0.00005	<0.000054	0.0000036
Nickel, total	14	0.014	<0.0040	<0.0058	0.00078
Nitrate, as N	12	<5.0	<5.0	<5.0	0
Oil and grease	52	250	<2.0	<8.6	4.7
Organic carbon, total	12	5.6	2.0	3.1	0.29
Oxygen, dissolved	52	19	5.2	9.3	0.34
PCBs, total	12	B0.0046	<0.00050	<0.0017	0.00033
pH, standard units	12	8.8	7.2	*b*	*b*
Phosphorus, total	15	1.7	<0.10	<0.61	0.11
Recoverable phenolics, total	12	<0.0010	<0.0010	<0.0010	0
Silver, total	15	<0.0050	<0.0050	<0.0050	0
Sulfate, as SO_4	12	1900	13	220	150
TSS	12	120	<5.0	<21	11
Temperature, °C	64	26	5.7	16	0.78
Trichloroethene	12	<0.0050	J0.0020	<0.0048	0.00025
Turbidity, JTU	12	110	5.0	69	11
Zinc, total	14	0.059	<0.0050	<0.020	0.0043

[a]< = undetected; J = below detection limit, but estimated; B = found in the blank.
[b]Not applicable.

Table 3.63. NPDES Permit Number TN 0002941, 1990

Discharge point X14 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
Aluminum, total	14	4.1	<0.050	<0.58	0.28
Ammonia, as N	12	0.70	0.010	0.093	0.055
Arsenic, total	14	<0.050	<0.050	<0.050	0
BOD	12	<5.0	<5.0	<5.0	0
Cadmium, total	15	<0.0050	<0.0020	<0.0026	0.00032
Chlorine, total residual	52	<0.010	<0.010	<0.010	0
Chloroform	12	<0.0050	J0.0030	J0.0044	0.00026
Chromium, total	14	0.012	<0.0040	<0.0064	0.00066
Conductivity, mS/cm	12	1.8	0.27	1.2	0.14
Copper, total	14	0.014	<0.0050	<0.0071	0.00076
Dissolved solids, total	12	270	140	200	11
Flow, Mgd	250	62	3.0	8.2	0.48
Fluoride, total	12	1.2	<1.0	<1.0	0.017
Iron, total	14	3.3	0.075	0.53	0.23
Lead, total	15	<0.050	<0.0040	<0.014	0.0049
Manganese, total	14	0.12	0.012	0.040	0.0085
Mercury, total	14	0.00022	<0.00005	<0.000062	0.000012
Nickel, total	14	0.015	<0.0040	<0.0059	0.00085
Nitrate, as N	12	<5.0	<5.0	<5.0	0
Oil and grease	52	29	<2.0	<3.0	0.61
Organic carbon, total	12	4.4	1.5	2.4	0.29
Oxygen, dissolved	52	20	6.8	9.8	0.30
PCBs, total	12	B0.012	<0.00050	<0.0023	0.00090
pH, standard units	12	8.5	7.1	*b*	*b*
Phosphorus, total	15	1.4	<0.10	<0.43	0.083
Recoverable phenolics, total	12	<0.0010	<0.0010	<0.0010	0
Silver, total	15	<0.0050	<0.0050	<0.0050	0
Sulfate, as SO_4	12	51	21	32	3.0
TSS	12	140	<5.0	<21	11
Temperature, °C	64	26	8.3	18	0.65
Trichloroethene	12	<0.0050	<0.0050	<0.0050	0
Turbidity, JTU	12	320	4.0	62	25
Zinc, total	14	0.062	0.012	0.028	0.0039

[a] < = undetected; J = below detection limit, but estimated; B = found in the blank.

[b] Not applicable.

Table 3.64. NPDES Permit Number TN 0002941, 1990

Discharge point X15 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max[a]	Min[a]	Av[a]	Standard error
Aluminum, total	14	1.4	<0.050	<0.52	0.088
Ammonia, as N	12	0.15	0.020	0.075	0.014
Arsenic, total	15	<0.050	0.0020	0.036	0.0053
BOD	12	<5.0	<5.0	<5.0	0
Cadmium, total	15	<0.0050	<0.0020	<0.0026	0.00032
Chlorine, total residual	52	<0.010	<0.010	<0.010	0
Chloroform	12	<0.0050	J0.0010	J0.0040	0.00052
Chromium, total	14	0.020	<0.0040	<0.013	0.0012
Conductivity, mS/cm	12	1.9	0.26	1.4	0.16
Copper, total	14	0.018	<0.0050	<0.0075	0.00094
Dissolved solids, total	12	260	160	210	8.8
Flow, Mgd	250	100	3.2	11	0.79
Fluoride, total	12	1.0	<1.0	<1.0	0
Iron, total	14	1.2	<0.050	<0.59	0.082
Lead, total	15	<0.050	<0.0040	<0.014	0.0049
Manganese, total	19	0.16	<0.0010	<0.088	0.0092
Mercury, total	14	0.00008	<0.00005	<0.000053	0.0000022
Nickel, total	14	<0.0090	<0.0040	<0.0054	0.00053
Nitrate, as N	12	5.0	<5.0	<5.0	0
Oil and grease	52	180	<2.0	<10	3.6
Organic carbon, total	12	6.8	2.0	3.3	0.42
Oxygen, dissolved	52	21	5.1	9.0	0.40
PCBs, total	12	B0.0069	<0.00050	<0.0019	0.00050
pH, standard units	12	8.8	7.2	*b*	*b*
Phosphorus, total	15	1.0	0.20	0.40	0.052
Silver, total	15	<0.0050	<0.0050	<0.0050	0
Sulfate, as SO_4	12	67	21	40	3.9
TSS	12	27	<5.0	<13	2.3
Temperature, °C	64	29	7.2	18	0.82
Trichloroethene	12	<0.0050	<0.0050	<0.0050	0
Turbidity, JTU	12	320	9.0	87	23
Zinc, total	14	0.074	0.0079	0.021	0.0045

[a]< = undetected; J = below detection limit, but estimated; B = found in the blank.

[b]Not applicable.

Table 3.65. NPDES Permit Number TN 0002941, 1990

Discharge point EF7002 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Oil and grease	1	590	590	590	*a*
pH, standard units	1	11	11	*a*	*a*

[a]Not applicable.

Table 3.66. NPDES Permit Number TN 0002941, 1990

Discharge point SP2519 at ORNL

Parameter	Number of samples	Max	Min	Av	Standard error
Flow, Mgd	4	0.0042	0.000094	0.0011	0.0010
pH, standard units	4	10	8.2	*a*	*a*
Temperature, °C	4	31	20	25	2.3

[a]Not applicable.

Table 3.67. NPDES Permit Number TN 0002941, 1990

Discharge point VC7002 at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
BOD	2	1,200	73	620	550
Fecal coliform, col./100 mL	2	>6,000	>600	>3,300	2,700
Flow, Mgd	47	0.00056	0	0.000086	0.000015
Oil and grease	2	210	160	180	22
pH, standard units	2	7.0	6.7	*a*	*a*
Recoveraale phenolics, total	2	0.24	0.21	0.23	0.015
TSS	2	3,300	2,400	2,800	440

[a]Not applicable.

Table 3.68. NPDES Permit Number TN 0002941, 1990

Cooling systems at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Chlorine, total residual	49	1.7	<0.010	0.15	0.057
Chromium, total	54	1.5	<0.0040	0.061	0.032
Copper, total	54	11	<0.0050	0.25	0.20
Downstream pH, standard units	43	8.3	7.0	*b*	*b*
Flow, Mgd	53	0.19	0.0010	0.034	0.0088
pH, standard units	54	8.9	7.0	8.3	0.057
Temperature, °C	54	36	9.4	24	0.77
Zinc, total	54	3.7	0.023	0.39	0.075

[a] < = undetected.
[b] Not applicable.

Table 3.69. NPDES Permit Number TN 0002941, 1990

Category I outfalls at ORNL

Parameter	Number of samples	Concentration[a] (mg/L)			
		Max	Min	Av	Standard error
Downstream pH, standard units	17	8.1	7.3	*b*	*b*
Flow, Mgd	17	0.14	0.00029	0.026	0.0098
Oil and grease	15	53	<2.0	<16	4.0
pH, standard units	24	8.2	6.8	*b*	*b*
TSS	22	1,100	3.0	100	52
Temperature, °C	24	27	11	17	1.1

[a] < = undetected.
[a] Not applicable.

Table 3.70. NPDES Permit Number TN 0002941, 1990

Category II outfalls at ORNL

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Downstream pH, standard units	179	9.7	7.0	*b*	*b*
Flow, Mgd	183	1.0	0.000086	0.036	0.0067
Oil and grease	173	120	<2.0	6.2	0.93
pH, standard units	187	9.6	6.8	*b*	*b*
TSS	179	400	<1.0	<26	4.2
Temperature, °C	187	61	11	21	0.49

[a] < = undetected.
[b]Not applicable.

Table 3.71. NPDES Permit Number TN 0002941, 1990

Category III outfalls at ORNL

Parameter	Number of samples	Max	Min	Av	Standard error
Flow, Mgd	65	1.2	0.00030	0.055	0.020
pH, standard units	66	8.4	6.7	*a*	*a*

[a]Not applicable.

Table 3.72. 1990 ORNL gross beta concentrations at category I and II outfalls

Outfall	Sampling date	Concentration (pCi/L)[a]	Uncertainty (pCi/L)
		Category I Outfalls	
102	16 Feb	8.9*	0.22
108	16 Feb	3.2*	0.17
	08 Mar	4.1*	0.19
		13*	0.25
109	16 Feb	13*	0.24
	08 Mar	–5.1	0.16
		7.8*	0.19
110	16 Feb	27*	2.1
112	16 Feb	–38	1.4
113	16 Feb	19*	1.7
114	16 Feb	–32	1.3
115	16 Feb	1.6*	0.16
116	16 Feb	38*	1.8
142	16 Feb	–16	1.4
162	16 Feb	38*	1.9
165	16 Feb	5400*	10
		5100*	10
170	16 Feb	19*	1.6
171	16 Feb	76*	2.1
173	16 Feb	–30	1.2
191	16 Feb	–8.1	1.4
		Category II Outfalls	
202	08 Mar	57*	0.40
		70*	0.40
203	20 Feb	46*	0.40
	21 Sep	0	0.16
204	20 Feb	15000*	60
	08 Mar	1900*	2.0
		1800*	2.0
	11 Sep	780*	1.0
	28 Nov	320*	1.0
205	20 Feb	32*	1.8
	21 Sep	4.1*	0.19
	28 Nov	23*	0.28
206	20 Feb	17*	0.26
	28 Nov	14*	0.26
207	08 Mar	78*	0.50
		76*	0.40
	16 Mar	130*	2.4
	20 Jun	160*	0.60
	11 Sep	410*	2.0
	28 Nov	84*	0.40
208	20 Feb	9.7*	0.21
	29 Jun	54*	0.30
	21 Sep	2.4*	0.17
209	20 Feb	14*	0.25
	29 Jun	9.7*	0.17
	21 Sep	2.2*	0.17
	28 Nov	7.3*	0.21
210	22 Feb	–16	1.7
	20 Jun	9.2*	0.25
	11 Sep	17*	0.72
	28 Nov	4.1*	0.18

Table 3.72 (continued)

Outfall	Sampling date	Concentration (pCi/L)[a]	Uncertainty (pCi/L)
211	08 Mar	4.3*	0.21
		4.3*	0.20
	11 Sep	19*	0.69
	28 Nov	9.5*	0.22
212	29 Jun	13*	0.16
	21 Sep	1.4*	0.17
	28 Nov	2.2*	0.20
213	29 Jun	11*	0.17
214	16 Mar	–19	1.3
	22 Jun	16*	0.27
	22 Sep	1.4*	0.16
	28 Nov	7.0*	0.19
215	29 Jun	3.2*	0.13
	22 Sep	–0.27	0.14
216	16 Feb	–16	1.4
	20 Jun	6.5*	0.21
	22 Sep	9.2*	0.24
217	16 Feb	6.5*	0.20
	20 Jun	8.1*	0.20
	11 Sep	0.27*	0.16
	28 Nov	1.9*	0.18
218	16 Mar	–11	1.6
	20 Jun	8.6*	0.21
	11 Sep	9.5*	0.22
	28 Nov	4.3*	0.18
219	16 Feb	4.3*	0.18
	20 Jun	12*	0.22
	11 Sep	9.2*	0.66
	28 Nov	4.1*	0.22
222	20 Jun	18*	0.66
	22 Sep	0.81*	0.17
	28 Nov	4.9*	0.21
223	16 Mar	30*	1.6
	22 Sep	19*	0.29
224	16 Mar	19*	1.7
	28 Nov	5.1*	0.22
226	22 Feb	16*	1.6
	20 Jun	7.0*	0.23
	11 Sep	8.4*	0.64
	28 Nov	8.1*	0.21
227	08 Mar	4.6*	0.18
		4.1*	0.17
	16 Mar	–2.7	1.8
	20 Jun	0.27*	0.16
	11 Sep	1.9*	0.16
	28 Nov	0.54*	0.16
230	22 Feb	–2.7	1.5
	20 Jun	12*	0.24
	22 Sep	–1.9	0.14
231	22 Feb	–24	1.4
	20 Jun	0.81*	0.18
	11 Sep	0.27*	0.15
	28 Nov	5.1*	0.21

Table 3.72 (continued)

Outfall	Sampling date	Concentration (pCi/L)[a]	Uncertainty (pCi/L)
232	16 Feb	1.4*	0.17
	22 Jun	30*	0.30
	13 Sep	6.8*	0.23
	28 Nov	1.6*	0.16
233	16 Feb	1.9*	0.17
	20 Jun	11*	0.22
	11 Sep	12*	0.23
	28 Nov	9.2*	0.22
234	16 Feb	1.1*	0.16
	20 Jun	6.8*	0.21
	11 Sep	0.27*	0.16
	28 Nov	4.6*	0.18
241	22 Jun	2.7*	0.21
	13 Sep	30*	0.30
	28 Nov	6.2*	0.18
242	16 Mar	–24	1.5
	22 Jun	62*	0.40
	22 Sep	1.6*	0.19
	28 Nov	3.8*	0.18
243	22 Feb	22*	1.8
	22 Jun	8.6*	0.21
	13 Sep	11*	0.22
	28 Nov	5.7*	0.19
244	16 Mar	27*	1.7
	22 Sep	0.27*	0.16
245	22 Jun	35*	0.30
	13 Sep	8.6*	0.22
	28 Nov	–3.2	0.15
247	16 Feb	–27	1.7
	22 Jun	0.81*	0.18
	13 Sep	3.2*	0.17
	28 Nov	7.6*	0.22
248	22 Feb	14*	1.5
	08 Mar	13*	0.23
		5.4*	0.21
	20 Jun	19*	0.29
	13 Sep	30*	0.30
	28 Nov	11*	0.22
249	16 Feb	49*	2.2
	20 Jun	2.4*	0.18
	13 Sep	3.8*	0.18
	28 Nov	1.9*	0.20
250	16 Feb	–8.1	1.6
	22 Jun	32*	0.30
	13 Sep	–0.27	0.14
	28 Nov	5.7*	0.18
261	16 Feb	1.6*	0.19
	29 Jun	3.5*	0.13
	22 Sep	4.9*	0.19
	28 Nov	12*	0.22
262	16 Feb	7.6*	0.20
	29 Jun	4.9*	0.14
	22 Sep	1.9*	0.17
	28 Nov	1.6*	0.17

Table 3.72 (continued)

Outfall	Sampling date	Concentration (pCi/L)[a]	Uncertainty (pCi/L)
263	20 Jun	5.7*	0.20
	22 Sep	12*	0.22
	28 Nov	2.2*	0.20
264	27 Sep	490*	11
	28 Nov	130*	0.60
265	22 Feb	180*	3.4
	20 Jun	7.3*	0.22
	11 Sep	7.6*	0.24
	28 Nov	35*	0.30
266	16 Feb	0.54*	0.16
	29 Jun	5.4*	0.13
	22 Sep	3.2*	0.18
	28 Nov	2.4*	0.18
267	16 Feb	–1.1	0.18
	08 Mar	13*	0.27
		1.4*	0.18
	20 Jun	7.3*	0.20
	11 Sep	30*	0.90
	28 Nov	4.3*	0.18
268	16 Feb	–6.5	0.19
	29 Jun	2.2*	0.18
	22 Sep	1.1*	0.16
	28 Nov	4.3*	0.20
269	16 Feb	–1.4	0.14
271	22 Feb	11*	2.0
	28 Nov	0.54*	0.18
281	16 Feb	10*	0.23
	08 Mar	4.9*	0.20
		12*	0.23
	20 Jun	4.6*	0.21
	13 Sep	9.7*	0.21
	28 Nov	5.9*	0.19
282	16 Feb	–2.7	1.7
	20 Jun	140*	0.60
	13 Sep	14*	0.24
	28 Nov	16*	0.25
283	16 Feb	27*	1.6
	08 Mar	22*	0.28
		1.9*	0.17
	22 Jun	16*	0.24
	13 Sep	6.8*	0.23
	28 Nov	7.0*	0.23
284	16 Feb	4.1*	0.18
	20 Jun	19*	0.30
	13 Sep	–1.6	0.14
	28 Nov	9.7*	0.21
285	16 Feb	22*	0.26
	22 Jun	180*	0.70
	28 Nov	17*	0.28
291	16 Feb	5.9*	0.20
	20 Jun	9.2*	0.21
	13 Sep	1.6*	0.16
	28 Nov	0.27*	0.15

[a]An asterisk (*) denotes that a radionuclide value is greater than 0 at the 5% level of significance.

Table 3.73. 1990 mercury concentrations in ORNL area surface water[a]

Station	Number of samples	Concentration (μg/L)				Percentage TWQ[c]
		Max	Min	Av	Standard error[b]	
			First Creek			
141	6	<0.050	<0.050	<0.050	0	<2.1
142	6	0.050	<0.050	<0.050	0	<2.1
143	6	<0.050	<0.050	<0.050	0	<2.1
241	6	<0.050	<0.050	<0.050	0	<2.1
243	6	0.050	<0.050	<0.050	0	<2.1
244	6	0.050	<0.050	<0.050	0	<2.1
246	6	0.050	<0.050	<0.050	0	<2.1
247	6	<0.050	<0.050	<0.050	0	<2.1
248	6	<0.050	<0.050	<0.050	0	<2.1
341	6	0.49	<0.050	<0.26	0.093	<11
342	6	<0.050	<0.050	<0.050	0	<2.1
343	6	<0.050	<0.050	<0.050	0	<2.1
344	6	<0.050	<0.050	<0.050	0	<2.1
X12	6	<0.050	<0.050	<0.050	0	<2.1
Stream summary	84	0.49	0.050	0.065	0.0086	2.7
			Fifth Creek			
161	6	<0.050	<0.050	<0.050	0	<2.1
162	6	0.10	<0.050	<0.060	0.0082	<2.5
163	6	0.060	<0.050	<0.052	0.0017	<2.2
164	6	<0.050	<0.050	<0.050	0	<2.1
261	6	0.14	<0.050	<0.080	0.015	<3.3
262	6	<0.050	<0.050	<0.050	0	<2.1
265	6	<0.050	<0.050	<0.050	0	<2.1
268	6	<0.050	<0.050	<0.050	0	<2.1
361	6	<0.050	<0.050	<0.050	0	<2.1
362	6	0.18	<0.050	<0.072	0.022	<3.0
363	6	0.53	<0.050	<0.28	0.10	<12
364	6	<0.050	<0.050	<0.050	0	<2.1
365	6	<0.050	<0.050	<0.050	0	<2.1
366	6	<0.050	<0.050	<0.050	0	<2.1
367	6	1.3	<0.050	<0.67	0.28	<28
368	6	<0.050	<0.050	<0.050	0	<2.1
Stream summary	96	1.3	0.050	0.11	0.023	4.4
			Melton Branch			
181	3	<0.050	<0.050	<0.050	0	<2.1
281	6	<0.050	<0.050	<0.050	0	<2.1
283	6	<0.050	<0.050	<0.050	0	<2.1
381	6	<0.050	<0.050	<0.050	0	<2.1
382	6	<0.050	<0.050	<0.050	0	<2.1
383	6	<0.050	<0.050	<0.050	0	<2.1
384	6	<0.050	<0.050	<0.050	0	<2.1
385	3	0.060	<0.050	<0.053	0.0033	<2.2
386	3	<0.050	<0.050	<0.050	0	<2.1
HDWTR	6	<0.050	<0.050	<0.050	0	<2.1
MBS	6	<0.050	<0.050	<0.050	0	<2.1
MHD	6	<0.050	<0.050	<0.050	0	<2.1
Stream summary	63	0.060	0.050	0.050	0.00016	2.1

Table 3.73 (continued)

Station	Number of samples	Concentration (μg/L)				Percentage TWQ[c]
		Max	Min	Av	Standard error[b]	
			White Oak Creek			
101	6	<0.050	<0.050	<0.050	0	<2.1
103	6	0.15	0.080	0.12	0.013	5.0
106	6	0.050	<0.050	<0.050	0	<2.1
109	6	0.050	0.050	0.050	0	2.1
116	6	<0.050	<0.050	<0.050	0	<2.1
202	6	0.050	<0.050	<0.050	0	<2.1
204	6	<0.050	<0.050	<0.050	0	<2.1
206	6	<0.050	<0.050	<0.050	0	<2.1
207	6	0.070	<0.050	<0.058	0.0040	<2.4
208	6	0.54	0.10	0.19	0.070	7.9
209	6	<0.050	<0.050	<0.050	0	<2.1
210	6	<0.050	<0.050	<0.050	0	<2.1
216	6	<0.050	<0.050	<0.050	0	<2.1
217	6	<0.050	<0.050	<0.050	0	<2.1
218	6	<0.050	<0.050	<0.050	0	<2.1
222	6	<0.050	<0.050	<0.050	0	<2.1
223	6	<0.050	<0.050	<0.050	0	<2.1
230	6	<0.050	<0.050	<0.050	0	<2.1
232	6	<0.050	<0.050	<0.050	0	<2.1
233	6	<0.050	<0.050	<0.050	0	<2.1
234	6	<0.050	<0.050	<0.050	0	<2.1
301	6	<0.050	<0.050	<0.050	0	<2.1
302	6	<0.050	<0.050	<0.050	0	<2.1
303	6	<0.050	<0.050	<0.050	0	<2.1
304	6	<0.050	<0.050	<0.050	0	<2.1
305	6	<0.050	<0.050	<0.050	0	<2.1
306	6	<0.050	<0.050	<0.050	0	<2.1
307	6	<0.050	<0.050	<0.050	0	<2.1
308	6	<0.050	<0.050	<0.050	0	<2.1
309	6	<0.050	<0.050	<0.050	0	<2.1
310	6	0.050	<0.050	<0.050	0	<2.1
311	6	<0.050	<0.050	<0.050	0	<2.1
312	6	<0.050	<0.050	<0.050	0	<2.1
313	6	<0.050	<0.050	<0.050	0	<2.1
314	6	<0.050	<0.050	<0.050	0	<2.1
7500	6	0.11	<0.050	<0.065	0.010	<2.7
FLUME	6	<0.050	<0.050	<0.050	0	<2.1
HDW	6	<0.050	<0.050	<0.050	0	<2.1
LSC	6	<0.050	<0.050	<0.050	0	<2.1
WOD	6	<0.050	<0.050	<0.050	0	<2.1
X01	6	<0.050	<0.050	<0.050	0	<2.1
X02	6	<0.050	<0.050	<0.050	0	<2.1
X03	6	<0.050	<0.050	<0.050	0	<2.1
X12	6	0.060	0.050	0.052	0.0017	2.2
Stream summary	264	0.54	0.050	0.055	0.0021	2.3
Overall summary	510	1.3	0.050	0.068	0.0050	2.8

[a]See Figs. 3.10–3.12 in Vol. 1.

[b]Standard error of the mean.

[c]Percentage of proposed Tennessee Water Quality Standards for the protection of fish and aquatic life.

Table 3.74. 1990 NPDES Permit Number TN 0002950

Discharge Point K-1700 at K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
1,1,1-Trichloroethane, µg/L	119	5	<0.4	2.23	1.80
1,1,2,2-Tetrachloroethane, µg/L	119	<5	<5	<5	0
1,1,2-Trichloroethane, µg/L	119	<5	<5	<5	0
1,1,-Dichloroethane, µg/L	119	5	<0.6	4.38	1.48
1,1-Dichloroethene, µg/L	119	<5	<5	<5	0
1,2-Dichloroethane, µg/L	119	36	<5	5.74	4.63
1,2-Dichloropropane, µg/L	119	<5	<5	<5	0
2-Chloroethylvinyl ether, µg/L	119	<10	<10	<10	0
Aluminum, mg/L	113	2.9	<0.032	0.288	0.45
Benzene, µg/L	119	5	<0.9	4.90	0.64
Beryllium, mg/L	113	<0.001	<0.0003	0.001	0
Bromodichloromethane, µg/L	119	5	<0.8	4.51	1.26
Bromoform, µg/L	119	<5	<5	<5	0
Bromomethane, µg/L	119	<10	<10	<10	0
Cadmium, mg/L	113	0.004	<0.002	0.002	0
Carbon tetrachloride, µg/L	119	<5	<5	<5	0
Chemical oxygen demand (COD), mg/L	226	28	<5	5.87	2.56
Chlorobenzene, µg/L	119	5	<5	<5	0
Chloroethane, µg/L	119	<10	<10	<10	0
Chloroform, µg/L	119	13	<0.5	4.19	2.15
Chloromethane, µg/L	119	<10	<10	<10	0
Chromium, mg/L	113	0.029	<0.01	0.010	0
Cis-1,3-dichloropropene, µg/L	119	<5	<5	<5	0
Dibromochloromethane, µg/L	119	<5	<5	<5	0
Dissolved solids, µg/L	113	892	88	306.26	157.18
Ethyl benzene, µg/L	119	<5	<5	<5	0
Fluoride, mg/L	113	0.9	<0.1	0.186	0.09
Lead, mg/L	113	0.02	<0.004	0.004	0
Mercury, mg/L	113	0.00032	<0.0002	<0.0002	0
Methylene chloride, µg/L	117	5	<1	4.789	0.80
Nitrate nitrogen, mg/L	113	1.8	<0.2	0.383	0.17
Oil and grease, mg/L	116	<2	<2	<2	0
pH, standard units	394	8.1	6.8	*a*	*a*
Selenium, mg/L	113	<0.005	<0.004	0.005	0
Silicon, mg/L	1	6.1	6.1	6.1	0
Silver, mg/L	113	<0.01	<0.006	0.009	0
Suspended solids, mg/L	223	147	<1	7.266	13.36
Temperature, °C	395	28.1	1.2	16.24	5.21
Tetrachloroethene, µg/L	119	5	<0.6	4.65	1.17
Toluene, µg/L	119	5	<0.7	4.93	0.55
Trans-1,2-dichloroethene, µg/L	119	53	<2	27.01	13.94
Trans-1,3-dichloropropene, µg/L	119	<5	<5	<5	0
Trichloroethene, µg/L	119	60	<2	33.268	13.97
Turbidity, NTU	226	290	1	9.851	25.53
Vinyl chloride, µg/L	119	12	<2	7.218	2.63
Zinc, mg/L	110	0.29	<0.0057	0.023	0.03

Table 3.75. 1990 NPDES Permit Number TN 0002950

Discharge Point K-1203 at K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Ammonia nitrogen, mg/L	172	1.5	<0.04	0.216	0.13
Biological oxygen demand (BOD), mg/L	173	18	<5	5.138	1.13
Chemical oxygen demand (COD), mg/L	229	69.5	<5	9.648	6.95
Chlorine, mg/L	390	0.32	0.02	0.063	0.03
Dissolved oxygen, mg/L	397	15.3	6.9	9.182	1.13
Dissolved solids, mg/L	56	306	180	230.892	32.15
Fecal coliform, col/100 mL	173	42	<1	6.901	8.22
pH, standard units	397	8.4	7.2	*a*	*a*
Settleable solids, mg/L	288	0.3	<0.1	0.117	0.04
Suspended solids, mg/L	172	29	1	6.681	3.99
Temperature, °C	396	27.5	5.4	20.011	4.85
Total organic carbon, mg/L	58	26	2	3.086	3.12

[a]Not applicable.

Table 3.76. 1990 NPDES Permit Number TN 0002950

Discharge Point K-1007-B at K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Chemical oxygen demand (COD), mg/L	126	23	<4.5	8.649	4.26
Chromium, mg/L	62	0.037	<0.01	0.01	0
Dissolved oxygen, mg/L	386	20	4.3	9.520	2.45
Fluoride, mg/L	62	0.2	<0.1	0.132	0.05
Oil and grease, mg/L	54	<2	<2	<2.000	0
pH, standard units	387	9.3	7.1	*a*	*a*
Suspended solids, mg/L	125	20	<1	8.328	3.53
Temperature, °C	387	29.8	4.8	18.198	7.69

[a]Not applicable.

Table 3.77. 1990 NPDES Permit Number TN 0002950

Discharge Point K-901A at K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Chemical oxygen demand (COD), mg/L	117	15	<5	6.448	2.47
Chromium, mg/L	59	0.03	<0.01	0.011	0
Dissolved oxygen, mg/L	378	12.8	5	7.683	2.04
Fluoride, mg/L	58	0.2	<0.1	0.117	0.04
Oil and grease, mg/L	59	<2	<2	<2	0
pH, standard units	377	8.6	7.2	*a*	*a*
Suspended solids, mg/L	117	83	2	11.965	10.51
Temperature, °C	376	58	4.3	17.274	7.72
Turbidity, NTU	118	27	4	14.683	4.56

[a]Not applicable.

Table 3.78. 1990 NPDES Permit Number TN 0002950

Discharge Point K-1515 at K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Aluminum, mg/L	68	0.85	0.16	0.472	0.17
Chemical oxygen demand (COD), mg/L	68	15	<5	<5.514	1.65
pH, standard units	381	8.8	6.5	*a*	*a*
Sulfate, mg/L	67	24	9.5	18.583	3.82
Suspended solids, mg/L	68	11	1	5.441	2.05
Temperature, °C	380	27.9	4	16.289	6.97

[a]Not applicable.

Table 3.79. 1990 NPDES Permit Number TN 0002950

Discharge Point K-1407-J at K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Total toxic organics (TTO), μg/L	11	2,123	<5	<145	
1,1,1-Trichloroethane, μg/L	208	33	<0.5	5.31	3.68
1,1,2,2-Tetrachloroethane, μg/L	208	5	<5	<5	0
1,1,2-Trichloroethane, μg/L	208	<5	<5	<5	0
1,1,-Dichloroethane, μg/L	208	6	<0.7	4.912	0.56
1,1-Dichloroethene, μg/L	208	21	<0.9	5.009	1.76
1,2,4-Trichlorobenzene, μg/L	58	<10	<10	<10	0
1,2-Dichlorobenzene, μg/L	58	<10	<10	<10	0
1,2-Dichloroethane, μg/L	208	<5	<5	<5	0
1,2-Dichloropropane, μg/L	208	<5	<5	<5	0
1,3-Dichlorobenzene, μg/L	58	<10	<10	<10	0
1,4-Dichlorobenzene, μg/L	58	<10	<10	<10	0
2,4,5-Trichlorophenol, μg/L	1	<50	<50	<50	0
2,4,6-Trichlorophenol, μg/L	58	<10	<10	<10	0
2,4-Dichlorophenol, μg/L	58	10	<1	9.844	1.18
2,4-Dimethylphenol, μg/L	58	<10	<10	<10	0
2,4-Dinitrophenol, μg/L	58	<50	<10	10.689	5.25
2,4-Dinitrotoluene, μg/L	58	<10	<10	<10	0
2,6-Dinitrotoluene, μg/L	58	<10	<10	<10	0
2-Chloroethylvinyl ether, μg/L	206	<10	<10	<10	0
2-Chloronaphthalene, μg/L	58	<10	<10	<10	0
2-Chlorophenol, μg/L	58	<10	<10	<10	0
2-Methylnaphthalene, μg/L	1	<10	<10	<10	0
2-Methylphenol, μg/L	1	<10	<10	<10	0
2-Nitroaniline, μg/L	1	<50	<50	<50	0
2-Nitrophenol, μg/L	58	<10	<10	<10	0
3,3'-Dichlorobenzidine, μg/L	58	<21	<20	20.017	0.13
3-Nitroaniline, μg/L	1	<50	<50	<50	0
4,6-Dinitro-2-methylphenol, μg/L	58	<52	<50	50.069	0.32
4-Bromophenyl-phenylether, μg/L	58	<10	<10	<10	0
4-Chloro-3-methylphenol, μg/L	58	<10	<10	<10	0
4-Chloroaniline, μg/L	1	<10	<10	<10	0
4-Chlorophenyl-phenylether, μg/L	58	<10	<10	<10	0
4-Methylphenol, μg/L	1	<10	<10	<10	0
4-Nitroaniline, μg/L	1	<50	<50	<50	0
4-Nitrophenol, μg/L	58	<52	<50	50.069	0.32
Acenaphthene, μg/L	58	<10	<10	<10	0
Acenaphthylene, μg/L	58	<10	<10	<10	0
Aluminum, mg/L	92	2.8	<0.02	0.205	0.30
Ammonia nitrogen, mg/L	51	1.7	<0.14	0.281	0.29
Anthracene, μg/L	58	10	<6	9.931	0.53
Antimony, mg/L	92	<0.05	<0.05	<0.050	0
Arsenic, mg/L	92	0.011	<0.005	0.005	0
Barium, mg/L	92	0.1	<0.0066	0.099	0.01
Benzene, μg/L	208	5	<0.8	4.897	0.60
Benzidine, μg/L	57	<10	<10	<10	0
Benzo(a)anthracene, μg/L	58	<10	<10	<10	0
Benzo(a)pyrene, μg/L	58	<10	<10	<10	0
Benzo(b)fluoranthene, μg/L	58	<10	<10	<10	0

Table 3.79 (continued)

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Benzo(g,h,i)perylene, µg/L	58	<10	<10	<10	0
Benzo(k)fluoranthene, µg/L	58	<10	<10	<10	0
Benzoic acid, µg/L	1	<50	<50	<50	0
Benzyl alcohol, µg/L	1	<10	<10	<10	0
Beryllium, mg/L	92	<0.001	<0.0003	0.001	0
Bis(2-chloroethoxy)methane, µg/L	58	<10	<10	<10	0
Bis(2-chloroethyl)ether, µg/L	58	<10	<10	<10	0
Bis(2-chloroisopropyl)ether, µg/L	58	<10	<10	<10	0
Bis(2-ethylhexyl)phthalate, µg/L	58	22	<3	9.982	2.12
Boron, mg/L	92	1.2	<0.004	0.084	0.17
Bromide, mg/L	50	<2	<2	<2	0
Bromodichloromethane, µg/L	208	6	<0.5	4.714	0.97
Bromoform, µg/L	208	<5	<5	<5	0
Bromomethane, µg/L	208	<10	<10	<10	0
Butylbenzylphthalte, µg/L	58	<10	<10	<10	0
Cadmium, mg/L	92	0.005	<0.002	0.002	0
Carbon tetrachloride, µg/L	208	<5	<5	<5	0
Chemical oxygen demand (COD), mg/L	165	89	<5	16.284	12.15
Chloride, mg/L	48	883	20	153.083	141.41
Chlorobenzene, µg/L	208	<5	<5	<5	0
Chloroethane, µg/L	208	<10	<10	<10	0
Chloroform, µg/L	208	31	<0.3	4.387	3.80
Chloromethane, µg/L	208	<10	<10	<10	0
Chromium, mg/L	92	0.05	<0.01	0.010	0
Chrysene, µg/L	58	10	<10	10	0
Cis-1,3-dichloropropene, µg/L	208	<5	<5	<5	0
Cobalt, mg/L	92	<0.1	<0.005	0.099	0.01
Copper, mg/L	92	0.1	<0.004	0.011	0.01
Cyanide, mg/L	51	0.1	<0.002	0.081	0.04
Di-n-butylphthalate, µg/L	58	10	<7	9.896	0.55
Di-n-octylphthalate, µg/L	58	<10	<10	<10	0
Dibenz(a.h)anthracene, µg/L	58	<10	<10	<10	0
Dibenzofuran, µg/L	1	<10	<10	<10	0
Dibromochloromethane, µg/L	208	<5	<5	<5	0
Diethylphthalate, µg/L	58	<10	<10	<10	0
Dimethylphthalate, µg/L	58	<10	<10	<10	0
Dissolved solids, µg/L	166	2,394	182	658.337	0
Ethyl benzene, µg/L	208	5	<0.8	4.955	0.38
Fluoranthene, µg/L	58	10	<8	9.948	0.29
Fluorene, µg/L	58	<10	<10	<10	0
Fluoride, mg/L	160	11	0.2	1.452	1.54
Hexachlorobenzene, µg/L	58	<10	<10	<10	0
Hexachlorobutadiene, µg/L	58	<10	<10	<10	0
Hexachlorocyclopentadiene, µg/L	58	<10	<10	<10	0
Hexachloroethane, µg/L	58	<10	<10	<10	0
Indeno(1,2,3-cd)pyrene, µg/L	58	<10	<10	<10	0
Iron, mg/L	92	9.9	<0.05	0.552	1.06
Isophorone, µg/L	58	<10	<10	<10	0
Kjeldahl nitrogen, mg/L	51	3	<0.6	1.244	0.46
Lead, mg/L	92	0.03	<0.004	0.005	0
Magnesium, mg/L	92	17	8	12.843	1.92
Manganese, mg/L	92	0.28	<0.0089	0.049	0.05

Table 3.79 (continued)

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
MBAS, mg/L	47	<0.2	<0.2	0.238	0.26
Mercury, mg/L	92	0.0045	<0.0002	<0.001	0
Methylene chloride, μg/L	208	90	<0.4	6.163	8.97
Molybdenum, mg/L	92	0.03	<0.01	0.010	0
N-nitroso-di-N-propylamine, μg/L	58	<10	<10	<10	0
N-nitrosodimethylamine, μg/L	57	<10	<10	<10	0
N-nitrosodiphenylamine, μg/L	58	<10	<10	<10	0
Naphthalene, μg/L	58	<10	<10	<10	0
Nickel, mg/L	92	0.5	<0.024	0.071	0.07
Nitrate nitrogen, mg/L	94	3.3	<0.2	0.628	0.53
Nitrobenzene, μg/L	58	<10	<10	<10	0
Oil and grease, mg/L	96	3.79	<2	2.021	0.18
PCB (Aroclor-1016), μg/L	48	<0.5	<0.5	<0.5	0
PCB (Aroclor-1221), μg/L	48	<0.5	<0.5	<0.5	0
PCB (Aroclor-1232), μg/L	48	<0.5	<0.5	<0.5	0
PCB (Aroclor-1242), μg/L	48	<0.5	<0.5	<0.5	0
PCB (Aroclor-1248), μg/L	48	<0.5	<0.5	<0.5	0
PCB (Aroclor-1254), μg/L	47	1	<0.27	0.984	0.11
PCB (Aroclor-1260), μg/L	48	<1	<1	<1	0
Pentachlorophenol, μg/L	58	<52	<50	50.069	0.32
pH, standard units	344	9.3	7.0	7.890	0.35
Phenanthrene, μg/L	58	10	<5	9.913	0.66
Phenol, μg/L	58	20	<6	10.379	2.00
Phenols, mg/L	49	2	<0.01	0.070	0.28
Phosphorus, mg/L	87	15	<0.2	1.536	2.13
Pyrene, μg/L	58	15	<9	10.069	0.67
Selenium, mg/L	92	0.0057	<0.004	0.005	0
Silver, mg/L	92	<0.01	<0.006	0.010	0
Sulfate, mg/L	46	576	49	234.239	136.74
Sulfide, mg/L	48	<1	<1	<1	0
Sulfite, mg/L	48	<2	<2	<2	0
Suspended solids, mg/L	165	35	<1	7.097	5.31
Temperature, °C	345	34.1	0	20.285	7.36
Tetrachloroethene, μg/L	208	59	<0.6	5.101	5.10
Thallium, mg/L	92	<0.02	<0.001	0.010	0
Tin, mg/L	92	0.013	<0.01	0.010	0
Titanium, mg/L	92	0.068	<0.003	0.004	0.01
Toluene, μg/L	208	6	<0.8	4.822	0.84
Total organic carbon (TOC), mg/L	91	15	2	5.120	2.06
Total phosphate, mg/L	46	21	0.5	4.030	3.71
Total residual chlorine, mg/L	48	0.5	<0.02	0.044	0.09
Trans-1,2-dichloroethene, μg/L	206	64	<1	8.169	9.59
Trans-1,3-dichloropropene, μg/L	208	10	<5	5.024	0.35
Trichloroethene, μg/L	208	460	<0.8	17.436	54.51
Uranium, mg/L	52	2.23	0.032	0.239	0.34
Vinyl chloride, μg/L	207	10	<1	9.768	1.36
Zinc, mg/L	92	0.31	<0.02	0.033	0.04

Table 3.80. 1990 NPDES Permit Number TN 0002950

Discharge Point K-1407-E/F at K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Arsenic, mg/L	59	0.0065	<0.005	0.005	0
Beryllium, mg/L	2	<0.001	<0.001	<0.001	0
Cadmium, mg/L	59	0.004	<0.002	0.002	0
Chromium, mg/L	59	0.011	<0.01	0.010	0
Copper, mg/L	59	0.21	<0.004	0.024	0.03
Iron, mg/L	56	1.9	<0.05	0.364	0.36
Lead, mg/L	59	0.0067	<0.004	0.004	0
Manganese, mg/L	57	1.1	0.023	0.134	0.17
Nickel, mg/L	59	2.6	<0.041	0.198	0.40
Oil and grease, mg/L	62	3.52	<2	2.024	0.19
PCB (Aroclor-1016), µg/L	57	<0.5	<0.5	<0.5	0
PCB (Aroclor-1221), µg/L	57	<0.5	<0.5	<0.5	0
PCB (Aroclor-1232), µg/L	57	<0.5	<0.5	<0.5	0
PCB (Aroclor-1242), µg/L	57	<0.5	<0.5	<0.5	0
PCB (Aroclor-1248), µg/L	57	<0.5	<0.5	<0.5	0
PCB (Aroclor-1254), µg/L	57	<1	<1	<1	0
PCB (Aroclor-1260), µg/L	57	<1	<1	<1	0
pH, standard units	697	9.6	3.7	*a*	*a*
Selenium, mg/L	59	<0.005	<0.005	<0.005	0
Silver, mg/L	59	0.01	<0.006	0.009	0
Sulfate, mg/L	15	1,440	75	649.47	339.12
Suspended solids, mg/L	57	42	1	8.95	7.20
Temperature, °C	751	38.3	3.5	19.3	7.29
Thorium, pCi/L	2	10.7	1.05	5.88	6.82
Zinc, mg/L	59	0.12	<0.006	0.022	0.01

[a]Not applicable.

Table 3.81. K-25 Site K-1407-J pond toxicity endpoints during 1990

Month	Fathead minnows		*Ceriodaphnia*	
	Survival NOEC[a] (%)	Growth NOEC (%)	Survival NOEC (%)	Reproduction NOEC (%)
February	100	100	1	1
April	50	50	100	100
June	100	100	100	100
August	100	100	100	100
October	100	100	100	100
December	100	100	100	100

[a]No-observed-effect concentration.

Table 3.82. K-25 Site K-1407-E and K-1407-F pond toxicity endpoints during 1990

Month	Fathead minnows		*Ceriodaphnia*	
	Survival NOEC[a] (%)	Growth NOEC (%)	Survival NOEC (%)	Reproduction NOEC (%)
February	100	100	25	25
April	100	100	6	6
June	100	100	6	6
August	100	100	100	100
October	100	100	6	6
December	100	100	50	50

[a]No-observed-effect concentration.

Table 3.83. ORNL 1990 concentration of PCB in sediment

Location[a]	Analysis	Number of samples	Concentration (μg/kg)			
			Max	Min	Av	Standard error[b]
WOC 06	Aroclor-1016	4	<250	<100	<160	35
	Aroclor-1221	4	<250	<100	<160	35
	Aroclor-1232	4	<250	<100	<160	35
	Aroclor-1242	4	<250	<100	<170	37
	Aroclor-1248	4	<250	<100	<160	35
	Aroclor-1254	4	2000	<200	<890	425
	Aroclor-1260	4	640	~130	~410	105
WOC 10	Aroclor-1016	4	<220	<89	<150	35
	Aroclor-1221	4	<220	<89	<150	35
	Aroclor-1232	4	<220	<89	<150	35
	Aroclor-1242	4	270	<89	<170	47
	Aroclor-1248	4	<220	<89	<150	35
	Aroclor-1254	4	490	<89	<270	104
	Aroclor-1260	4	~180	~120	~170	14
WOD 13	Aroclor-1016	4	240	<81	<130	37
	Aroclor-1221	4	<110	<81	<96	8.9
	Aroclor-1232	4	<110	<81	<96	8.9
	Aroclor-1242	4	<110	~21	~73	18
	Aroclor-1248	4	<110	<81	<96	8.9
	Aroclor-1254	4	<230	~64	~150	33
	Aroclor-1260	4	<230	<160	<190	17
WOC 14	Aroclor-1016	4	<260	<130	<180	33
	Aroclor-1221	4	<260	<130	<180	33
	Aroclor-1232	4	<260	<130	<180	33
	Aroclor-1242	4	300	~120	~170	43
	Aroclor-1248	4	<260	<130	<180	33
	Aroclor-1254	4	<250	~89	~200	38
	Aroclor-1260	4	<510	<250	<370	66
MB 07	Aroclor-1016	4	<210	<100	<130	25
	Aroclor-1221	4	<210	<100	<130	25
	Aroclor-1232	4	<210	<100	<130	25
	Aroclor-1242	4	270	~28	~120	50
	Aroclor-1248	4	<210	<100	<130	25
	Aroclor-1254	4	<410	<200	<270	50
	Aroclor-1260	4	<410	<200	<270	50
CR 08	Aroclor-1016	4	<140	<80	<97	14
	Aroclor-1221	4	<140	<80	<97	14
	Aroclor-1232	4	<140	<80	<97	14
	Aroclor-1242	4	250	~78	~120	42
	Aroclor-1248	4	<140	<80	<97	14
	Aroclor-1254	4	<280	~29	~120	56
	Aroclor-1260	4	<280	<160	<190	29

Table 3.83 (continued)

Location[a]	Analysis	Number of samples	Concentration (μg/kg)			
			Max	Min	Av	Standard error[b]
CR 09	Aroclor-1016	4	<180	<80	<130	26
	Aroclor-1221	4	<180	<80	<130	26
	Aroclor-1232	4	<180	<80	<130	26
	Aroclor-1242	4	230	<80	<130	35
	Aroclor-1248	4	<180	<80	<130	26
	Aroclor-1254	4	~180	~44	~96	28
	Aroclor-1260	4	<360	<160	<250	52
CR 11	Aroclor-1016	4	<130	<80	<94	12
	Aroclor-1221	4	<130	<80	<94	12
	Aroclor-1232	4	<130	<80	<94	12
	Aroclor-1242	4	<130	~26	~80	21
	Aroclor-1248	4	<130	<80	<94	12
	Aroclor-1254	4	<260	<160	<190	25
	Aroclor-1260	4	<260	<160	<190	25
CR 12	Aroclor-1016	4	<110	<81	<98	7.6
	Aroclor-1221	4	<110	<81	<98	7.6
	Aroclor-1232	4	<110	<81	<98	7.6
	Aroclor-1242	4	<89	~22	~67	15
	Aroclor-1248	4	<110	<81	<98	7.6
	Aroclor-1254	4	<220	~56	~150	34
	Aroclor-1260	4	<230	<160	<200	15

[a]See Fig. 3.10 in Vol. 1.
[b]Standard error of the mean.

GROUNDWATER

REFERENCES

The following references are referred to in Tables 4.1–4.11.

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 1200-1-11-5, Appendix 05/B.
5. DOE Order 5400.5. 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 4.1. Primary drinking water parameters monitored in groundwater during 1990

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]

[a]References for applicable standards precede this table.
[b]Maximum contaminant level.
[c]Secondary maximum contaminant level.
[d]RCRA 40 CFR Pt. 265 Appendix B and State of Tennessee Hazardous Waste Regulations.

Table 4.2. Parameters establishing groundwater quality monitored during 1990

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

[a]Secondary maximum contaminant level.

Table 4.3. Indicator parameters monitored in groundwater semiannually in 1990

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

[a]Secondary maximum contaminant level.

Table 4.4. 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

[a]Maximum contaminant level.
[b]Secondary maximum contaminant level.

Table 4.5. 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]

[a]Maximum contaminant level.
[b]Secondary maximum contaminant level.

Table 4.6. Typical anions sought in groundwater

Parameter	Reference	Results used for required monitoring characterization studies: 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]

[a]Maximum contaminant level.
[b]Secondary maximum contaminant level.
[c]State of Tennessee Hazardous Waste Regulations, TN 1200-1-11.05, Appendix 0.05/B.
[d]Proposed by Y-12 Environmental Management Department for required monitoring and compliance limit.

Table 4.7. 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

[a]Maximum contaminant level effective 7/8/87.

Table 4.8. Pesticides and polychlorinated biphenyls (hazardous substance list) sought in groundwater

Parameter	Reference	Chemical Abstracts Service No.	Applicable standards (mg/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 4.9. 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-di-n-propylamine		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
Anthracene		120-12-7	None
Di-*n*-butylphthalate		84-74-2	None
Fluoranthene		206-44-0	None
Pyrene		129-00-0	None

Table 4.9 (continued)

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

[a]Maximum contaminant level effective 7/8/87.

Table 4.10. 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

[a]Maximum contaminant level.

[b]Maximum contaminant level in the absence of ^{90}Sr and alpha emitters = 1,000 pCi/L.

Table 4.11. 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 (as N)		None
Chemical oxygen demand		None
MBAS		None

Table 4.12. Constituents in groundwater at the Y-12 Plant, 1990

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
9754-2 Fuel Facility							
Barium, total (mg/L)	20	20	1.3	0.058	0.34	1	1
Cadmium, total (mg/L)	6	20	0.035	<0.0020	0.020	0.010	4
Chloride (mg/L)	20	20	610	2	130	250	3
Chromium, total (mg/L)	17	20	6	<0.010	0.73	0.050	11
Dissolved solids (mg/L)	20	20	1430	62	439	500	8
Gross alpha (pCi/L)	*a*	20	20	–0.45	3.4	15	1
Iron, total (mg/L)	20	20	45	0.59	5.4	0.30	20
Lead, total (mg/L)	10	20	0.082	<0.0040	0.020	0.0500	1
Manganese, total (mg/L)	20	20	3.6	0.059	1.3	0.050	20
Mercury, total (mg/L)	8	20	0.0057	<0.00020	0.0010	0.0020	1
pH (standard units)	*a*	35	7.5	3.7	*a*	6.5/8.5	3
Radium (pCi/L)	*a*	5	5.4	0.57	2.2	5	1
Tetrachloroethene (µg/L)	1	20	5	<5	5	*b*	*a*
Turbidity (NTU)	*a*	20	2.2	15	240	5	20
Bear Creek Valley surface and spring water							
1,2-Dichloroethene, total (µg/L)	4	20	190	<5	73	*b*	*a*
Dissolved solids (mg/L)	20	20	2080	22	428	500	5
Gross alpha (pCi/L)	*a*	20	77	–1.2	26	15	12
Gross beta (pCi/L)	*a*	20	610	–2.9	110	50	10
Iron, total (mg/L)	20	20	29	0.013	1.8	0.30	8
Manganese, total (mg/L)	20	20	6.1	0.0058	0.62	0.050	10
Methylene chloride (µg/L)	1	20	5	<5	5	*b*	*a*
Nitrate-N (mg/L)	16	20	310	<0.2	49	10	10
pH (standard units)	*a*	20	8.1	5.5	6.8	6.5/8.5	10
Trichloroethene (µg/L)	2	20	32	<5	26	5	2
Turbidity (NTU)	*a*	20	220	0.90	29	5	10
Beta-4 Security Pit							
1,2-Dichloroethene, total (µg/L)	3	6	36	<5	23	*b*	*a*
Barium, total (mg/L)	12	12	1.4	0.15	0.38	1	1
Chromium, total (mg/L)	6	12	0.057	<0.010	0.023	0.050	1
Iron, total (mg/L)	12	12	51	0.23	7.6	0.30	11
Manganese, total (mg/L)	12	12	4.4	0.067	1.2	0.050	12
pH (standard units)	*a*	30	7.8	5.8	6.8	*a*	4
Tetrachloroethene (µg/L)	1	6	5	<5	5	*b*	*a*
Turbidity (NTU)	*a*	6	290	5	67	5	5
Burial grounds							
1,1,1-Trichloroethane (µg/L)	11	152	970	<5	120	200	1
1,1-Dichloroethane (µg/L)	27	152	550	<5	140	*b*	*a*
1,1-Dichloroethene (µg/L)	11	152	140	<5	52	7	11
1,2-Dichloroethane (µg/L)	2	152	18	<5	15	5	2
1,2-Dichloroethene, total (µg/L)	20	152	5.4	<5	860	*b*	*a*
2-Hexanone (µg/L)	1	152	570	<10	570	*b*	*a*
228 Radium (pCi/L)	*a*	5	5.4	–5.4	0.22	5	2
Acetone (µg/L)	11	152	69	<10	21	*b*	*a*
Benzene (µg/L)	8	152	130	<5	75	5	8
Bromoform (µg/L)	1	152	20	<5	20	*b*	*a*

Table 4.12 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Cadmium, total (mg/L)	13	151	29	<0.020	2.2	0.010	4
Carbon tetrachloride (μg/L)	1	152	13	<5	13	5	1
Chloride (mg/L)	146	152	8	<1	240	250	12
Chloroethane (μg/L)	2	152	45	<10	33	*b*	*a*
Chloroform (μg/L)	3	152	59	<5	30	*b*	*a*
Chromium, total (mg/L)	24	152	0.25	<0.040	0.062	0.050	9
Dissolved solids (mg/L)	152	152	4990	22	519	500	28
Fluoride (mg/L)	53	113	7	<0.1	2	4	8
Gross alpha (pCi/L)	*a*	152	1	−3.8	3.2	15	5
Gross beta (pCi/L)	*a*	152	440	−140	8.7	50	3
Iron, total (mg/L)	109	113	53	<0.0040	2.9	0.30	69
Lead, total (mg/L)	81	152	0.26	<0.0040	0.018	0.050	4
Manganese, total (mg/L)	108	113	1.4	<0.0010	0.20	0.050	76
Methylene chloride (μg/L)	4	152	54	<5	30	*b*	*a*
Nitrate-N (mg/L)	23	152	28	<1000	5.9	10	5
pH (standard units)	*a*	269	10.9	5.7	7.5	6.5/8.5	107
Sulfate (mg/L)	149	152	310	<1000	19	250	1
Tetrachloroethene (μg/L)	20	152	2.9	<5	530	*b*	*a*
Toluene (μg/L)	1	152	10	<5	10	*b*	*a*
Trichloroethene (μg/L)	16	152	1.8	<5	460	5	14
Turbidity (NTU)	*a*	152	7	0.50	27	5	88
Vinyl chloride (μg/L)	10	152	970	<10	350	2	10
Xylenes (μg/L)	1	152	35	<5	35	*b*	*a*
Burial Grounds—LLWDDD Lysimeter Demonstration Site							
Barium, total (mg/L)	23	23	1.8	0.070	0.56	1	4
Bis(2-ethylhexyl)phthalate (μg/L)	1	5	17	<10	17	*b*	*a*
Chromium, total (mg/L)	7	23	0.076	<0.010	0.029	0.050	1
Dissolved solids (mg/L)	23	23	4420	46	858	500	4
Gross alpha (pCi/L)	*a*	23	130	−0.23	8.9	15	1
Gross beta (pCi/L)	*a*	23	680	−50	63	50	4
Iron, total (mg/L)	22	23	13	<0.0040	2.1	0.30	15
Lead, total (mg/L)	11	23	0.096	<0.0040	0.023	0.050	1
Manganese, total (mg/L)	23	23	1.2	0.0026	0.26	0.050	18
Nitrate-N (mg/L)	4	23	990	<0.2	820	10	4
pH (standard units)	*a*	38	7.7000	5.6000	*a*	6.5/8.5	8
Radium (pCi/L)	*a*	5	5.1	1.4	2.8	5	1
Turbidity (NTU)	*a*	23	4	0.70	56	5	13
Burial Grounds—LLWDDD Packaging							
Coliform, (cc/100 ml)	1	6	2	0	2	1	1
Dissolved solids (mg/L)	6	6	574	104	245	500	1
Iron, total (mg/L)	6	6	1.9	0.29	1.1	0.30	5
Manganese, total (mg/L)	6	6	0.29	0.010	0.10	0.050	3
pH (standard units)	*a*	24	8.8	6.8	7.5	*a*	4
Tetrachloroethene (μg/L)	3	6	1.8	<5	650	*b*	*a*
Trichloroethene (μg/L)	1	6	23	<5	23	5	1
Turbidity (NTU)	*a*	6	20	2.1	9.9	5	3

Table 4.12 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Chestnut Ridge Security Pit							
1,1,1-Trichloroethane (μg/L)	35	68	590	<5	150	200	12
1,1,2,2-Tetrachloroethane (μg/L)	1	68	13	<5	13	*b*	*a*
1,1-Dichloroethane (μg/L)	21	68	170	<5	75	*b*	*a*
1,1-Dichloroethene (μg/L)	16	68	110	<5	57	7	16
1,2-Dichloroethane (μg/L)	1	68	6	<5	6	5	1
1,2-Dichloroethene, total (μg/L)	9	68	47	<5	20	*b*	*a*
Acetone (μg/L)	8	68	43	<10	20	*b*	*a*
Carbon tetrachloride (μg/L)	2	68	40	<5	27	5	2
Chloroform (μg/L)	2	68	20	<5	15	*b*	*a*
Chromium, total (mg/L)	10	68	0.085	<0.040	0.038	0.050	2
Fluoride (mg/L)	10	68	7	<0.1	0.9	4	1
Gross beta (pCi/L)	*a*	68	54	–3.7	4.3	50	1
Iron, total (mg/L)	49	51	18	<0.0040	0.88	0.30	17
Lead, total (mg/L)	20	68	0.38	<0.0051	0.037	0.050	2
Manganese, total (mg/L)	36	51	0.49	<0.0010	0.041	0.050	4
Methylene chloride (μg/L)	2	68	11	<5	8	*b*	*a*
pH (standard units)	*a*	119	8.4	6.1	*a*	6.5/8.5	2
Tetrachloroethene (μg/L)	34	68	1	<5	26	*b*	*a*
Turbidity (NTU)	*a*	68	4	0.30	110	5	29
Chestnut Ridge Sediment Disposal Basin							
Acetone (μg/L)	1	32	20	<10	20	*b*	*a*
Iron, total (mg/L)	32	32	5.8	0.018	0.86	0.30	19
Lead, total (mg/L)	18	32	0.089	<0.0040	0.018	0.050	1
Manganese, total (mg/L)	28	32	0.31	<0.0010	0.046	0.050	6
pH (standard units)	*a*	83	8.3	6	7.2	6.5/8.5	4
Phenol (μg/L)	10	28	61	<10	20	*b*	*a*
Turbidity (NTU)	*a*	32	320	1.5	47	5	25
East Chestnut Ridge Waste Pile							
Acetone (μg/L)	1	12	12	<10	12	*b*	*a*
Iron, total (mg/L)	10	12	9.3	<0.0040	1.7	0.30	4
Manganese, total (mg/L)	6	12	0.060	<0.0010	0.024	0.050	1
Turbidity (NTU)	*a*	12	70	0.30	11	5	3
Fly Ash Pond							
Iron, total (mg/L)	12	16	0.77	<0.0040	0.29	0.30	3
Turbidity (NTU)	*a*	16	7.2	0.60	2.9	5	3
Industrial Landfill III							
Acetone (μg/L)	2	28	15	<10	14	*b*	*a*
Benzene (μg/L)	1	28	12	<5	12	5	1
Chromium, total (mg/L)	8	28	0.27	<0.010	0.072	0.050	4
Coliform (cc/100 ml)	1	7	7	0	7	1	1
Iron, total (mg/L)	28	28	40	0.0041	4.6	0.30	17
Lead, total (mg/L)	11	28	0.20	<0.0040	0.069	0.050	6
Manganese, total (mg/L)	24	28	2.1	<0.0010	0.18	0.050	10
pH (standard units)	*a*	49	7.7	6	*a*	6.5/8.5	4
Turbidity (NTU)	*a*	28	4.6	0.30	290	5	16

Table 4.12 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
			Industrial Landfill IV				
Acetone (μg/L)	2	20	22	<10	17	*b*	*a*
Chromium, total (mg/L)	2	20	0.063	<0.010	0.052	0.050	1
Gross alpha (pCi/L)	*a*	20	15	–9.4	0.90	15	1
Iron, total (mg/L)	20	20	12	0.021	0.93	0.30	8
Lead, total (mg/L)	7	20	0.17	<0.0040	0.033	0.050	1
Manganese, total (mg/L)	16	20	0.34	<0.0010	0.054	0.050	3
pH (standard units)	*a*	35	7.6	5.5	6.8	6.5/8.5	4
Turbidity (NTU)	*a*	20	9	1.5	69	5	15
			Kerr Hollow Quarry				
Acetone (μg/L)	1	21	14	<10	14	*b*	*a*
Carbon tetrachloride (μg/L)	1	21	6	<5	6	5	1
Chromium, total (mg/L)	3	28	0.075	<0.010	0.036	0.050	1
Gross beta (pCi/L)	*a*	21	78	–27	12	50	1
Iron, total (mg/L)	26	28	18	<0.0040	3.2	0.30	18
Lead, total (mg/L)	7	21	0.11	<0.0040	0.034	0.050	2
Manganese, total (mg/L)	24	28	2.3	<0.0010	0.30	0.050	10
Turbidity (NTU)	*a*	28	320	0.28	40	5	20
			New Hope Pond				
1,2-Dichloroethene, total (μg/L)	12	75	120	<5	49	*b*	*a*
Acetone (μg/L)	5	75	180	<10	50	*b*	*a*
Benzene (μg/L)	2	75	44	<5	42	5	2
Cadmium, total (mg/L)	4	57	0.019	<0.0020	0.0070	0.010	1
Carbon tetrachloride (μg/L)	32	75	8.5	<5	1.6	5	32
Chloride (mg/L)	75	75	610	2	69	250	7
Chloroform (μg/L)	28	75	2.3	<5	240	*b*	*a*
Chromium, total (mg/L)	13	75	2.9	<0.010	0.34	0.050	7
Dissolved solids (mg/L)	74	74	1310	126	407	500	13
Gross alpha (pCi/L)	*a*	75	8.0	–7.3	34	15	10
Gross beta (pCi/L)	*a*	75	730	–3	33	50	7
Iron, total (mg/L)	57	57	72	0.0053	2.8	0.30	38
Lead, total (mg/L)	27	75	1.4	<0.0040	0.090	0.050	6
Manganese, total (mg/L)	49	57	6.6	<0.0010	0.53	0.050	33
Mercury, total (mg/L)	9	75	0.0036	<0.00020	0.0010	0.0020	2
Methylene chloride (μg/L)	8	75	410	<5	98	*b*	*a*
pH (standard units)	*a*	129	9.4	6.5	*a*	6.5/8.5	7
Strontium (pCi/L)	*a*	3	110	17	53	8	3
Tetrachloroethene (μg/L)	25	75	290	<5	99	*b*	*a*
Trichloroethene (μg/L)	15	75	140	<5	46	5	13
Turbidity (NTU)	*a*	75	7	0.20	190	5	42

Table 4.12 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
			Oil Landfarm				
1,1-Dichloroethane (μg/L)	7	100	16	<5	8	*b*	*a*
1,1-Dichloroethene (μg/L)	11	100	22	<5	9	7	3
1,2-Dichloroethane (μg/L)	1	100	6	<5	6	5	1
1,2-Dichloroethene, total (μg/L)	22	100	110	<5	34	*b*	*a*
228 Radium (pCi/L)	*a*	5	16	–2.7	6.6	5	3
Acetone (μg/L)	10	100	86	<10	27	*b*	*a*
Barium, total (mg/L)	74	74	1.2	0.018	0.23	1	1
Benzene (μg/L)	2	100	33	<5	20	5	2
Cadmium, total (mg/L)	6	74	0.045	<0.0020	0.012	0.010	2
Carbon tetrachloride (μg/L)	7	100	9	<5	7	5	4
Chlorobenzene (μg/L)	1	100	5	<5	5	*b*	*a*
Chloroform (μg/L)	1	100	26	<5	26	*b*	*a*
Chromium, total (mg/L)	24	100	0.41	<0.010	0.067	0.050	7
Dissolved solids (mg/L)	99	100	1.2	<1	4.0	500	28
Fluoride (mg/L)	37	74	4.7	<0.10	0.79	4	3
Gross alpha (pCi/L)	*a*	100	54	–0.80	5.4	15	10
Gross beta (pCi/L)	*a*	100	150	–2.4	16	50	5
Iron, total (mg/L)	72	73	82	<0.0040	4.4	0.30	41
Lead, total (mg/L)	51	100	0.66	<0.0040	0.036	0.050	5
Manganese, total (mg/L)	67	73	9.7	<0.0010	0.72	0.050	35
Mercury, total (mg/L)	4	74	0.038	<0.00020	0.016	0.0020	3
Methylene chloride (μg/L)	1	100	5	<5	5	*b*	*a*
Nitrate-N (mg/L)	50	100	260	<0.20	29	10	21
pH (standard units)	*a*	181	11.8	5.1	*a*	6.5/8.5	41
Strontium (pCi/L)	*a*	5	73	–43	25	8	3
Sulfate (mg/L)	98	100	3	<100	30	250	3
Tetrachloroethene (μg/L)	7	100	240	<5	47	*b*	*a*
Trichloroethene (μg/L)	44	100	460	<5	89	5	43
Turbidity (NTU)	*a*	100	5.8	0.20	130	5	60
Vinyl chloride (μg/L)	1	100	14	<10	14	2	1
			Perimeter wells, east				
Acetone (μg/L)	1	13	19	<10	19	*b*	*a*
Barium, total (mg/L)	13	13	1.3	0.017	0.29	1	1
Carbon tetrachloride (μg/L)	1	13	16	<5	16	5	1
Chloroform (μg/L)	1	13	12	<5	12	*b*	*a*
Chromium, total (mg/L)	5	13	0.32	<0.010	0.084	0.050	1
Dissolved solids (mg/L)	13	13	570	250	4	500	3
Gross alpha (pCi/L)	*a*	13	32	0.27	5.5	15	1
Gross beta (pCi/L)	*a*	13	94	–0.23	13	50	1
Iron, total (mg/L)	13	13	140	0.12	19	0.30	9
Lead, total (mg/L)	3	13	0.44	<0.0040	0.24	0.050	2
Manganese, total (mg/L)	12	13	7.8	<0.0010	1.7	0.050	5
Methylene chloride (μg/L)	1	13	14	<5	14	*b*	*a*
pH (standard units)	*a*	13	9.3	6.2	*a*	6.5/8.5	2
Turbidity (NTU)	*a*	13	2	1	350	5	7

Table 4.12 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
			Perimeter wells, west				
Dissolved solids (mg/L)	9	9	1.3	56	520	500	3
Fluoride (mg/L)	4	9	6	<0.1	2	4	1
Iron, total (mg/L)	8	9	54	<0.0040	8.6	0.30	5
Manganese, total (mg/L)	9	9	0.49	0.0021	0.083	0.050	3
pH (standard units)	*a*	9	11.6	5.5	*a*	6.5/8.5	5
Sulfate (mg/L)	9	9	1.1	1	350	250	3
Turbidity (NTU)	*a*	9	850	3.0000	165.444	5	8
			Roger's Quarry				
Coliform, (cc/100 ml)	1	4	4	0	4	1	1
Dissolved solids (mg/L)	8	8	530	210	380	500	2
Iron, total (mg/L)	7	8	0.94	<0.0040	0.51	0.30	4
Manganese, total (mg/L)	6	8	0.16	<0.0010	0.097	0.050	4
Nitrate-N (mg/L)	2	8	21	<0.2	16	10	2
Turbidity (NTU)	*a*	8	37	0.80	12	5	5
			Rust Spoil Area				
1,2-Dichloroethene, total (μg/L)	19	28	28	<5	17	*b*	*a*
Acetone (μg/L)	1	28	13	<10	13	*b*	*a*
Chloroform (μg/L)	5	28	6	<5	6	*b*	*a*
Chromium, total (mg/L)	10	28	0.18	<0.010	0.060	0.050	4
Dissolved solids (mg/L)	28	28	810	190	570	500	16
Gross beta (pCi/L)	*a*	28	120	–0.34	36	50	6
Iron, total (mg/L)	27	28	5	<0.0040	0.75	0.30	13
Lead, total (mg/L)	14	28	0.098	<0.0040	0.033	0.050	3
Manganese, total (mg/L)	27	28	3.4	<0.0010	0.49	0.050	10
Nitrate-N (mg/L)	28	28	48	0.2	12	10	18
pH (standard units)	*a*	45	12.3	6.3	*a*	6.5/8.5	14
Strontium (pCi/L)	*a*	6	120	–24	22	8	2
Trichloroethene (μg/L)	28	28	83	9	43	5	28
Turbidity (NTU)	*a*	28	360	0.090	27	5	14
			S-2 Pond Site				
1,2-Dichloroethene, total (μg/L)	3	7	81	<5	73	*b*	*a*
Acetone (μg/L)	1	7	230	<10	230	*b*	*a*
Cadmium, total (mg/L)	7	7	4.5	0.17	1.8	0.010	7
Carbon tetrachloride (μg/L)	7	7	40	9	22	5	7
Chloroform (μg/L)	6	7	41	<5	23	*b*	*a*
Copper, total (mg/L)	6	6	110	0.78	46	1	3
Dissolved solids (mg/L)	7	7	3.5	670	1.8	500	7
Gross alpha (pCi/L)	*a*	7	54	3.4	19	15	2
Gross beta (pCi/L)	*a*	7	57	6.6	22	50	1
Iron, total (mg/L)	5	6	0.94	<0.0040	0.26	0.30	1
Lead, total (mg/L)	6	7	0.054	<0.0040	0.029	0.050	1
Manganese, total (mg/L)	6	6	40	3.8	21	0.050	6
Mercury, total (mg/L)	3	7	0.014	<0.00020	0.011	0.0020	3
Nitrate-N (mg/L)	7	7	1.4	79	490	10	7

Table 4.12 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
pH (standard units)	*a*	10	7.1	4.4	*a*	6.5/8.5	7
Sulfate (mg/L)	7	7	350	20	120	250	2
Tetrachloroethene (μg/L)	7	7	880	170	440	*b*	*a*
Trichloroethene (μg/L)	7	7	490	59	230	5	7
Turbidity (NTU)	*a*	7	20	1.7	10	5	5
Zinc, total (mg/L)	6	6	5.8	0.089	2.7	5	2
			S-3 Pond Site				
1,1-Dichloroethane (μg/L)	1	98	8	<5	8	*b*	*a*
1,2-Dichloroethene, total (μg/L)	14	98	2.7	<5	7	*b*	*a*
2-Butanone (μg/L)	2	98	32	<10	24	*b*	*a*
228 Radium (pCi/L)	*a*	10	110	–2.7	47	5	8
Acetone (μg/L)	12	98	460	<10	140	*b*	*a*
Barium, total (mg/L)	98	98	350	0.0040	13	1	30
Cadmium, total (mg/L)	20	98	4.1	<0.010	0.39	0.010	17
Chloride (mg/L)	84	98	440	<100	50	250	4
Chloroform (μg/L)	7	98	33	<5	19	*b*	*a*
Chromium, total (mg/L)	13	98	0.22	<0.010	0.036	0.050	1
Copper, total (mg/L)	50	64	1.4	<0.40	0.076	1	1
Dissolved solids (mg/L)	98	98	7.65	20	6560	500	48
Ethylbenzene (μg/L)	1	98	15	<5	15	*b*	*a*
Fluoride (mg/L)	51	98	39	<0.1	2	4	10
Gross alpha (pCi/L)	*a*	100	8.7	–20	190	15	20
Gross beta (pCi/L)	*a*	100	7.2	–290	1.7	50	24
Iron, total (mg/L)	63	64	28	<0.40	2.6	0.30	35
Lead, total (mg/L)	45	98	2.3	<0.0040	0.19	0.050	13
Manganese, total (mg/L)	61	64	170	<0.0010	3.9	0.050	32
Mercury, total (mg/L)	13	98	0.087	<0.00020	0.012	0.0020	6
Methylene chloride (μg/L)	9	98	160	<5	38	*b*	*a*
Nitrate-N (mg/L)	68	98	1.3	<0.5	1.7	10	43
pH (standard units)	*a*	200	11.9	3.5	*a*	6.5/8.5	90
Silver, total (mg/L)	1	64	0.064	<0.60	0.064	0.050	1
Strontium (pCi/L)	*a*	10	250	12	64	8	10
Sulfate (mg/L)	77	98	8	<100	41	250	2
Tetrachloroethene (μg/L)	20	98	3.7	<5	470	*b*	*a*
Toluene (μg/L)	3	98	40	<5	19	*b*	*a*
Trichloroethene (μg/L)	15	98	840	<5	130	5	13
Turbidity (NTU)	*a*	98	320	0.40	25	5	53
Vinyl acetate (μg/L)	2	98	37	<10	30	*b*	*a*
Xylenes (μg/L)	2	98	80	<5	45	*b*	*a*
			S-3 Pond Site—Salvage Yard/OSDS				
1,1-Dichloroethene (μg/L)	1	17	30	<5	30	7	1
Acetone (μg/L)	1	17	38	<10	38	*b*	*a*
Chromium, total (mg/L)	5	17	0.13	<0.010	0.056	0.050	2
Dissolved solids (mg/L)	17	17	708	60	309	500	4
Iron, total (mg/L)	17	17	17	0.079	1.8	0.30	15

Table 4.12 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Manganese, total (mg/L)	17	17	1.2	0.0054	0.14	0.050	6
Methylene chloride (μg/L)	1	17	5	<5	5	*b*	*a*
Nitrate-N (mg/L)	6	17	6.7	<2	1.1	10	1
pH (standard units)	*a*	38	7.9	6	*a*	6.5/8.5	8
Tetrachloroethene (μg/L)	2	17	140	<5	76	*b*	*a*
Trichloroethene (μg/L)	1	17	15	<5	15	5	1
Turbidity (NTU)	*a*	17	60	3.4	18	5	13
			Sanitary Landfill II				
1,1-Dichloroethane (μg/L)	3	7	32	<5	28	*b*	*a*
1,1-Dichloroethene (μg/L)	1	7	31	<5	31	7	1
1,2-Dichloroethene, total (μg/L)	1	7	29	<5	29	*b*	*a*
2-Butanone (μg/L)	1	7	44	<10	44	*b*	*a*
Acetone (μg/L)	1	7	10	<10	10	*b*	*a*
Benzene (μg/L)	1	7	13	<5	13	5	1
Chlorobenzene (μg/L)	1	7	10	<5	10	*b*	*a*
Chromium, total (mg/L)	4	7	0.082	<0.010	0.036	0.050	1
Iron, total (mg/L)	7	7	120	0.057	19	0.30	4
Lead, total (mg/L)	5	7	0.11	<0.0040	0.039	0.050	1
Manganese, total (mg/L)	7	7	3.4	0.013	0.76	0.050	5
Tetrachloroethene (μg/L)	1	7	5	<5	5	*b*	*a*
Toluene (μg/L)	1	7	12	<5	12	*b*	*a*
Trichloroethene (μg/L)	1	7	64	<5	64	5	1
Turbidity (NTU)	*a*	4	3.5	1	1.1	5	4
			Spoil Area I				
1,2-Dichloroethene, total (μg/L)	7	24	45	<5	21	*b*	*a*
Acetone (μg/L)	1	24	12	<10	12	*b*	*a*
Gross beta (pCi/L)	*a*	24	90	–2.4	15	50	3
Iron, total (mg/L)	20	23	0.91	<0.0040	0.16	0.30	4
Lead, total (mg/L)	10	24	0.12	<0.0040	0.019	0.050	1
Manganese, total (mg/L)	16	23	0.12	<0.0010	0.017	0.050	1
Nitrate-N (mg/L)	19	24	33	<0.2	6	10	4
Tetrachloroethene (μg/L)	8	24	55	<5	23	*b*	*a*
Trichloroethene (μg/L)	5	24	22	<5	14	5	5
Turbidity (NTU)	*a*	24	20	0.20	2	5	1
			Underground Storage Tank Investigation—9201-1				
Acetone (μg/L)	1	2	340	<10	340	*b*	*a*
Benzene (μg/L)	2	2	3	2	2.5	5	2
Ethylbenzene (μg/L)	2	2	1.3	980	1.1	*b*	*a*
Iron, total (mg/L)	2	2	3.6	1.7	2.7	0.30	2
Manganese, total (mg/L)	2	2	0.85	0.55	0.70	0.050	2
Toluene (μg/L)	2	2	1.4	620	1	*b*	*a*
Turbidity (NTU)	*a*	2	65	65	65	5	2
Xylenes (μg/L)	2	2	1.8	730	1.3	*b*	*a*

Table 4.12 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Underground Storage Tank Investigation—9204-2							
Acetone (μg/L)	1	3	110	<10	110	*b*	*a*
Benzene (μg/L)	3	3	120	20	72	5	3
Ethylbenzene (μg/L)	2	3	650	<5	380	*b*	*a*
Gross alpha (pCi/L)	*a*	3	41	0.60	18	15	1
Iron, total (mg/L)	3	3	2.9	1.7	2.2	0.30	3
Manganese, total (mg/L)	3	3	3.3	2	2.6	0.050	3
Toluene (μg/L)	2	3	370	<5	260	*b*	*a*
Turbidity (NTU)	*a*	3	1.2	15	4	5	3
Xylenes (μg/L)	3	3	4.3	370	2.3	*b*	*a*
Underground Storage Tank Investigation—9754-2							
Benzene (μg/L)	3	3	360	39	180	5	3
Dissolved solids (mg/L)	3	3	568	552	558	500	3
Ethylbenzene (μg/L)	2	3	20	<5	16	*b*	*a*
Iron, total (mg/L)	3	3	1.7	0.27	0.78	0.30	2
Manganese, total (mg/L)	3	3	0.29	0.27	0.28	0.050	3
Methylene chloride (μg/L)	1	3	5	<5	5	*b*	*a*
Toluene (μg/L)	3	3	2	24	110	*b*	*a*
Turbidity (NTU)	*a*	3	1	2.6	42	5	2
Xylenes (μg/L)	3	3	86	6	54	*b*	*a*
Underground Storage Tank Investigation—Rust Garage							
1,2-Dichloroethane (μg/L)	1	4	3	<5	3	5	1
2-Butanone (μg/L)	1	4	580	<10	580	*b*	*a*
Acetone (μg/L)	1	4	13	<10	13	*b*	*a*
Benzene (μg/L)	1	4	1.9	<5	1.9	5	1
Chromium, total (mg/L)	3	4	0.89	<0.010	0.58	0.050	3
Ethylbenzene (μg/L)	1	4	1.9	<5	1.9	*b*	*a*
Gross alpha (pCi/L)	*a*	4	36	4.2	19	15	2
Iron, total (mg/L)	4	4	10	0.38	3.3	0.30	4
Manganese, total (mg/L)	4	4	2.9	0.27	1	0.050	4
pH (standard units)	*a*	4	6.3	5	*a*	6.5/8.5	4
Toluene (μg/L)	1	4	2.9	<5	2.9	*b*	*a*
Turbidity (NTU)	*a*	4	740	7	230	5	4
Xylenes (μg/L)	1	4	3.6	<5	3.6	*b*	*a*
Underground Storage Tank Investigation—Salvage Yard/OSDS							
1,2-Dichloroethene, total (μg/L)	2	3	130	<5	130	*b*	*a*
Iron, total (mg/L)	3	3	2.1	0.33	1.2	0.30	3
Manganese, total (mg/L)	3	3	0.98	0.20	0.69	0.050	3
Tetrachloroethene (μg/L)	3	3	130	6	56	*b*	*a*
Trichloroethene (μg/L)	2	3	39	<5	35	5	2
Turbidity (NTU)	*a*	3	180	18	76	5	3
Vinyl chloride (μg/L)	2	3	30	<10	21	2	2

Table 4.12 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
United Nuclear Site							
Iron, total (mg/L)	25	26	1.2	<0.0040	0.17	0.30	4
Manganese, total (mg/L)	14	26	0.14	<0.0010	0.023	0.050	2
pH (standard units)	*a*	41	7.4	6.4	*a*	6.5/8.5	1
Turbidity (NTU)	*a*	26	50	0.80	7.7	5	9
USGS-1S/Chestnut Ridge							
Acetone (μg/L)	1	6	28	<10	28	*b*	*a*
Iron, total (mg/L)	6	6	31	1.5	8.3	0.30	6
Manganese, total (mg/L)	6	6	0.15	0.033	0.092	0.050	4
Methylene chloride (μg/L)	2	6	23	<5	23	*b*	*a*
Turbidity (NTU)	*a*	6	320	17	110	5	6
Waste Coolant Facility							
1,1,1-Trichloroethane (μg/L)	16	32	510	<5	170	200	4
1,1-Dichloroethane (μg/L)	11	32	180	<5	78	*b*	*a*
1,1-Dichloroethene (μg/L)	17	32	360	<5	2	7	16
1,2-Dichloroethene, total (μg/L)	24	32	1.5	<5	4.4	*b*	*a*
Acetone (μg/L)	7	32	8	<10	490	*b*	*a*
Cadmium, total (mg/L)	3	32	0.036	<0.0020	0.014	0.010	1
Carbon tetrachloride (μg/L)	1	32	12	<5	12	5	1
Chromium, total (mg/L)	10	32	3.7	<0.029	0.56	0.050	3
Iron, total (mg/L)	31	32	15	<0.40	1.7	0.30	19
Manganese, total (mg/L)	32	32	0.87	0.0026	0.18	0.050	25
Methylene chloride (μg/L)	2	32	29	<5	21	*b*	*a*
pH (standard units)	*a*	56	7.7	4.3	*a*	6.5/8.5	22
Tetrachloroethene (μg/L)	25	32	2	<5	670	*b*	*a*
Trichloroethene (μg/L)	24	32	1.4	<5	540	5	24
Turbidity (NTU)	*a*	32	160	0.80	32	5	24
Vinyl acetate (μg/L)	3	32	170	<10	91	*b*	*a*
Vinyl chloride (μg/L)	13	32	380	<10	180	2	13

[a]Not applicable.
[b]No reference.

Table 4.13. Constituents in Waste Area Grouping (WAG) 1 groundwater at ORNL, September 7–October 4, 1990

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
			Perimeter wells				
Anions, unfiltered (mg/L)							
Chloride	23	23	89	1.3	22*	250	0[3]
Fluoride	23	23	3.3	0.20	0.59*	4.0	0[2]
Nitrate	4	23	9.8	1.6	4.7*	10	0[2]
Sulfate as SO_4	20	23	170	5.3	45*	200	0[3]
Base/neutral/acid extractable organics, unfiltered (μg/L)							
Bis(2-ethylhexyl) phthalate	4	23	41	J 7.0	22*	*e*	[*e*]
Di-n-octylphthalate	2	23	220	10	120	*e*	[*e*]
Diethyl phthalate	7	23	B 23	JB 2.0	[*e*]	*e*	[*e*]
Field measurements, unfiltered							
Conductivity (ms/cm)	23	23	0.92	0.027	0.48*	*e*	[*e*]
Temperature (°C)	23	23	26	15	19*	31	0[1]
pH (standard units)	23	23	9.2	6.5	[*e*]	(6.5, 8.5)	2[3]
Metals, filtered (mg/L)							
Aluminum, total	1	23	0.13	0.13	0.13	*e*	[*e*]
Arsenic, total	1	23	0.064	0.064	0.064	0.050	1[2]
Barium, total	23	23	0.31	0.0030	0.11*	1.0	0[2]
Boron, total	8	23	1.1	0.088	0.41*	*e*	[*e*]
Cadmium, total	1	23	0.0071	0.0071	0.0071	0.010	0[1]
Calcium, total	23	23	180	1.0	88*	*e*	[*e*]
Chromium, total	20	23	0.012	0.0053	0.0089*	0.050	0[1]
Iron, total	14	23	15	0.057	2.8*	0.30	6[3]
Magnesium, total	23	23	31	0.46	18*	*e*	[*e*]
Manganese, total	15	23	7.6	0.0081	1.4*	0.050	10[3]
Nickel, total	7	23	0.010	0.0042	0.0063*	0.10	0[1]
Potassium	23	23	6.3	1.0	2.0*	*e*	[*e*]
Silicon, total	23	23	7.7	2.8	5.5*	*e*	[*e*]
Silver, total	1	23	0.0052	0.0052	0.0052	0.050	0[1]
Sodium, total	17	23	300	6.3	53*	*e*	[*e*]
Strontium, total	23	23	2.6	0.076	0.62*	*e*	[*e*]
Zinc, total	20	23	0.052	0.0052	0.013*	5.0	0[1]
Metals, unfiltered							
Aluminum, total	8	23	2.1	0.081	0.75*	*e*	[*e*]
Arsenic, total	2	23	0.074	0.065	0.070*	0.050	2[2]
Barium, total	23	23	0.30	0.0033	0.11*	1.0	0[2]
Boron, total	8	23	1.1	0.088	0.40*	*e*	[*e*]
Calcium, total	23	23	170	2.1	88*	*e*	[*e*]
Chromium, total	20	23	0.059	0.0066	0.012*	0.050	1[1]
Copper, total	2	23	0.011	0.0098	0.010*	1.0	0[1]
Iron, total	20	23	17	0.086	2.4*	0.30	14[3]
Magnesium, total	23	23	32	0.49	18*	*e*	[*e*]

Table 4.13 (continued)

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
Manganese, total	19	23	6.9	0.0012	1.1*	0.050	11[3]
Mercury, total	1	22	*e*	*e*	*e*	0.00020	0[1]
Nickel, total	8	23	0.021	0.0041	0.0089*	0.10	0[1]
Potassium	23	23	6.0	1.0	2.1*	*e*	[*e*]
Silicon, total	23	23	8.9	2.8	5.8*	*e*	[*e*]
Sodium, total	17	23	280	6.0	52*	*e*	[*e*]
Strontium, total	23	23	2.5	0.072	0.61*	*e*	[*e*]
Vanadium, total	1	23	0.0040	0.0040	0.0040	*e*	[*e*]
Zinc, total	22	23	0.034	0.0062	0.014*	5.0	0[1]
Others, filtered (mg/L)							
Alkalinity	23	23	480	170	310*	*e*	[*e*]
Solids, total dissolved	23	23	740	230	420*	500	7[1]
Others, unfiltered							
Alkalinity (mg/L)	23	23	480	170	300*	*e*	[*e*]
Carbon, total organic (mg/L)	23	23	3.1	0.55	1.3*	*e*	[*e*]
Halides, total organic (μg/L)	15	23	29	5.5	11*	*e*	[*e*]
Nitrogen, total Kjeldahl (mg/L)	14	23	3.6	0.30	1.1*	*e*	[*e*]
Solids, total suspended (mg/L)	15	23	46	5.0	18*	*e*	[*e*]
Sulfide, total (mg/L)	1	23	1.1	1.1	1.1	*e*	[*e*]
Pesticides, unfiltered (μg/L)							
Aroclor-1254	1	23	J 0.26	J 0.26	0.26	*e*	[*e*]
Endosulfan sulfate	2	23	J 0.026	J 0.019	0.023*	*e*	[*e*]
Heptachlor epoxide	4	23	J 0.040	J 0.014	0.028*	*e*	[*e*]
Radionuclides,[f] filtered							
^{60}Co (pCi/L)	4	23	8.6	4.1	6.2*	200	0[4]
^{137}Cs (pCi/L)	1	23	4.9	4.9	4.9	120	0[4]
Gross alpha (pCi/L)	18	23	300	1.2	21	15	1[2]
Gross beta (pCi/L)	21	23	16,000	1.7	810	50	3[2]
^{3}H (pCi/L)	19	23	27,000	780	4,600*	20,000	1[2]
^{89}Sr + ^{90}Sr (pCi/L)	5	6	8,100	15	1,700	8.0	5[2]
^{234}U (pCi/L)	1	1	220	220	220	20	1[4]
^{235}U (pCi/L)	1	1	3.2	3.2	3.2	24	0[4]
^{238}U (pCi/L)	1	1	7.0	7.0	7.0	24	0[4]
U-Total (g/L)	1	1	0.000022	0.000022	0.000022	*e*	[*e*]
Radionuclides,[f] unfiltered							
^{60}Co (pCi/L)	2	23	7.3	5.7	6.5*	200	0[4]
^{137}Cs (pCi/L)	1	23	7.0	7.0	7.0	120	0[4]
Gross alpha (pCi/L)	17	23	160	1.2	14	15	1[2]
Gross beta (pCi/L)	22	23	12,000	5.4	570	50	3[2]
^{3}H (pCi/L)	16	23	30,000	810	5,500*	20,000	1[2]
^{89}Sr + ^{90}Sr (pCi/L)	5	5	7,600	8.6	1,600	8.0	5[2]
^{234}U (pCi/L)	1	1	200	200	200	20	1[4]
^{235}U (pCi/L)	1	1	3.2	3.2	3.2	24	0[4]
^{238}U (pCi/L)	1	1	6.8	6.8	6.8	24	0[4]
U-Total (g/L)	1	1	0.000022	0.000022	0.000022	*e*	[*e*]

Table 4.13 (continued)

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
Tentatively identified compounds, unfiltered (μg/L)							
1,13-Tetradecadiene-28.92	4	4	B 220	B 130	160*	*e*	[*e*]
Hexane-20.1	1	1	JB 16	JB 16	16	*e*	[*e*]
Hexane-20.12	2	2	JB 15	JB 15	15	*e*	[*e*]
Hexane-20.14	1	1	JB 14	JB 14	14	*e*	[*e*]
Hexane-20.24	1	1	JB 14	JB 14	14	*e*	[*e*]
Hexane-20.25	3	3	JB 17	JB 3.0	12	*e*	[*e*]
Hexane-20.26	1	1	JB 14	JB 14	14	*e*	[*e*]
Hexane-20.37	1	1	JB 17	JB 17	17	*e*	[*e*]
Hexane-20.38	1	1	JB 15	JB 15	15	*e*	[*e*]
Hexane-20.39	2	2	JB 15	JB 15	15	*e*	[*e*]
Unknown-11.68	1	1	J 17	J 17	17	*e*	[*e*]
Unknown-11.9	1	1	J 14	J 14	14	*e*	[*e*]
Unknown-34.06	1	1	J 15	J 15	15	*e*	[*e*]
Unknown-7.77	1	1	J 7.0	J 7.0	7.0	*e*	[*e*]
Unknown-8.87	1	1	J 16	J 16	16	*e*	[*e*]
Unknown-8.97	2	2	B 11	J 10	11*	*e*	[*e*]
Unknown phthalate-34.06	1	1	J 27	J 27	27	*e*	[*e*]
Volatile organics, unfiltered (μg/L)							
1,2-Dichloroethene	1	23	21	21	21	*e*	[*e*]
Benzene	1	23	J 2.0	J 2.0	2.0	*e*	[*e*]
Chloroform	1	23	15	15	15	100	0[2]
Methylene chloride	10	23	J 3.0	JB 1.0	1.4*	*e*	[*e*]
Trichloroethene	1	23	6.0	6.0	6.0	*e*	[*e*]
Vinyl chloride	1	23	18	18	18	*e*	[*e*]
Upgradient wells							
Anions, unfiltered (mg/L)							
Chloride	3	3	15	3.0	7.7	250	0[3]
Fluoride	3	3	0.70	0.30	0.47*	4.0	0[2]
Nitrate	2	3	6.7	1.8	4.3	10	0[2]
Sulfate as SO_4	3	3	28	24	26*	200	0[3]
Field measurements, unfiltered							
Conductivity (ms/cm)	3	3	0.39	0.26	0.32*	*e*	[*e*]
Temperature (°C)	3	3	15	15	15*	31	0[1]
pH (standard units)	3	3	7.7	7.0	[*e*]	(6.5, 8.5)	0[3]
Metals, filtered (mg/L)							
Barium, total	3	3	0.22	0.018	0.14	1.0	0[2]
Calcium, total	3	3	110	92	100*	*e*	[*e*]
Chromium, total	3	3	0.0094	0.0048	0.0074*	0.050	0[1]
Iron, total	2	3	3.4	0.060	1.7	0.30	1[3]
Magnesium, total	3	3	27	6.7	17*	*e*	[*e*]
Manganese, total	2	3	1.5	0.0024	0.75	0.050	1[3]
Nickel, total	1	3	0.0043	0.0043	0.0043	0.10	0[1]
Potassium	3	3	1.9	0.70	1.1	*e*	[*e*]
Silicon, total	3	3	5.3	3.1	4.4*	*e*	[*e*]
Sodium, total	1	3	11	11	11	*e*	[*e*]
Strontium, total	3	3	1.0	0.15	0.66	*e*	[*e*]
Zinc, total	3	3	0.012	0.010	0.011*	5.0	0[1]

Table 4.13 (continued)

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
Metals, unfiltered (mg/L)							
Barium, total	3	3	0.22	0.015	0.14	1.0	0[2]
Calcium, total	3	3	99	92	96*	*e*	[*e*]
Chromium, total	3	3	0.0096	0.0050	0.0078*	0.050	0[1]
Iron, total	2	3	6.4	0.12	3.3	0.30	1[3]
Magnesium, total	3	3	27	6.3	17	*e*	[*e*]
Manganese, total	2	3	1.5	0.0019	0.75	0.050	1[3]
Nickel, total	1	3	0.0043	0.0043	0.0043	0.10	0[1]
Potassium	3	3	1.8	0.68	1.1*	*e*	[*e*]
Silicon, total	3	3	5.3	2.9	4.4*	*e*	[*e*]
Sodium, total	1	3	11	11	11	*e*	[*e*]
Strontium, total	3	3	1.0	0.14	0.65	*e*	[*e*]
Zinc, total	3	3	0.021	0.0095	0.014*	5.0	0[1]
Others, filtered (mg/L)							
Alkalinity	3	3	330	240	270*	*e*	[*e*]
Solids, total dissolved	3	3	390	300	350*	500	0[1]
Others, unfiltered							
Alkalinity (mg/L)	3	3	330	240	270*	*e*	[*e*]
Carbon, total organic (mg/L)	3	3	1.3	0.60	0.95*	*e*	[*e*]
Halides, total organic (μg/L)	1	3	6.0	6.0	6.0	*e*	[*e*]
Nitrogen, total Kjeldahl (mg/L)	2	3	0.40	0.30	0.35*	*e*	[*e*]
Sulfide, total (mg/L)	1	3	1.0	1.0	1.0	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
Gross alpha	2	3	1.4	1.3	1.3*	15	0[2]
Gross beta	3	3	5.1	2.5	3.7*	50	0[2]
^{3}H	3	3	4,300	2,300	3,500*	20,000	0[2]
Radionuclides,[f] unfiltered (pCi/L)							
^{137}Cs	1	3	5.9	5.9	5.9	120	0[4]
Gross alpha	2	3	1.4	0.65	1.0	15	0[2]
Gross beta	3	3	9.7	4.9	7.2*	50	0[2]
^{3}H	3	3	4,100	2,200	3,400*	20,000	0[2]
Tentatively identified compounds, unfiltered (μg/L)							
Ethanol-6.4	1	1	J 66	J 66	66	*e*	[*e*]
Hexane-20.38	3	3	JB 14	JB 5.0	11*	*e*	[*e*]
Sulfur-28.63	1	1	J 21	J 21	21	*e*	[*e*]
Unknown-15.3	1	1	J 6.0	J 6.0	6.0	*e*	[*e*]
Volatile organics, unfiltered (μg/L)							
Methylene chloride	2	3	J 3.0	JB 2.0	2.5	*e*	[*e*]

[a]Prefixes J and B mean that the value was estimated or found in the laboratory blank, respectively.

[b]An asterisk (*) follows a mean that is significantly greater than zero.

[c]If a reference limit exists, the source is coded as:

1. Rules of Tennessee Department of Health and Environment, Bureau of Environment, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, February 1987.
2. 40 CFR (7-1-1989 Edition) Part 141–National Primary Drinking Water Regulations, Subpart B-Maximum Contaminant Levels.
3. 40 CFR (7-1-1989 Edition) Part 143–National Secondary Drinking Water Regulations.
4. DOE Order 5400.5, February 8, 1990. Chapter III, Derived Concentration Guides for Air and Water.

[d]The source of the reference limit is enclosed within brackets.

[e]Not applicable.

[f]Multiply pCi/L by 0.037 to convert to Bq/L.

Table 4.14. Constituents in Waste Area Grouping (WAG) 5 groundwater at ORNL, July 31–August 16, 1990

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
			Downgradient wells				
Anions, unfiltered (mg/L)							
Chloride	20	20	56	1.0	12*	250	0[3]
Fluoride	5	20	1.0	1.0	1.0	4.0	0[2]
Sulfate as SO_4	18	20	330	5.8	58*	200	2[3]
Field measurements, unfiltered							
Conductivity (ms/cm)	20	20	0.72	0.12	0.40*	*e*	[*e*]
Temperature (°C)	20	20	18	14	15*	31	0[1]
pH (standard units)	20	20	8.7	6.0	7.0*	(6.5, 8.5)	4[3]
Metals, filtered (mg/L)							
Aluminum, total	18	20	0.53	0.051	0.21*	*e*	[*e*]
Boron, total	3	14	0.42	0.18	0.33*	*e*	[*e*]
Cadmium, total	1	20	0.0050	0.0050	0.0050	0.010	0[1]
Calcium, total	20	20	760	3.4	130*	*e*	[*e*]
Cobalt, total	1	20	0.0077	0.0077	0.0077	*e*	[*e*]
Iron, total	19	20	2.1	0.053	0.65*	0.30	11[3]
Magnesium, total	20	20	36	1.3	19*	*e*	[*e*]
Manganese, total	19	20	0.69	0.0016	0.20*	0.050	13[3]
Mercury, total	1	20	0.00010	0.00010	0.00010	0.00020	0[1]
Nickel, total	13	20	0.037	0.0041	0.016*	0.10	0[1]
Silicon, total	14	14	13	2.7	8.6*	*e*	[*e*]
Sodium, total	19	20	150	5.1	25*	*e*	[*e*]
Strontium, total	14	14	5.0	0.079	0.70*	*e*	[*e*]
Uranium, total	4	20	0.0021	0.00060	0.0011*	*e*	[*e*]
Vanadium, total	1	20	0.0030	0.0030	0.0030	*e*	[*e*]
Zinc, total	2	20	0.0083	0.0054	0.0069	5.0	0[1]
Others, filtered (mg/L)							
Alkalinity	20	20	520	96	300*	*e*	[*e*]
Others, unfiltered							
Alkalinity (mg/L)	20	20	530	95	300*	*e*	[*e*]
Carbon, total organic (mg/L)	17	20	4.3	0.40	1.4*	*e*	[*e*]
Halides, total organic (μg/L)	8	20	3,600	6.3	490	*e*	[*e*]
Solids, total dissolved (mg/L)	20	20	790	150	410*	500	6[1]
Solids, total suspended (mg/L)	8	20	68	6.0	22*	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{60}Co	2	20	38	7.3	23	200	0[4]
^{137}Cs	2	20	8.4	5.9	7.2	120	0[4]
Gross alpha	6	20	29	1.4	9.8*	15	2[2]
Gross beta	13	20	620	3.8	86*	50	4[2]
$^{89}Sr + ^{90}Sr$	6	20	540	8.1	160	8.0	6[2]
Radionuclides,[f] unfiltered (pCi/L)							
^{3}H	16	20	23,000,000	840	2,900,000*	20,000	9[2]

Table 4.14 (continued)

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
			Upgradient wells				
Anions, unfiltered (mg/L)							
Chloride	2	2	1.9	1.6	1.8*	250	0[3]
Sulfate as SO_4	2	2	21	6.7	14	200	0[3]
Field measurements, unfiltered							
Conductivity (ms/cm)	2	2	1.7	0.22	0.96	*e*	[*e*]
Temperature (°C)	2	2	15	14	14*	31	0[1]
pH (standard units)	2	2	7.1	6.7	*e*	(6.5, 8.5)	0[3]
Metals, filtered (mg/L)							
Aluminum, total	2	2	0.55	0.14	0.35	*e*	[*e*]
Calcium, total	2	2	75	66	71*	*e*	[*e*]
Iron, total	2	2	0.83	0.16	0.50	0.30	1[3]
Magnesium, total	2	2	13	2.8	7.9	*e*	[*e*]
Manganese, total	2	2	0.10	0.022	0.061	0.050	1[3]
Silicon, total	1	1	7.1	7.1	7.1	*e*	[*e*]
Sodium, total	1	2	6.4	6.4	6.4	*e*	[*e*]
Strontium, total	1	1	0.11	0.11	0.11	*e*	[*e*]
Others, filtered (mg/L)							
Alkalinity	2	2	210	170	190*	*e*	[*e*]
Others, unfiltered (mg/L)							
Alkalinity	2	2	210	170	190*	*e*	[*e*]
Carbon, total organic	1	2	0.60	0.60	0.60	*e*	[*e*]
Solids, total dissolved	2	2	280	160	220	500	0[1]
Solids, total suspended	1	2	41	41	41	*e*	[*e*]
Radionuclides,[f] unfiltered							
^3H (pCi/L)	2	2	1,300	1,300	1,300	20,000	0[2]

[a]Prefixes J and B mean that the value was estimated or found in the laboratory blank, respectively.

[b]An asterisk (*) follows a mean that is significantly greater than zero.

[c]If a reference limit exists, the source is coded as:

1. Rules of Tennessee Department of Health and Environment, Bureau of Environment, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, February 1987.
2. 40 CFR (7-1-1989 Edition) Part 141–National Primary Drinking Water Regulations, Subpart B-Maximum Contaminant Levels.
3. 40 CFR (7-1-1989 Edition) Part 143–National Secondary Drinking Water Regulations.
4. DOE Order 5400.5, February 8, 1990. Chapter III, Derived Concentration Guides for Air and Water.

[d]The source of the reference limit is enclosed within brackets.

[e]Not applicable.

[f]Multiply pCi/L by 0.037 to convert to Bq/L.

Table 4.15. Constituents in Waste Area Grouping (WAG) 6 groundwater at ORNL[a] during 1990

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[d]	Number of values exceeding reference [ref][e]
			Max[b]	Min[b]	Av[c]		
			Downgradient wells				
Field measurements, unfiltered							
Conductivity (m/cm)	30	30	0.80	0.010	0.31*	*f*	[*f*]
Temperature (°C)	30	30	18	12	15*	31	0[1]
pH (standard units)	30	30	7.9	4.8	*f*	(6.5, 8.5)	8[3]
Others, filtered (mg/L)							
Alkalinity	13	13	460	4.5	220*	*f*	[*f*]
Others, unfiltered (mg/L)							
Alkalinity	30	30	480	3.8	200*	*f*	[*f*]
Radionuclides, filtered (pCi/L)							
^{60}Co	5	30	110	11	46*	200	0[4]
Gross alpha	14	30	7.6	0.21	2.1*	15	0[2]
^{3}H	11	15	590,000	1,100	100,000*	80,000	4[4]
$^{89}Sr + {}^{90}Sr$	6	30	5.1	1.4	2.7*	40	0[4]
Radionuclides, unfiltered (pCi/L)							
^{3}H	13	15	320,000	810	65,000*	80,000	3[4]
Tentatively identified compounds, unfiltered (μg/L)							
1,4-Dioxane-14.56	1	1	J 26	J 26	26	*f*	[*f*]
1-Propanethiol-9.21	1	1	J 7.0	J 7.0	7.0	*f*	[*f*]
1-Propanethiol-9.26	1	1	J 17	J 17	17	*f*	[*f*]
Aceticacid,methylester-6.09	1	1	J 38	J 38	38	*f*	[*f*]
Ethane,1,1,'-oxybis-4.97	1	1	J 120	J 120	120	*f*	[*f*]
Ethanethiol-5.12	1	1	J 22	J 22	22	*f*	[*f*]
Ethanethiol-5.16	1	1	J 45	J 45	45	*f*	[*f*]
Ethylether-3.03	1	1	J 58	J 58	58	*f*	[*f*]
Methane,trichlorofluoro-4.42	1	1	J 9.0	J 9.0	9.0	*f*	[*f*]
Methanethiol-3.87	1	1	J 59	J 59	59	*f*	[*f*]
Methanethiol-3.91	1	1	J 45	J 45	45	*f*	[*f*]
Sulfurdioxide-3.14	1	1	J 71	J 71	71	*f*	[*f*]
Unknown-10.9	1	1	J 9.0	J 9.0	9.0	*f*	[*f*]
Volatile organics, unfiltered (μg/L)							
1,1-Dichloroethane	2	30	J 3.0	J 3.0	3.0	*f*	[*f*]
1,1-Dichloroethene	1	30	J 1.0	J 1.0	1.0	7.0	0[5]
1,2-Dichloroethane	1	30	15	15	15	5.0	1[5]
1,2-Dichloroethene	3	30	9.0	J 1.0	6.0	*f*	[*f*]
Acetone	10	30	B 11	JB 2.0	4.3*	*f*	[*f*]
Carbon disulfide	7	30	110	J 1.0	19	*f*	[*f*]
Carbon tetrachloride	2	30	73	33	53	5.0	2[5]
Chloroform	8	30	63	J 1.0	17	100	0[2]
Methylene chloride	4	30	J 2.0	J 1.0	1.5*	*f*	[*f*]
Tetrachloroethene	8	30	J 4.0	J 1.0	2.3*	*f*	[*f*]
Toluene	7	30	JB 2.0	JB 1.0	1.3*	*f*	[*f*]
Trichloroethene	5	30	E 320	J 2.0	130	5.0	2[5]

Table 4.15 (continued)

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[d]	Number of values exceeding reference [ref][e]
			Max[b]	Min[b]	Av[c]		
			Upgradient wells				
Field measurements, unfiltered							
Conductivity (m/cm)	14	14	3.2	0.050	0.52*	*f*	[*f*]
Temperature (°C)	14	14	16	14	15*	31	0[1]
pH (standard units)	14	14	9.1	5.9	*f*	(6.5, 8.5)	2[3]
Others, filtered (mg/L)							
Alkalinity	7	7	350	5.5	150*	*f*	[*f*]
Others, unfiltered (mg/L)							
Alkalinity	11	14	430	5.5	150*	*f*	[*f*]
Radionuclides, filtered (pCi/L)							
^{60}Co	3	14	41	4.6	17	200	0[4]
Gross alpha	7	14	5.4	1.3	2.8*	15	0[2]
^{3}H	2	7	950	890	920*	80,000	0[4]
$^{89}Sr + {}^{90}Sr$	2	14	6.8	5.1	5.9*	40	0[4]
Radionuclides, unfiltered (pCi/L)							
^{3}H	3	7	860	760	830*	80,000	0[4]
Volatile organics, unfiltered (μg/L)							
Acetone	2	14	J 4.0	JB 3.0	3.5*	*f*	[*f*]
Carbon disulfide	1	14	JB 1.0	JB 1.0	1.0	*f*	[*f*]
Tetrachloroethene	4	14	5.0	J 1.0	2.8*	*f*	[*f*]
Toluene	7	14	JB 2.0	JB 1.0	1.3*	*f*	[*f*]

[a]See Fig. 4.6 in Vol. 1.

[b]Prefixes J, B, and E mean that the value was estimated, found in the laboratory blank, or exceeded the calibration range, respectively. Multiply pCi/L by 0.037 to convert to Bq/L.

[c]An asterisk (*) follows a mean that is significantly greater then zero.

[d]If a reference limit exists, the source is coded as:

1. Rules of Tennessee Department of Health and Environment, Bureau of Environment, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, February 1987.
2. 40 CFR (7-1-1989 Edition) Part 141–National Primary Drinking Water Regulations, Subpart B-Maximum Contaminant Levels.
3. 40 CFR (7-1-1989 Edition) Part 143–National Secondary Drinking Water Regulations.
4. DOE Order 5400.5, February 8, 1990. Chapter III, Derived Concentration Guides for Air and Water.
5. 40 CFR (7-1-1990 Edition) Part 141–National Primary Drinking Water Regulations, Subpart D-Reporting, Public Notification and Recordkeeping.

[e]The source of the reference limit is enclosed within brackets.

[f]Not applicable.

Table 4.16. Constituents in Waste Area Grouping (WAG) 7 groundwater at ORNL, June 7–June 25, 1990

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
Downgradient wells							
Anions, unfiltered (mg/L)							
Chloride	14	14	84	1.0	13*	250	0[3]
Fluoride	6	14	6.5	1.0	2.2*	4.0	1[2]
Nitrate	2	14	1,900	38	970	10	2[2]
Sulfate as SO_4	14	14	690	8.9	160*	200	4[3]
Field measurements, unfiltered							
Conductivity (ms/cm)	14	14	3.0	0.24	0.73*	*e*	[*e*]
Temperature (°C)	14	14	17	14	15*	31	0[1]
Turbidity (JTU)	14	14	660	350	430*	1.0	14[2]
pH (standard units)	14	14	8.6	6.6	*e*	(6.5, 8.5)	2[3]
Metals, filtered (mg/L)							
Aluminum, total	6	14	0.51	0.068	0.22*	*e*	[*e*]
Calcium, total	14	14	360	2.8	91*	*e*	[*e*]
Chromium, total	1	14	0.020	0.020	0.020	0.050	0[1]
Cobalt, total	2	14	0.036	0.034	0.035*	*e*	[*e*]
Copper, total	1	14	0.016	0.016	0.016	1.0	0[1]
Iron, total	10	14	7.7	0.024	1.1	0.30	5[3]
Lead, total	1	14	0.020	0.020	0.020	0.050	0[1]
Magnesium, total	14	14	130	0.63	22*	*e*	[*e*]
Manganese, total	13	14	1.3	0.0011	0.24*	0.050	7[3]
Mercury, total	1	14	0.00020	0.00020	0.00020	0.00020	0[1]
Nickel, total	6	14	0.36	0.0064	0.11	0.10	2[1]
Potassium	14	14	10	0.90	4.1*	*e*	[*e*]
Sodium, total	12	14	590	5.4	130*	*e*	[*e*]
Thorium, total	9	14	7.6	0.088	1.4	*e*	[*e*]
Uranium, total	4	14	0.026	0.00070	0.0073	*e*	[*e*]
Vanadium, total	1	14	0.0022	0.0022	0.0022	*e*	[*e*]
Zinc, total	3	14	0.021	0.0052	0.011	5.0	0[1]
Others, filtered (mg/L)							
Alkalinity	14	14	630	40	280*	*e*	[*e*]
Others, unfiltered							
Alkalinity (mg/L)	14	14	630	39	280*	*e*	[*e*]
Carbon, total organic (mg/L)	14	14	2.3	0.58	1.2*	*e*	[*e*]
Halides, total organic (μg/L)	4	14	15	5.5	9.9*	*e*	[*e*]
Solids, total dissolved (mg/L)	14	14	3,200	270	750*	500	6[1]
Solids, total suspended (mg/L)	7	14	130	16	59*	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{60}Co	4	14	840	4.9	240	200	1[4]
^{137}Cs	1	14	8.4	8.4	8.4	120	0[4]
Gross alpha	1	14	300	300	300	15	1[2]
Gross beta	11	14	6,500	6.8	650	50	4[2]
$^{89}Sr + ^{90}Sr$	2	14	3.5	2.6	3.1*	8.0	0[2]
^{99}Tc	6	14	11,000	7.0	1,900	4,000	1[4]
Radionuclides,[f] unfiltered (pCi/L)							
^{3}H	12	14	1,200,000	840	170,000	20,000	5[2]

Table 4.16 (continued)

Analyte	Number detected	Number of samples	Values above the detection limit			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
			Upgradient wells				
Anions, unfiltered (mg/L)							
Chloride	2	2	3.6	1.0	2.3	250	0[3]
Sulfate as SO_4	2	2	91	5.8	48	200	0[3]
Field measurements, unfiltered							
Conductivity (ms/cm)	2	2	0.34	0.010	0.18	*e*	[*e*]
Temperature (°C)	2	2	15	15	15	31	0[1]
Turbidity (JTU)	2	2	550	370	460	1.0	2[2]
pH (standard units)	2	2	8.0	6.1	7.0*	(6.5, 8.5)	1[3]
Metals, filtered (mg/L)							
Calcium, total	2	2	25	1.2	13	*e*	[*e*]
Iron, total	1	2	0.022	0.022	0.022	0.30	0[3]
Magnesium, total	2	2	5.7	1.7	3.7	*e*	[*e*]
Manganese, total	2	2	0.22	0.074	0.15	0.050	2[3]
Nickel, total	1	2	0.021	0.021	0.021	0.10	0[1]
Potassium	2	2	9.3	0.60	5.0	*e*	[*e*]
Sodium, total	1	2	99	99	99	*e*	[*e*]
Thorium, total	2	2	0.40	0.12	0.26	*e*	[*e*]
Others, filtered (mg/L)							
Alkalinity	2	2	190	13	100	*e*	[*e*]
Others, unfiltered (mg/L)							
Alkalinity	2	2	190	13	100	*e*	[*e*]
Carbon, total organic	1	2	0.58	0.58	0.58	*e*	[*e*]
Solids, total dissolved	2	2	370	71	220	500	0[1]
Solids, total suspended	2	2	75	5.0	40	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{137}Cs	1	2	6.8	6.8	6.8	120	0[4]
$^{89}Sr + {}^{90}Sr$	1	2	2.7	2.7	2.7	8.0	0[2]

[a]Prefixes U, J, and B mean that the value was undetected, estimated, or found in the laboratory blank, respectively.

[b]An asterisk (*) follows a mean that is significantly than zero.

[c]If a reference limit exists, the source is coded as:

1. Rules of Tennessee Department of Health and Environment, Bureau of Environment, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, February 1987.
2. 40 CFR (7-1-1989 Edition) Part 141–National Primary Drinking Water Regulations, Subpart B-Maximum Contaminant Levels.
3. 40 CFR (7-1-1989 Edition) Part 143–National Secondary Drinking Water Regulations.
4. DOE Order 5400.5, February 8, 1990. Chapter III, Derived Concentration Guides for Air and Water. Subpart D-Reporting, Public Notification and Recordkeeping.

[d]The source of the reference limit is enclosed within brackets.

[e]Not applicable.

[f]Multiply pCi/L by 0.037 to convert to Bq/L.

Table 4.17. Constituents in the Waste Area Grouping (WAG) 1 groundwater—K-25 Site, 1990

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
			WAG 1				
Alpha activity, pCi/L	82	82	-0.37	45.1	4.2	15 [*c*]	7
Aluminum, mg/L	103	116	0.02	24	1.3	*a*	*b*
Barium, mg/L	116	116	0.0036	0.49	0.11	1.0 [*c*]	0
Beryllium, mg/L	17	116	0.0003	0.0014	0.00072	*a*	*b*
Beta activity, pCi/L	82	82	0.12	1137.3	53	50 [*c*]	11
Boron, mg/L	109	116	0.0058	0.48	0.076	*a*	3.2
Cadmium, mg/L	29	116	0.003	0.028	0.0069	0.01 [*c*]	4
Calcium, mg/L	116	116	1.2	240	79	*a*	*b*
Cesium-137, pCi/L	5	8	-21.8	33.7	2.3	3.000 [*e*]	0
Chloride IC, mg/L	58	58	1	480	8.5	*a*	*b*
Chromium, mg/L	14	116	0.01	0.31	0.044	0.05 [*c*]	2
Cobalt, mg/L	46	116	0.0052	0.12	0.027	*a*	*b*
Conductivity, μmho/cm	284	284	123	2111	680	*a*	*b*
Copper, mg/L	63	116	0.0043	0.029	0.012	1.0 [*d*]	0
Dissolved oxygen, ppm	64	64	0	9.3	2.7	*a*	*b*
Dissolved solids, mg/L	56	56	74	1360	440	500 [*d*]	19
Fluoride by specific ion electrode, mg/L	56	56	0.1	2.4	0.35	*a*	*b*
Fluoride, mg/L	2	2	0.4	0.4	0.4	2.0 [*d*]	0
Freon 123, mg/L	3	5	0.005	0.012	0.0073	*a*	*b*
Iron, mg/L	99	116	0.0049	35	4.8	0.3 [*d*]	68
Lead, mg/L	24	142	0.004	0.025	0.0093	0.05 [*c*]	*0*
Lithium, mg/L	39	116	0.0042	0.058	0.015	*a*	*b*
Magnesium, mg/L	116	116	0.05	45	13	*a*	*b*
Manganese, mg/L	113	116	0.0012	23	4	0.05 [*d*]	89
Molybdenum, mg/L	3	116	0.011	0.026	0.016	*a*	*b*
Nickel, mg/L	40	116	0.01	0.79	0.086	*a*	*b*
Niobium, mg/L	13	116	0.007	0.016	0.01	*a*	*b*
Phosphorous, mg/L	35	116	0.2	1.6	0.55	*a*	*b*
Potassium, mg/L	116	116	0.83	11	3.3	*a*	*b*
Redox, mV	58	58	88	356	160	*a*	*b*
Silicon, mg/L	116	116	0.24	38	6.8	*a*	*b*
Sodium, mg/L	116	116	0.63	190	41	*a*	*b*
Strontium (total), mg/L	28	28	0.028	0.55	0.18	*a*	*b*
Strontium (total), pCi/L	3	3	-20.36	63.31	8.4	*a*	*b*
Strontium, mg/L	88	88	0.032	1.6	0.25	*a*	*b*
Strontium, pCi/L	6	6	-131.17	84.01	11	*a*	*b*
Sulfate, mg/L	58	58	3	437	65	250 [*d*]	4
Suspended solids, mg/L	55	58	1	1324	160	*a*	*b*
Technetium-99, pCi/L	6	11	-400	110	-80	100,000 [*e*]	0
Temperature, °C	58	58	8.7	25.1	17	*a*	*b*
Thorium-234, pCi/L	1	3	5.62	5.62	5.6	10,000	*b*
Titanium, mg/L	72	116	0.0033	0.7	0.041	*a*	*b*

Table 4.17 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
Total organic carbon (TOC), mg/L	166	224	1	4	1.9	*a*	*b*
Total organic halide (Tox), mg/L	138	220	0.01	8.422	0	*a*	*b*
Turbidity, NTU	58	58	0.55	1100	120	1 [*c*]	56
Unknown Hydrocarbon, mg/L	1	3	0.015	0.015	0.015	*a*	*b*
Unknown, mg/L	12	36	0.006	0.19	0.056	*a*	*b*
Uranium alpha activity, pCi/L	2	2	26.9	30.7	29	*a*	*b*
Uranium fluorometric, mg/L	46	116	0.001	0.035	0.0054	*a*	*b*
Vanadium, mg/L	9	116	0.0093	0.049	0.02	*a*	*b*
Zinc, mg/L	101	116	0.39	0.39	0.022	5 [*d*]	0
Zirconium, mg/L	2	116	0.0057	0.01	0.0078	*a*	*b*
bis(2-Ethylbexyl)phthalate, mg/L	1	57	0.032	0.032	0.032	1	*b*
pH (standard units)	284	284	4.7	9.9	*b*	6.5–8.5 [*d*]	99
			K1407B Pond				
1,1,1-Trichloroethane, mg/L	1	12	0.18	0.18	0.18	0.2 [*c*]	0
1,2-Dichloroethane, mg/L	2	12	0.016	0.018	0.017	0.005 [*c*]	2
1,2-Dichloroethene (total), mg/L	3	12	0.013	0.05	0.025	*a*	*b*
Alpha activity, pCi/L	18	18	–0.13	45.1	6.6	15 [*c*]	3
Aluminum, mg/L	24	24	0.042	0.84	0.2	*a*	*b*
Arsenic, mg/L	6	24	0.0092	0.012	0.011	0.05 [*c*]	0
Barium, mg/L	24	24	0.026	0.41	0.18	1.0 [*c*]	0
Beta activity, pCi/L	18	18	3.8	1137.55	160	50 [*c*]	3
Boron, mg/L	24	24	0.01	0.095	0.031	*a*	3.2
Cadmium, mg/L	12	24	0.0033	0.028	0.0099	0.01 [*c*]	4
Calcium, mg/L	24	24	93	240	170	*a*	*b*
Carbon tetrachloride, mg/L	2	12	0.026	0.044	0.035	0.005 [*c*]	2
Cesium-137, pCi/L	2	2	–5.93	28.1	11	3000 [*e*]	0
Chloride IC, mg/L	12	12	52	480	270	*a*	*b*
Chloroform, mg/L	1	12	0.006	0.006	0.006	0.1 [*c*]	0
Cobalt, mg/L	9	24	0.0053	0.038	0.013	*a*	*b*
Conductivity, μmho/cm	60	60	206	2111	1300	*a*	*b*
Copper, mg/L	17	24	0.0051	0.029	0.016	1 [*d*]	0
Dissolved oxygen, ppm	18	18	0.5	6.1	2.4	*a*	*b*
Dissolved solids, mg/L	12	12	456	1360	860	500 [*d*]	8
Fluoride by specific ion electrode, mg/L	7	12	0.1	0.2	0.16	*a*	*b*
Freon 123, mg/L	1	2	0.012	0.012	0.012	*a*	*b*
Iron, mg/L	19	24	0.029	21	7.9	0.3 [*d*]	15
Lead, mg/L	4	36	0.0051	0.0087	0.0075	0.05 [*c*]	0
Lithium, mg/L	6	24	0.005	0.0061	0.0053	*a*	*b*
Magnesium, mg/L	24	24	12	45	24	*a*	*b*
Manganese, mg/L	24	24	0.097	23	8.2	0.05 [*d*]	24
Mercury, mg/L	1	24	0.00021	0.00021	0.00021	0.002 [*c*]	0
Nickel, mg/L	7	24	0.011	0.021	0.015	*a*	*b*
Niobium, mg/L	5	24	0.0076	0.016	0.012	*a*	*b*
Nitrate, mg/L	1	12	3	3	3	10 [*c*]	0
Phosphorous, mg/L	2	24	0.21	0.72	0.47	*a*	*b*
Potassium, mg/L	24	24	1.5	4	2.6	*a*	*b*
Protactinium-234M, pCi/L	2	2	–1790	2470	340	*a*	*b*
Redox, mV	12	12	–74	288	140	*a*	*b*
Silicon, mg/L	24	24	1.4	9	5.4	*a*	*b*
Silver, mg/L	1	24	0.0068	0.0068	0.0068	0.05	0
Sodium, mg/L	24	24	12	150	53	*a*	*b*

Table 4.17 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
Strontium (total), mg/L	6	6	0.23	0.52	0.34	*a*	*b*
Strontium, mg/L	18	18	0.25	0.53	0.38	*a*	*b*
Strontium-90, pCi/L	*b*	2	–6.92	–5.24	–6	*a*	*b*
Sulfate, mg/L	12	12	18	437	150	250 [*d*]	4
Suspended solids, mg/L	10	12	9	234	56	*a*	*b*
Technetium-99, pCi/L	2	2	424	538	480	100,000 [*e*]	0
Temperature, °C	12	12	14.2	24.7	19	*a*	*b*
Tetrachloroethane, mg/L	1	1	0.087	0.087	0.087	*a*	*b*
Thorium-234, pCi/L	2	2	–193	593	200	10,000	*b*
Titanium, mg/L	7	24	0.0037	0.018	0.01	*a*	*b*
Total organic carbon (TOC), mg/L	48	48	1	4	2.3	*a*	*b*
Total organic halide (Tox), mg/L	43	44	0.016	8.422	1.8	*a*	*b*
Trichloroethene, mg/L	2	12	0.012	0.017	0.015	0.005 [*c*]	2
Turbidity, NTU	12	12	0.55	115	38	1 [*c*]	10
Unknown, mg/L	3	10	0.028	0.03	0.029	*a*	*b*
Uranium 235, pCi/L	2	2	0	0.41	0.2	600	*b*
Uranium 238, pCi/L	2	2	0	0.82	0.41	600	*b*
Uranium fluorometric, mg/L	4	24	0.001	0.002	0.0015	*a*	*b*
Uranium-234, pCi/L	2	2	–33.4	–0.41	–20	550	*b*
Zinc, mg/L	21	24	0.001	0.39	0.037	5 [*d*]	0
pH, standard units	60	60	6.4	7.3	*b*	6.5–8.5 [*d*]	4
			K1407C Pond				
1,2-Dichloroethene (total), mg/L	7	14	0.005	0.013	0.008	*a*	*b*
Acetone, mg/L	1	14	0.01	0.01	0.01	*a*	*b*
Alpha activity, pCi/L	21	21	–0.37	5.58	1.6	15 [*c*]	0
Aluminum, mg/L	25	28	0.02	0.96	0.19	*a*	*b*
Arsenic, mg/L	12	28	0.0051	0.0078	0.0059	0.05 [*c*]	0
Barium, mg/L	28	28	0.012	0.31	0.087	1.0 [*c*]	0
Beryllium, mg/L	2	28	0.00034	0.00034	0.00034	*a*	*b*
Beta activity, pCi/L	21	21	4.33	55.76	19	50 [*c*]	*1*
Boron, mg/L	23	28	0.0069	0.037	0.017	*a*	*b*
Cadmium, mg/L	4	28	0.0047	0.0055	0.0052	0.01 [*c*]	0
Calcium, mg/L	28	28	17	160	75	*a*	*b*
Cesium-137, pCi/L	2	2	3.34	28.5	16	3,000 [*e*]	0
Chloride IC, mg/L	14	14	2	154	56	*a*	*b*
Cobalt, mg/L	10	28	0.0055	0.072	0.029	*a*	*b*
Conductivity, μmho/cm	70	70	130	1,590	700	*a*	*b*
Copper, mg/L	10	28	0.0047	0.012	0.0072	1.0 [*d*]	0
Dissolved oxygen, ppm	14	14	0	9.3	2.4	*a*	*b*
Dissolved solids, mg/L	14	14	108	828	420	250 [*d*]	7
Fluoride by specific ion electrode, mg/L	1	14	0.1	0.1	0.1	*a*	*b*
Freon 123, mg/L	1	1	0.005	0.005	0.005	*a*	*b*
Gamma activity, pCi/L	2	2	0	0	0	*a*	*b*
Iron, mg/L	27	28	0.0049	17	3.7	0.3 [*d*]	18
Lead, mg/L	8	42	0.0041	0.011	0.007	0.05 [*c*]	0
Magnesium, mg/L	28	28	2	22	11	*a*	*b*
Manganese, mg/L	28	28	0.0064	23	5.3	0.05 [*d*]	18
Mercury, mg/L	3	28	0.0002	0.00021	0.0002	0.002 [*d*]	0
Nickel, mg/L	4	28	0.01	0.014	0.011	*a*	*b*

Table 4.17 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
Niobium, mg/L	4	28	0.0087	0.01	0.0096	*a*	*b*
Nitrate, mg/L	5	14	2	7	3.8	10 [*c*]	0
Phosphorous, mg/L	10	28	0.22	1.5	0.57	*a*	*b*
Potassium, mg/L	28	28	1.7	5.3	3.2	*a*	*b*
Redox, mV	b	14	-88	356	110	*a*	*b*
Silicon, mg/L	28	28	2.8	8.2	4.2	*a*	*b*
Sodium, mg/L	28	28	0.63	190	53	*a*	*b*
Strontium, mg/L	28	28	0.023	0.26	0.13	*a*	*b*
Strontium, pCi/L	2	2	23.31	38.79	31	*a*	*b*
Sulfate, mg/L	14	14	3	200	60	250 [*d*]	0
Suspended solids, mg/L	14	14	1	105	19	*a*	*b*
Technetium-99, pCi/L	*b*	2	-400	40	-200	100,000 [*e*]	0
Temperature, °C	*b*	14	10.8	25.1	17	*a*	*b*
Titanium, mg/L	19	28	0.0035	0.017	0.0087	*a*	*b*
Total organic carbon (TOC), mg/L	33	56	1	4	2.7	*a*	*b*
Total organic halide (Tox), mg/L	28	56	0.01	0.07	0.021	*a*	*b*
Trichloroethene, mg/L	4	14	0.005	0.015	0.0092	0.005 [*c*]	2
Turbidity, NTU	14	14	2.9	96	37	1 [*c*]	14
Unknown, mg/L	7	23	0.008	0.19	0.08	*a*	*b*
Uranium fluorometric, mg/L	13	28	0.001	0.006	0.0027	*a*	*b*
Zinc, mg/L	26	28	0.0025	0.045	0.012	5 [d]	0
pH, standard units	70	70	5.7	7.3	*b*	6.5–8.5 [*d*]	28

[a]No reference.
[b]Not applicable.
[c]National Primary Drinking Water Regulations, 40 CFR Pt. 141, as amended.
[d]National Secondary Drinking Water Regulations, 40 CFR Pt. 143, as amended.
[e]DOE Order 5400.5, Derived Concentration Guides for Air and Water.

Table 4.18. Constituents in the Waste Area Grouping (WAG) 2 groundwater—K-25 Site, 1990

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
1,1,1-Trichloroethane, mg/L	2	48	0.008	0.023	0.016	0.2 [*c*]	0
1,1-Dichloroethane, mg/L	7	48	0.006	0.4	0.087	*a*	*b*
1,2-Dichloroethane (total), mg/L	8	48	0.006	0.038	0.023	*a*	*b*
2-Methylnapthlene, mg/L	2	45	0.012	0.03	0.021	*a*	*b*
Acetone, mg/L	5	48	0.026	0.15	0.07	*a*	*b*
AROCLOR-1242, mg/L	1	45	0.0056	0.0056	0.0056	*a*	*b*
AROCLOR-1248, mg/L	1	45	0.0033	0.0033	0.0033	*a*	*b*
Arsenic, mg/L	3	96	0.007	0.0092	0.008	0.05 [*c*]	*b*
Alpha activity, pCi/L	63	63	–0.9	6.28	1.3	15 [*c*]	0
Aluminum, mg/L	86	96	0.021	49	1.4	*a*	*b*
Barium, mg/L	96	96	0.013	0.74	0.16	1.0 [*c*]	0
Beryllium, mg/L	6	96	0.00031	0.0003	0.00012	*a*	*b*
Beta activity, pCi/L	63	63	–1.28	35.6	4.5	50 [*c*]	0
Boron, mg/L	94	96	0.0054	1.1	0.11	*a*	*b*
Cadmium, mg/L	22	96	0.003	0.0087	0.0052	0.01 [*c*]	0
Calcium, mg/L	96	96	7.4	180	93	*a*	*b*
Chloride IC, mg/L	46	47	4	259	40	*a*	*b*
Chlorotrifluoroethene, mg/L	2	2	0.004	0.007	0.0055	*a*	*b*
Chromium, mg/L	13	96	0.013	0.068	0.033	0.05 [*c*]	3
Cobalt, mg/L	19	96	0.0058	0.0048	0.015	*a*	*b*
Conductivity, μmho/cm	235	235	191	6206	760	*a*	*b*
Copper, mg/L	32	96	0.0045	0.055	0.015	1.0 [*d*]	0
Dioctyl Adipate, mg/L	1	1	0.019	0.019	0.019	*a*	*b*
Dissolved oxygen, ppm	48	48	0.5	8.9	3.1	*a*	*b*
Dissolved solids, mg/L	48	48	22	1784	450	500 [*d*]	10
Fluoride by specific ion electrode, mg/L	29	38	0.1	6.4	0.44	*a*	*b*
Freon 113, mg/L	4	6	0.03	0.11	0.05	*a*	*b*
Freon 123, mg/L	5	6	0.015	0.031	0.024	*a*	*b*
Iron, mg/L	76	96	0.0043	58	7.2	0.3 [*d*]	38
Lead, mg/L	22	96	0.0045	0.026	0.01	0.05 [*c*]	0
Lithium, mg/L	62	96	0.0042	1.2	0.046	*a*	*b*
Magnesium, mg/L	96	96	0.019	43	20	*a*	*b*
Manganese, mg/L	96	96	0.0011	18	2.3	0.05 [*d*]	54
Nickel, mg/L	33	96	0.01	0.14	0.026	*a*	0.7
Niobium, mg/L	19	96	0.0073	0.012	0.0098	*a*	*b*
Nitrate, mg/L	16	48	0.2	2.4	0.89	10 [*c*]	0
Petroleum Hydrocarbons, mg/L	6	15	1.6	103.7	30	*a*	*b*
Phosphorous, mg/L	18	96	0.23	2.1	0.51	*a*	*b*
Potassium, mg/L	92	96	0.64	500	15	*a*	*b*
Redox, mV	48	48	–45	313	170	*a*	*b*
Silicon, mg/L	96	96	2.2	48	6.8	*a*	*b*
Sodium, mg/L	96	96	2.9	270	20	*a*	*b*
Strontium (total), mg/L	8	8	0.57	0.88	0.69	*a*	*b*
Strontium (total), pCi/L	1	1	5.04	5.04	5	3,000	*b*
Strontium, mg/L	88	88	0.049	1.8	0.37	*a*	*b*
Sulfate, mg/L	46	47	1	156	38	250 [*d*]	0
Suspended solids, mg/L	42	48	2	1810	100	*a*	*b*
Technetium-99, pCi/L	1	1	4.052	4.052	4.1	100,000 [*e*]	0
Temperature, °C	48	48	12	27	17	*a*	*b*
Thorium-234, pCi/L	1	1	15.81	15.81	16	10,000	*b*

Table 4.18 (continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
Titanium, mg/L	57	96	0.0032	0.51	0.026	*a*	*b*
Total organic carbon (TOC), mg/L	171	192	1	70	5.4	*a*	*b*
Total organic halide (Tox), mg/L	143	192	0.01	2.616	0.23	*a*	*b*
Turbidity, NTU	48	48	1	850	63	1 [*c*]	47
Unknown phthalate, mg/L	1	1	0.01	0.01	0.01	*a*	*b*
Unknown, mg/L	24	36	0.008	0.54	0.041	*a*	*b*
Uranium fluorometric, mg/L	21	96	0.004	0.004	0.0017	*a*	*b*
Vanadium, mg/L	9	96	0.0053	0.062	0.021	*a*	*b*
Zinc, mg/L	67	96	0.0016	0.17	0.032	5 [*d*]	0
Zirconium, mg/L	3	96	0.0065	0.017	0.012	*a*	*b*
pH, standard units	235	235	5.7	12	*b*	6.5–8.5 [*d*]	38

[a]No reference.
[b]Not applicable.
[c]National Primary Drinking Water Regulations, 40 CFR Pt. 141, as amended.
[d]National Secondary Drinking Water Regulations, 40 CFR Pt. 143, as amended.
[e]DOE Order 5400.5, Derived Concentration Guides for Air and Water.

Table 4.19. Constituents in the Waste Area Grouping (WAG) 4 groundwater—K-25 Site, 1990

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
2-Hexanone, mg/L	1	8	0.026	0.026	0.026	*a*	*b*
Alpha activity, pCi/L	10	10	−1.53	6.83	1.8	15 [*c*]	0
Aluminum, mg/L	10	16	0.028	3.2	0.53	*a*	*b*
Barium, mg/L	16	16	0.013	0.033	0.02	1 [*c*]	0
Beta activity, pCi/L	10	10	1.86	10.39	5.2	50 [*c*]	0
Boron, mg/L	12	16	0.0048	0.11	0.049	*a*	*b*
Cadmium	3	16	0.0032	0.0034	0.0033	0.01 [*c*]	0
Calcium, mg/L	16	16	43	210	75	*a*	*b*
Chloride IC, mg/L	8	8	7	16	11	*a*	*b*
Chloroform, mg/L	8	8	0.0009	0.0031	0.012	0.1 [*c*]	0
Chromium, mg/L	6	16	0.011	0.033	0.022	0.05 [*c*]	0
Conductivity, μmho/cm	40	40	312	717	490	*a*	*b*
Copper, mg/L	8	16	0.0046	0.045	0.012	1.0 [*d*]	0
Dissolved oxygen, ppm	8	8	3.2	6.6	5.5	*a*	*b*
Dissolved solids, mg/L	8	8	192	498	300	500 [*d*]	0
Fluoride by SIE, mg/L	8	8	0.2	0.9	0.38	2.0 [*d*]	0
Iron, mg/L	10	16	0.008	3.9	0.67	0.3 [*d*]	2
Lithium, mg/L	12	16	0.0044	0.014	0.0067	*a*	*b*
Magnesium, mg/L	16	16	9.3	34	16	*a*	*b*
Manganese, mg/L	15	16	0.0024	0.24	0.028	0.05 [*d*]	2
Molybdenum, mg/L	2	16	0.012	0.015	0.014	*a*	*b*
Nitrate, mg/L	6	8	0.2	1	0.57	10 [*c*]	0
Phenol, mg/L	1	8	0.014	0.014	0.014	*a*	*b*
Phosphorous, mg/L	8	16	0.22	0.46	0.36	*a*	*b*
Potassium, mg/L	16	16	1.3	4.5	2.8	*a*	*b*
Redox, mV	8	8	196	288	240	*a*	*b*
Silicon, mg/L	16	16	0.91	7	2.7	*a*	*b*
Sodium, mg/L	16	16	5.9	24	14	*a*	*b*
Strontium, mg/L	16	16	0.092	0.42	0.17	*a*	*b*
Sulfate, mg/L	8	8	27	195	88	250 [*d*]	0
Suspended solids, mg/L	7	8	1	403	100	*a*	*b*
Temperature, °C	8	8	8.1	17.6	14	*a*	*b*
Titanium, mg/L	6	16	0.0036	0.039	0.013	*a*	*b*
Total coliform, col/100 ml	3	8	5	88	33	1 [*c*]	3
Total organic carbon (TOC), mg/L	27	32	1	2	1.1	*a*	*b*
Total organic halide (Tox), mg/L	26	32	0.011	0.055	0.035	*a*	*b*
Turbidity, NTU	8	8	1	26	8.1	1 [*c*]	7
Unknown Siloxane, mg/L	1	1	0.009	0.009	0.009	*a*	*b*
Unknown, mg/L	2	2	0.022	0.097	0.059	*a*	*b*
Uranium fluorometric, mg/L	8	16	0.001	0.003	0.002	0.89	b
Zinc, mg/L	13	16	0.0018	0.045	0.012	5 [*d*]	0
pH, standard units	40	40	7	8.1	b	6.5–8.5 [*d*]	0

[a]No reference.
[b]Not applicable.
[c]National Primary Drinking Water Regulations, 40 CFR Pt. 141, as amended.
[d]National Secondary Drinking Water Regulations, 40 CFR Pt. 143, as amended.
[e]DOE Order 5400.5, Derived Concentration Guides for Air and Water.

Table 4.20. Constituents in the Waste Area Grouping (WAG) 5 groundwater—K-25 Site, 1990

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
1,2-Dichloroethene (total), mg/L	1	1	0.08	0.08	0.08	*a*	*b*
Alpha activity, pCi/L	1	1	2.07	2.07	2.1	15 [*c*]	0
Aluminum, mg/L	2	2	0.038	0.83	0.43	*a*	*b*
Barium, mg/L	2	2	0.032	0.039	0.036	1.0 [*c*]	0
Beta activity, pCi/L	1	1	6.05	6.05	6	50 [*c*]	0
Boron, mg/L	2	2	0.037	0.075	0.056	3.2	0
Calcium, mg/L	2	2	110	120	120	*a*	*b*
Chloride IC, mg/L	1	1	18	18	18	*a*	*b*
Conductivity, µmho/cm	5	5	509	556	540	*a*	*b*
Copper, mg/L	2	2	0.0072	0.017	0.012	1.0 [*d*]	0
Dissolved oxygen, ppm	1	1	7.6	7.6	7.6	*a*	*b*
Dissolved solids, mg/L	1	1	388	388	390	500 [*d*]	0
Fluoride, mg/L	1	1	0.2	0.2	0.2	2.0 [*d*]	0
Iron, mg/L	1	2	0.74	0.74	0.74	0.3 [*d*]	1
Lead, mg/L	1	2	0.0065	0.0065	0.0065	0.05 [*c*]	0
Lithium, mg/L	1	2	0.0055	0.0055	0.0055	*a*	*b*
Magnesium, mg/L	2	2	8.8	9.7	9.3	*a*	*b*
Manganese, mg/L	2	2	1.2	1.4	1.3	0.05 [*d*]	2
Nickel, mg/L	2	2	0.011	0.042	0.027	*a*	*b*
Potassium, mg/L	2	2	2.9	3.5	3.2	*a*	*b*
Redox, mV	1	1	264	264	260	*a*	*b*
Silicon, mg/L	2	2	4.1	5.6	4.8	*a*	*b*
Sodium, mg/L	2	2	4.2	4.4	4.3	*a*	*b*
Strontium, mg/L	2	2	0.19	0.22	0.21	*a*	*b*
Sulfate, mg/L	1	1	26	26	26	250 [*d*]	0
Suspended solids, mg/L	1	1	50	50	50	*a*	*b*
Temperature, °C	1	1	14	14	14	*a*	*b*
Titanium, mg/L	1	2	0.013	0.013	0.013	*a*	*b*
Total organic carbon (TOC), mg/L	4	4	1	2	1.3	*a*	*b*
Total organic halide (Tox), mg/L	4	4	0.133	0.169	0.15	*a*	*b*
Trichloroethene, mg/L	1	1	0.11	0.11	0.11	0.005 [*c*]	1
Turbidity, NTU	1	1	50	50	50	1 [*c*]	1
Uranium fluorometric, mg/L	1	2	0.001	0.001	0.001	0.89	b
Zinc, mg/L	2	2	0.0033	0.041	0.022	5 [*d*]	0
pH, standard units	5	5	7.1	7.2	b	6.5–8.5 [*d*]	0

[a]No reference.
[b]Not applicable.
[c]National Primary Drinking Water Regulations, 40 CFR Pt. 141, as amended.
[d]National Secondary Drinking Water Regulations, 40 CFR Pt. 143, as amended.
[e]DOE Order 5400.5, Derived Concentration Guides for Air and Water.

Table 4.21. Constituents in the Waste Area Grouping (WAG) 7 groundwater—K-25 Site, 1990

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
1,2-Dichloroethene (total), mg/L	3	21	0.018	0.034	0.023	*a*	*b*
Alpha activity, pCi/L	28	28	–0.65	3.89	1.1	15 [*c*]	0
Aluminum, mg/L	36	42	0.023	6.1	0.95	*a*	*b*
Barium, mg/L	42	42	0.014	0.096	0.043	1.0 [*c*]	0
Beryllium, mg/L	5	42	0.00057	0.00094	0.00074	*a*	*b*
Beta activity, pCi/L	28	28	1.28	43.93	19	50 [*c*]	0
Boron, mg/L	38	42	0.0052	2.3	0.25	3.2	0
Cadmium, mg/L	9	42	0.003	0.013	0.006	0.01 [*c*]	1
Calcium, mg/L	42	42	6	82	43	*a*	*b*
Chloride IC, mg/L	21	21	10	27	18	*a*	*b*
Chloroform, mg/L	3	21	0.002	0.01	0.0067	0.1 [*c*]	0
Chromium, mg/L	24	42	0.01	1.5	0.14	0.05 [*c*]	7
Cobalt, mg/L	7	42	0.0052	0.011	0.0079	*a*	*b*
Conductivity, µmho/cm	105	105	280	739	410	*a*	*b*
Copper, mg/L	18	42	0.0043	0.067	0.019	*a*	*b*
Dissolved oxygen, ppm	21	21	1.2	10.3	5.1	*a*	*b*
Dissolved solids, mg/L	21	21	166	424	240	500 [*d*]	0
Fluoride by SIE, mg/L	14	16	0.1	2	0.41	*a*	*b*
Fluoride, mg/L	4	5	0.1	0.2	0.18	2.0 [*d*]	0
Iron, mg/L	33	42	0.0043	9	1.8	0.3 [*d*]	15
Lead, mg/L	6	42	0.0051	0.013	0.0091	0.05 [*c*]	0
Lithium, mg/L	26	42	0.0041	0.051	0.014	*a*	*b*
Magnesium, mg/L	42	42	3.8	33	20	*a*	*b*
Manganese, mg/L	37	42	0.0016	8.4	1.4	0.05 [*d*]	21
Mercury, mg/L	1	42	0.00034	0.00034	0.00034	0.002 [*c*]	0
Molybdenum, mg/L	5	42	0.012	0.043	0.02	*a*	*b*
Nickel, mg/L	24	42	0.013	0.15	0.043	*a*	*b*
Niobium, mg/L	9	42	0.0071	0.014	0.0093	*a*	*b*
Nitrate, mg/L	17	21	0.4	4	1.2	10 [*c*]	0
Phosphorous, mg/L	3	42	0.22	0.42	0.31	*a*	*b*
Potassium, mg/L	42	42	1.1	27	4.8	*a*	*b*
Redox-I, mV	21	21	91	268	210	*a*	*b*
Redox, mV	21	21	105	303	230	*a*	*b*
Silicon, mg/L	42	42	1.3	15	4.4	*a*	*b*
Sodium, mg/L	42	42	1.8	130	21	*a*	*b*
Strontium, mg/L	42	42	0.02	0.92	0.12	*a*	*b*
Sulfate, mg/L	21	21	4.1	76	28	250 [*d*]	0
Suspended solids, mg/L	21	21	1	329	62	*a*	*b*
Temperature, °C	21	21	9.9	19.2	15	*a*	*b*
Tetrachloroethene, mg/L	1	21	0.001	0.001	0.001	*a*	*b*
Titanium, mg/L	32	42	0.0034	0.086	0.018	*a*	*b*
Total coliform, col/100 mL	4	21	1	2	1.3	1 [*c*]	1
Total organic carbon (TOC), mg/L	40	84	1	2	1.3	*a*	*b*
Total organic halide (Tox), mg/L	65	84	0.01	0.524	0.072	*a*	*b*
Trichloroethene, mg/L	13	21	0.009	0.17	0.04	0.005 [*c*]	13
Turbidity, NTU	21	21	1.8	250	56	1 [*c*]	21
Unknown siloxane, mg/L	15	15	0.026	0.11	0.049	*a*	*b*
Unknown, mg/L	9	9	0.01	0.052	0.02	*a*	*b*
Uranium fluorometric, mg/L	8	42	0.001	0.002	0.0014	0.89	*b*
Vanadium, mg/L	4	42	0.0054	0.013	0.0096	*a*	*b*
Zinc, mg/L	29	42	0.0011	0.1	0.021	5 [*d*]	0
pH, standard units	105	105	6.1	9.3	7.1	6.5–8.5 [*d*]	22

[a]No reference.
[b]Not applicable.
[c]National Primary Drinking Water Regulations, 40 CFR Pt. 141, as amended.
[d]National Secondary Drinking Water Regulations, 40 CFR Pt. 143, as amended.
[e]DOE Order 5400.5, Derived Concentration Guides for Air and Water.

Table 4.22. Constituents in the Waste Area Grouping (WAG) 9 groundwater—K-25 Site, 1990

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
1,1,1-Trichloroethane, mg/L	1	23	0.011	0.011	0.011	0.2 [c]	0
1,2-Dichloroethene (total), mg/L	1	23	0.02	0.02	0.02	*a*	*b*
Alpha activity, pCi/L	29	29	–0.77	3.64	1.1	15 [c]	0
Aluminum, mg/L	34	44	0.024	1.2	0.28	*a*	*b*
Arsenic, mg/L	4	44	0.0055	0.016	0.01	0.05 [c]	0
Barium, mg/L	44	44	0.019	0.26	0.057	1.0 [c]	0
Beta activity, pCi/L	29	29	0.58	41.79	16	50 [c]	0
Boron, mg/L	40	44	0.0062	0.19	0.051	*a*	*b*
Cadmium, mg/L	8	44	0.0031	0.014	0.0067	0.01 [c]	1
Calcium, mg/L	44	44	17	150	78	*a*	*b*
Chloride IC, mg/L	23	23	1	67	19	*a*	*b*
Chloroform, mg/L	2	23	0.0008	0.006	0.0034	0.1 [c]	0
Chromium, mg/L	26	44	0.011	0.24	0.036	0.05 [c]	2
Cobalt, mg/L	7	44	0.008	0.051	0.023	*a*	*b*
Conductivity, μmho/cm	115	115	199	1039	520	*a*	*b*
Copper, mg/L	16	44	0.0042	0.026	0.01	1.0 [d]	0
Dissolved oxygen, ppm	23	23	0.9	6.8	3.8	*a*	*b*
Dissolved solids, mg/L	23	23	158	754	320	500 [d]	2
Fluoride by SIE, mg/L	19	23	0.1	0.4	0.19	*a*	*b*
Iron, mg/L	27	44	0.005	7.6	1	0.3 [d]	13
Lead, mg/L	4	44	0.0045	0.0062	0.0056	0.05 [c]	0
Lithium, mg/L	7	44	0.0041	0.014	0.0092	*a*	*b*
Magnesium, mg/L	44	44	2.9	24	12	*a*	*b*
Manganese, mg/L	38	44	0.001	8.2	0.86	0.05 [d]	11
Molybdenum, mg/L	4	44	0.012	0.025	0.018	*a*	*b*
Nickel, mg/L	14	44	0.01	0.85	0.12	*a*	*b*
Niobium, mg/L	11	44	0.0073	0.017	0.011	*a*	*b*
Nitrate, mg/L	19	23	0.3	1	0.72	10 [c]	0
Phosphorous, mg/L	2	44	0.27	0.28	0.28	*a*	*b*
Potassium, mg/L	41	44	0.81	12	3.4	*a*	*b*
Redox, mV	23	23	88	320	240	*a*	*b*
Silicon, mg/L	44	44	0.87	8.6	4	*a*	*b*
Silver, mg/L	1	44	0.0072	0.0072	0.0072	*a*	*b*
Sodium, mg/L	44	44	2.6	78	14	*a*	*b*
Strontium, mg/L	44	44	0.027	0.29	0.13	*a*	*b*
Sulfate, mg/L	23	23	5	379	67	250 [d]	1
Suspended solids, mg/L	17	23	1	167	32	*a*	*b*
Temperature, °C	23	23	9.6	23.1	16	*a*	*b*
Titanium, mg/L	22	44	0.003	0.026	0.011	*a*	*b*
Total coliform, col/100 mL	4	23	1	5	2.3	1 [c]	2
Total organic carbon (TOC), mg/L	58	92	1	4	1.8	*a*	*b*
Total organic halide (Tox), mg/L	31	92	0.01	0.052	0.018	*a*	*b*
Trichloroethene, mg/L	5	23	0.002	0.044	0.016	0.005 [c]	4
Turbidity, NTU	23	23	0.45	110	21	1 [c]	19
Unknown, mg/L	2	5	0.009	0.013	0.011	*a*	*b*
Uranium fluorometric, mg/L	11	44	0.001	0.001	0.001	0.89	*b*
Zinc, mg/L	40	44	0.0017	0.047	0.016	5 [d]	0
pH, standard units	115	115	5.6	8.2	*b*	6.5–8.5 [d]	16

[a]No reference.
[b]Not applicable.
[c]National Primary Drinking Water Regulations, 40 CFR Pt. 141, as amended.
[d]National Secondary Drinking Water Regulations, 40 CFR Pt. 143, as amended.
[e]DOE Order 5400.5, Derived Concentration Guides for Air and Water.

Table 4.23. Constituents in the Waste Area Grouping (WAG) 10 groundwater—K-25 Site, 1990

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
1,1,1-Trichloroethane, mg/L	5	13	0.0009	0.015	0.0074	0.2 [c]	0
1,1-Dichloroethene, mg/L	3	13	0.006	0.01	0.0073	0.007 [c]	1
Acetone, mg/L	1	13	0.005	0.005	0.005	*a*	*b*
Alpha activity, pCi/L	15	15	–0.35	4.7	1.3	15 [c]	0
Aluminum, mg/L	17	24	0.024	6.1	0.51	*a*	*b*
Arsenic, mg/L	1	26	0.0052	0.0052	0.0052	0.05 [c]	0
Barium, mg/L	26	26	0.021	0.22	0.054	1.0 [c]	0
Beryllium, mg/L	2	26	0.00038	0.00051	0.00045	*a*	*b*
Beta activity, pCi/L	15	15	0.93	9.84	5.4	50 [c]	0
Boron, mg/L	26	26	0.0058	0.071	0.03	*a*	*b*
Cadmium, mg/L	5	26	0.0031	0.0049	0.0036	0.01 [c]	0
Calcium, mg/L	24	24	5.3	110	56	*a*	*b*
Chloride IC, mg/L	13	13	1	18	4	*a*	*b*
Chromium, mg/L	3	24	0.01	0.22	0.081	0.05 [c]	1
Cobalt, mg/L	1	24	0.0079	0.0079	0.0079	*a*	*b*
Conductivity, µmho/cm	65	65	78	608	370	*a*	*b*
Copper, mg/L	9	26	0.0041	0.05	0.015	1.0 [d]	0
Dissolved oxygen, ppm	13	13	0.8	6.5	2.5	*a*	*b*
Dissolved solids, mg/L	13	13	16	356	210	500 [d]	0
Fluoride by specific ion electrode, mg/L	8	11	0.1	0.8	0.26	*a*	*b*
Fluoride, mg/L	2	2	0.2	0.2	0.2	2.0 [d]	0
Iron, mg/L	20	26	0.0045	15	1.4	0.3 [d]	9
Lead, mg/L	3	26	0.012	0.019	0.014	0.05 [c]	0
Lithium, mg/L	10	24	0.0046	0.02	0.0079	*a*	*b*
Magnesium, mg/L	24	24	2.9	41	15	*a*	*b*
Manganese, mg/L	23	24	0.0019	1.3	0.18	0.05 [d]	15
Mercury, mg/L	3	24	0.00023	0.0012	0.00061	0.002 [c]	0
Nickel, mg/L	6	24	0.011	0.13	0.032	*a*	*b*
Niobium, mg/L	5	24	0.008	0.0098	0.009	*a*	*b*
Nitrate, mg/L	5	13	0.2	1	0.56	10 [c]	0
Phosphorous, mg/L	1	24	0.48	0.48	0.48	*a*	*b*
Potassium, mg/L	22	24	0.79	4.7	2.2	*a*	*b*
Redox, mV	13	13	20	310	210	*a*	*b*
Silicon, mg/L	24	24	1.6	16	4.1	*a*	*b*
Sodium, mg/L	26	26	0.69	12	4	*a*	*b*
Strontium (total), mg/L	4	4	0.042	0.057	0.05	*a*	*b*
Strontium, mg/L	22	22	0.015	0.6	0.14	*a*	*b*
Sulfate, mg/L	13	13	1	85	21	250 [d]	0
Suspended solids, mg/L	12	13	1	237	28	*a*	*b*
Temperature, °C	13	13	11.7	17.6	14	*a*	*b*
Titanium, mg/L	15	26	0.0033	0.11	0.016	*a*	*b*
Total coliform, col/100 mL	4	13	1	3	2	1 [c]	3
Total organic carbon (TOC), mg/L	40	52	1	30	4.1	*a*	*b*
Total organic halide (Tox), mg/L	23	52	0.01	0.05	0.024	*a*	*b*
Trichloroethene, mg/L	5	13	0.008	0.043	0.023	0.005 [c]	5
Turbidity, NTU	13	13	1.6	150	21	1 [c]	13
Unknown hydrocarbon, mg/L	2	2	0.032	0.034	0.033	*a*	*b*
Unknown, mg/L	1	1	0.009	0.009	0.009	*a*	*b*
Uranium fluorometric, mg/L	9	26	0.001	0.013	0.0038	0.89	b
Vanadium, mg/L	1	26	0.0089	0.0089	0.0089	*a*	*b*
Zinc, mg/L	20	26	0.0012	0.72	0.061	5 [d]	0
pH, standard units	65	65	5.3	8.1	6.9	6.5–8.5 [d]	10

[a]No reference.
[b]Not applicable.
[c]National Primary Drinking Water Regulations, 40 CFR Pt. 141, as amended.
[d]National Secondary Drinking Water Regulations, 40 CFR Pt. 143, as amended.
[e]DOE Order 5400.5, Derived Concentration Guides for Air and Water.

Table 4.24. Constituents in the Waste Area Grouping (WAG) 12 groundwater—K-25 Site, 1990

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Min	Max	Av		
Alpha activity, pCi/L	11	11	0.03	13.5	2.6	15 [c]	0
Aluminum, mg/L	16	16	0.02	4.3	0.8	*a*	*b*
Arsenic, mg/L	6	16	0.013	0.028	0.024	0.05 [c]	0
Barium, mg/L	16	16	0.014	0.18	0.082	1.0 [c]	0
Beryllium, mg/L	6	16	0.00035	0.0017	0.0012	*a*	*b*
Beta activity, pCi/L	11	11	-2.68	12.85	2.9	50 [c]	0
Boron, mg/L	15	16	0.014	0.88	0.37	*a*	*b*
Cadmium, mg/L	12	16	0.0052	0.018	0.011	0.01 [c]	5
Calcium, mg/L	16	16	7.5	260	99	*a*	*b*
Chloride IC, mg/L	6	8	1	4	2.5	*a*	*b*
Cobalt, mg/L	6	16	0.84	1.1	0.96	*a*	*b*
Conductivity, µmho/cm	40	40	85	2476	1200	*a*	*b*
Copper, mg/L	9	16	0.0044	0.032	0.012	1.0 [d]	0
Dissolved oxygen, ppm	8	8	0.6	4.1	2.1	*a*	*b*
Dissolved solids, mg/L	8	8	38	2394	1000	500 [d]	6
Fluoride by SIE, mg/L	8	8	0.1	0.3	0.18	*a*	*b*
Iron, mg/L	16	16	0.04	82	38	0.3 [d]	13
Lead, mg/L	2	16	0.0046	0.016	0.01	0.05 [c]	0
Lithium, mg/L	5	16	0.0063	0.0083	0.0077	*a*	*b*
Magnesium, mg/L	16	16	1.7	170	55	*a*	*b*
Manganese, mg/L	16	16	0.044	98	34	0.05 [d]	15
Nickel, mg/L	8	16	0.01	0.21	0.13	*a*	*b*
Niobium, mg/L	11	16	0.01	0.056	0.025	*a*	*b*
Nitrate, mg/L	2	8	1	1	1	10 [c]	0
Phosphorous, mg/L	13	16	0.36	3.6	1.1	*a*	*b*
Potassium, mg/L	16	16	0.98	2.8	1.9	*a*	*b*
Redox, mV	8	8	-95	371	120	*a*	*b*
Silicon, mg/L	16	16	1.2	12	7.9	*a*	*b*
Silver, mg/L	7	16	0.0063	0.031	0.018	0.05 [c]	0
Sodium, mg/L	16	16	2.6	21	12	*a*	*b*
Strontium (total), mg/L	6	6	0.023	0.3	0.14	*a*	*b*
Strontium, mg/L	10	10	0.018	0.3	0.15	*a*	*b*
Sulfate, mg/L	8	8	5	17600	3200	250 [d]	6
Suspended solids, mg/L	8	8	2	232	58	*a*	*b*
Temperature, °C	8	8	12.2	19.5	15	*a*	*b*
Titanium, mg/L	11	16	0.0032	0.075	0.016	*a*	*b*
Total organic carbon (TOC), mg/L	24	32	1	3	1.7	*a*	*b*
Total organic halide (Tox), mg/L	5	32	0.01	0.015	0.013	*a*	*b*
Turbidity, NTU	8	8	2.8	200	90	1 [c]	8
Uranium fluorometric, mg/L	1	16	0.001	0.001	0.001	0.89	b
Zinc, mg/L	12	16	0.0032	0.36	0.14	5 [d]	0
pH, standard units	40	40	3.8	6.9	5.7	6.5–8.5 [d]	35

[a]No reference.

[b]Not applicable.

[c]National Primary Drinking Water Regulations, 40 CFR Pt. 141, as amended.

[d]National Secondary Drinking Water Regulations, 40 CFR Pt. 143, as amended.

[e]DOE Order 5400.5, Derived Concentration Guides for Air and Water.

BIOLOGICAL SAMPLING

Table 5.1. 1990 concentration of I-131 in raw milk

Station[a]	Number of samples	Concentration (pCi/L)			
		Max	Min	Av[b]	Standard error[c]
		Immediate environs			
1	10	1.4	–2.4	–0.49	0.41
2	12	1.6	–2.4	–0.52	0.37
3	12	1.1	–1.6	–0.081	0.22
4	12	1.9	–1.9	–0.14	0.32
8	10	2.7	–0.81	0.67*	0.32
Network summary	56	2.7	–2.4	–0.13	0.15

[a]See Fig. 5.1 in Vol. 1.
[b]An asterisk (*) indicates that the average is significantly greater than zero at 95% confidence level.
[c]Standard error of the mean.

Table 5.2. 1990 concentration of total radioacitve Sr in raw milk

Station[a]	Number of samples	Concentration (pCi/L)			
		Max	Min	Av[b]	Standard error[c]
		Immediate environs			
1	10	17	–0.19	3.2*	1.6
2	12	4.1	0.35	1.5*	0.32
3	12	4.6	0.49	2.1*	0.37
4	12	7.0	0.32	3.0*	0.57
8	10	6.5	0.32	3.8*	0.59
Network summary	56	17	–0.19	2.7*	0.35

[a]See Fig. 5.1 in Vol. 1.
[b]An asterisk (*) indicates that the average is significantly greater than zero at 95% confidence level.
[c]Standard error of the mean.

Table 5.3. 1990 mercury concentrations in Clinch River bluegill

Location[a]	Number of fish sampled	Concentration (μg/g wet wt)			
		Max	Min	Av	Standard error
CRK 8.0	12	0.46	<0.082	<0.19	0.032
CRK 33.3	12	0.17	<0.044	<0.11	0.011
CRK 40.0	12	0.10	<0.025	<0.072	0.0090

[a]See Fig. 5.2 in Vol. 1.

Table 5.4. 1990 PCB concentrations in Clinch River bluegill

Location[a]	PCB type	Number of fish sampled	Concentration (μg/g wet wt)			
			Max	Min	Av	Standard error[b]
CRK 8.0	1254	12	<0.35	<0.010	<0.13	0.037
CRK 8.0	1260	12	<0.35	<0.010	<0.13	0.036
CRK 33.3	1254	12	<0.23	<0.010	<0.10	0.029
CRK 33.3	1260	12	<0.23	<0.010	<0.12	0.026
CRK 40.0	1254	12	<0.54	<0.010	<0.22	0.064
CRK 40.0	1260	12	<0.54	<0.010	<0.22	0.063

[a]See Fig. 5.2 in Vol 1.
[b]Standard error of the mean.

Table 5.5. 1990 radionuclide concentrations in Clinch River bluegill

Location[a]	Radionuclide	Number of samples[b]	Max	Min	Av[c]	Standard error[d]
		Concentration (pCi/g ash wt)				
CRK 8.0	^{60}Co	6	0.43	-0.11	0.088	0.079
CRK 8.0	^{137}Cs	6	5.9	1.4	3.8*	0.73
CRK 8.0	Total Sr[e]	6	5.4	-0.027	1.2	0.85
CRK 33.3	^{60}Co	6	0.54	-0.027	0.17*	0.082
CRK 33.3	^{137}Cs	6	26	4.6	14*	3.6
CRK 33.3	Total Sr[e]	6	3.0	0.89	1.4*	0.32
CRK 40.0	^{60}Co	6	0.30	0.054	0.14*	0.034
CRK 40.0	^{137}Cs	6	4.6	0.41	1.2	0.67
CRK 40.0	Total Sr[e]	6	0.46	0.14	0.24*	0.058
		Concentration (pCi/g wet wt)				
CRK 8.0	^{60}Co	6	0.0051	-0.0013	0.0011	0.00095
CRK 8.0	^{137}Cs	6	0.077	0.017	0.047*	0.0093
CRK 8.0	Total Sr[e]	6	0.064	-0.00033	0.015	0.010
CRK 33.3	^{60}Co	6	0.0079	-0.00035	0.0023*	0.0012
CRK 33.3	^{137}Cs	6	0.46	0.087	0.22*	0.064
CRK 33.3	Total Sr[e]	6	0.056	0.012	0.023*	0.0068
CRK 40.0	^{60}Co	6	0.0049	0.00062	0.0020*	0.00063
CRK 40.0	^{137}Cs	6	0.075	0.0069	0.020	0.011
CRK 40.0	Total Sr[e]	6	0.0075	0.0022	0.0040*	0.00093

[a]See Fig. 5.2 in Vol. 1.
[b]A sample is a composite of 6 to 10 fish.
[c]An asterisk (*) indicates that the average is significantly greater than zero at 95% confidence level.
[d]Standard error of the mean.
[e]Total radioactive Sr (Sr-89 and Sr-90).

Table 5.6. 1990 grass sampling and pine needle data at the K-25 Site[a]

Station	F^- concentration (μg/g dry wt)	U (total) concentration		^{99}Tc concentration (pCi/g dry wt)
		μg/g dry wt	pCi/g dry wt	
		Grass sampling data		
V1	4	<0.5		0.17
V2	4	<0.5		–0.17
V3	21	<0.5		–0.08
V4	<3	<0.5		–0.08
V5				
V6	5	<0.5		3.42
V7	<3	<0.5		0.58
V8	25	<0.5		–0.25
V9	5	<0.5		–0.17
V10	3	<0.5		0.16
V11	3	0.7		37.9
V12	4	<0.5		1.07
V13	<3	<0.5		–0.02
V14	7	<0.5		0.67
V15	7	<0.5		0.86
V16	6	<0.5		1.51
		Pine needle sampling data		
PN1	3	<0.5		0.03
PN2	<3	<0.5		–0.08
PN3	3	<0.5		–0.06
PN4				
PN5	<3	<0.5		0.71
PN6	4	<0.5		0.18

[a]See Fig. 5.3 (grass and pine needle sampling locations) in Vol. 1.

SOIL AND SEDIMENT MONITORING

Table 6.1. 1990 summary of inorganic analysis of soil at ORNL air stations[a]

Analyte	Number of samples	Concentration (mg/kg dry wt)			
		Max	Min	Av	Standard error[b]
Ag	15	<0.31	<0.26	<0.28	0.0030
Al	15	21,000	9,000	15,000	950
As	15	26	<2.7	<7.2	2.1
B	15	9.7	<4.2	<5.3	0.40
Ba	15	370	43	120	20
Be	15	1.3	0.49	0.94	0.061
Ca	15	71,000	2,300	22,000	6,600
Cd	15	33	<0.29	<9.1	2.5
Co	15	19	6.0	13	0.86
Cr	15	32	13	21	1.2
Cu	15	46	9.4	24	3.3
Fe	15	33,000	8,800	24,000	1,700
Hg	15	0.23	0.090	0.14	0.011
Li	15	<930	<790	<850	9.6
Mg	15	11,000	1,100	4,400	890
Mn	15	2,100	480	1,100	120
Mo	15	<2.5	<2.1	<2.3	0.029
Na	15	<310	<270	<280	2.9
Ni	15	48	8.5	22	3.1
P	15	860	220	430	44
Pb	15	49	12	26	2.7
Sb	15	<3.1	<2.7	<2.8	0.029
Se	15	<3.1	<2.7	<2.8	0.029
Si	15	2,400	1,100	1,700	100
Sn	15	<3.1	<2.7	<2.8	0.029
Sr	15	68	7.9	24	5.0
Ti	15	180	65	110	11
V	15	46	13	27	2.2
Zn	15	340	28	110	25
Zr	15	13	3.2	7.5	0.63

[a]See Fig. 2.19 in Vol. 1.
[b]Standard error of the mean.

Table 6.2. 1990 summary of inorganic analysis of soil at ORR air stations[a]

Analyte	Number of samples	Concentration (mg/kg dry wt)			
		Max	Min	Av	Standard error[b]
Ag	9	<0.29	<0.26	<0.28	0.0029
Al	9	23,000	15,000	19,000	980
As	9	22	<2.7	<8.5	2.5
B	9	9.1	<4.1	<5.5	0.55
Ba	9	150	27	93	14
Be	9	1.0	0.28	0.72	0.081
Ca	9	27,000	1,400	12,000	3,600
Cd	9	21	0.65	5.2	2.3
Co	9	41	10	17	3.4
Cr	9	33	14	23	2.4
Cu	9	180	9.9	40	18
Fe	9	26,000	13,000	21,000	1,800
Hg	9	8.0	0.14	2.5	1.1
Li	9	<880	<770	<830	11
Mg	9	6,900	1,100	3,600	860
Mn	9	1,200	610	930	70
Mo	9	<2.3	<2.1	<2.2	0.031
Na	9	<290	<260	<280	2.9
Ni	9	28	7.8	18	2.7
P	9	580	95	340	43
Pb	9	81	18	37	7.8
Sb	9	<2.9	<2.6	<2.8	0.029
Se	9	<2.9	<2.6	<2.8	0.029
Si	9	2,000	1,400	1,700	70
Sn	9	<2.9	<2.6	<2.8	0.029
Sr	9	33	5.7	16	3.8
Ti	9	210	150	180	8.2
V	9	51	23	31	3.2
Zn	9	90	39	64	5.9
Zr	9	17	2.0	7.5	1.6

[a]See Fig. 2.19 in Vol. 1.
[b]Standard error of the mean.

Table 6.3. Analysis of soil at ORNL air station 3, 1990[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av	Standard error[b]
		Metals (mg/kg dry wt)			
Ag	3	<0.29	<0.28	<0.29	0.0033
Al	3	15,000	11,000	13,000	1,200
As	3	<2.9	<2.8	<2.9	0.033
B	3	<4.6	<4.5	<4.6	0.033
Ba	3	97	89	93	2.3
Be	3	1.0	0.88	0.93	0.035
Ca	3	66,000	29,000	47,000	11,000
Cd	3	19	2.5	8.2	5.4
Co	3	12	12	12	0
Cr	3	20	19	20	0.33
Cu	3	22	18	20	1.2
Fe	3	28,000	25,000	26,000	880
Hg	3	0.13	0.10	0.12	0.010
Li	3	<870	<840	<860	10
Mg	3	10,000	3,800	7,000	1,800
Mn	3	1,100	860	980	69
Mo	3	<2.3	<2.2	<2.3	0.033
Na	3	<290	<280	<290	3.3
Ni	3	18	15	16	0.88
P	3	380	220	320	49
Pb	3	27	19	22	2.5
Sb	3	<2.9	<2.8	<2.9	0.033
Se	3	<2.9	<2.8	<2.9	0.033
Si	3	1,400	1,300	1,400	33
Sn	3	<2.9	<2.8	<2.9	0.033
Sr	3	68	33	50	10
Ti	3	74	65	70	2.6
V	3	26	19	23	2.0
Zn	3	260	89	150	55
Zr	3	10	8.3	9.4	0.57
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.065	0.002	0.024	0.020
^{137}Cs	3	3.2	0.78	1.6	0.81
G-Alpha	3	7.6	5.4	6.4*	0.63
G-Beta	3	21	13	17*	2.2
^{40}K	3	14	9.7	12*	1.2
^{238}Pu	3	0.011	–0.043	–0.016	0.016
^{239}Pu	3	0.089	0.043	0.067*	0.013
^{228}Ts	3	0.38	0.32	0.35*	0.016
^{230}Th	3	0.23	0.21	0.22*	0.0083
^{232}Th	3	0.27	0.25	0.26*	0.0065
Total-Sr	3	0.81	0.17	0.38	0.21
^{234}U	3	0.51	0.35	0.41*	0.050
^{235}U	3	0.038	0.018	0.025*	0.0065
^{238}U	3	0.30	0.22	0.26*	0.023

[a]See Fig. 2.19 in Vol. 1.
[b]Standard error of the mean.

Table 6.4. Analysis of soil at ORNL air station 7, 1990[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av	Standard error[b]
		Metals (mg/kg dry wt)			
Ag	3	<0.29	<0.28	<0.28	0.0033
Al	3	21,000	17,000	19,000	1,200
As	3	5.3	<2.8	<3.8	0.75
B	3	9.7	<4.7	<7.5	1.5
Ba	3	100	82	88	5.8
Be	3	1.3	0.65	0.98	0.19
Ca	3	6,500	4,900	5,600	470
Cd	3	6.8	<0.29	<3.8	1.9
Co	3	14	13	14	0.33
Cr	3	21	16	19	1.5
Cu	3	20	9.4	14	3.1
Fe	3	28,000	15,000	22,000	3,800
Hg	3	0.13	0.090	0.11	0.012
Li	3	<870	<850	<860	6.7
Mg	3	3,300	1,700	2,700	500
Mn	3	1,000	830	890	57
Mo	3	<2.3	<2.3	<2.3	0
Na	3	<290	<280	<280	3.3
Ni	3	22	11	17	3.3
P	3	860	310	550	160
Pb	3	22	17	19	1.5
Sb	3	<2.9	<2.8	<2.8	0.033
Se	3	<2.9	<2.8	<2.8	0.033
Si	3	2,100	1,900	2,000	58
Sn	3	<2.9	<2.8	<2.8	0.033
Sr	3	13	7.9	11	1.6
Ti	3	140	130	130	3.3
V	3	27	24	26	0.88
Zn	3	81	40	60	12
Zr	3	7.4	7.2	7.3	0.058
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.049	–0.11	–0.012	0.051
^{137}Cs	3	2.1	0.26	1.1	0.52
G-Alpha	3	8.1	6.2	6.9*	0.59
G-Beta	3	18	10	15*	2.6
^{40}K	3	18	12	16*	2.0
^{238}Pu	3	0.043	–0.014	0.014	0.016
^{239}Pu	3	0.038	–0.046	–0.00090	0.024
^{228}Th	3	0.65	0.30	0.41*	0.12
^{230}Th	3	0.38	0.19	0.25*	0.064
^{232}Th	3	0.46	0.11	0.26	0.10
Total-Sr	3	0.20	0.11	0.15*	0.028
^{234}U	3	0.46	0.38	0.41*	0.024
^{235}U	3	0.032	0.013	0.024*	0.0057
^{238}U	3	0.35	0.24	0.30*	0.033

[a]See Fig. 2.19 in Vol. 1.

[b]Standard error of the mean.

Table 6.5. Analysis of soil at ORNL air station 9, 1990[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av	Standard error[b]
		Metals (mg/kg dry wt)			
Ag	3	<0.31	<0.27	<0.29	0.012
Al	3	12,000	9,000	11,000	880
As	3	5.1	<3.0	<3.7	0.68
B	3	<5.0	<4.3	<4.7	0.20
Ba	3	110	90	99	5.9
Be	3	0.78	0.49	0.66	0.087
Ca	3	71,000	3,700	27,000	22,000
Cd	3	16	4.3	11	3.5
Co	3	14	6.0	9.7	2.3
Cr	3	21	13	17	2.3
Cu	3	23	11	15	3.8
Fr	3	19,000	8,800	15,000	3,100
Hg	3	0.18	0.10	0.14	0.023
Li	3	<930	<800	<870	38
Mg	3	11,000	1,100	4,500	3,300
Mn	3	1,800	520	1,200	380
Mo	3	<2.5	<2.1	<2.3	0.12
Na	3	<310	<270	<290	12
Ni	3	11	8.5	9.5	0.75
P	3	730	300	520	120
Pb	3	49	24	35	7.4
Sb	3	<3.1	<2.7	<2.9	0.12
Se	3	<3.1	<2.7	<2.9	0.12
Si	3	1,800	1,300	1,500	150
Sn	3	<3.1	<2.7	<2.9	0.12
Sr	3	57	9.1	27	15
Ti	3	92	68	79	7.1
V	3	24	13	19	3.3
Zn	3	38	28	32	3.2
Zr	3	7.5	3.2	4.9	1.3
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.19	–0.11	0.040	0.084
^{137}Cs	3	2.6	1.1	1.9*	0.45
G-Alpha	3	7.8	3.8	5.1*	1.4
G-Beta	3	16	6.5	12*	2.8
^{40}K	3	7.3	5.1	5.9*	0.68
^{238}Pu	3	0.0027	–0.014	–0.0063	0.0048
^{239}Pu	3	0.043	–0.011	0.014	0.016
^{228}Th	3	0.41	0.23	0.33*	0.052
^{230}Th	3	0.23	0.12	0.18*	0.032
^{232}Th	3	0.22	0.15	0.19*	0.022
Total-Sr	3	0.46	0.22	0.36*	0.072
^{234}U	3	0.62	0.46	0.53*	0.048
^{235}U	3	0.049	0.025	0.034*	0.0073
^{238}U	3	0.43	0.22	0.33*	0.062

[a]See Fig. 2.19 in Vol. 1.

[b]Standard error of the mean.

Table 6.6. Analysis of soil at ORNL air station 20, 1990[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av	Standard error[b]
		Metals (mg/kg dry wt)			
Ag	3	<0.29	<0.26	<0.28	0.010
Al	3	21,000	14,000	17,000	2,000
As	3	<2.9	<2.7	<2.8	0.058
B	3	<4.7	<4.2	<4.5	0.15
Ba	3	370	130	220	74
Be	3	1.3	0.86	1.1	0.13
Ca	3	5,500	2,300	3,600	980
Cd	3	0.89	0.31	0.64	0.17
Co	3	19	11	15	2.3
Cr	3	32	25	28	2.0
Cu	3	46	19	29	8.5
Fe	3	33,000	29,000	31,000	1,200
Hg	3	0.23	0.12	0.17	0.032
Li	3	<880	<790	<840	27
Mg	3	4,300	2,200	3,100	620
Mn	3	1,400	480	940	270
Mo	3	<2.3	<2.1	<2.2	0.067
Na	3	<290	<270	<280	6.7
Ni	3	38	20	29	5.2
P	3	390	340	360	15
Pb	3	24	12	17	3.5
Sb	3	<2.9	<2.7	<2.8	0.058
Se	3	<2.9	<2.7	<2.8	0.058
Si	3	1,300	1,100	1,200	67
Sn	3	<2.9	<2.7	<2.8	0.058
Sr	3	17	9.9	12	2.4
Ti	3	180	170	180	3.3
V	3	25	24	24	0.33
Zn	3	90	43	64	14
Zr	3	7.0	5.2	6.1	0.52
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.11	–0.049	0.053	0.051
^{137}Cs	3	2.2	0.97	1.7*	0.38
G-Alpha	3	6.2	3.2	5.0*	0.91
G-Beta	3	25	14	21*	3.4
^{40}K	3	21	11	16*	2.7
^{238}Pu	3	0.027	–0.027	0	0.016
^{239}Pu	3	0.049	–0.035	0.0099	0.024
^{228}Th	3	0.65	0.35	0.50*	0.086
^{230}Th	3	0.22	0.11	0.15*	0.033
^{232}Th	3	0.41	0.22	0.33*	0.055
Total-Sr	3	0.51	0.22	0.35*	0.085
^{234}U	3	0.41	0.32	0.35*	0.027
^{235}U	3	0.032	0.002	0.019	0.0088
^{238}U	3	0.23	0.20	0.21*	0.010

[a]See Fig. 2.19 in Vol. 1.

[b]Standard error of the mean.

Table 6.7. Analysis of soil at ORNL air station 21, 1990[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av	Standard error[b]
		Metals (mg/kg dry wt)			
Ag	3	<0.28	<0.27	<0.28	0.0033
Al	3	16,000	15,000	15,000	330
As	3	26	21	23	1.5
B	3	6.0	<4.3	<5.1	0.50
Ba	3	160	43	85	38
Be	3	1.3	0.86	1.1	0.13
Ca	3	57,000	7,100	24,000	16,000
Cd	3	33	16	22	5.5
Co	3	16	7.3	12	2.6
Cr	3	25	20	23	1.5
Cu	3	46	39	43	2.0
Fe	3	28,000	26,000	27,000	580
Hg	3	0.20	0.17	0.19	0.0088
Li	3	<850	<800	<830	15
Mg	3	10,000	1,600	4,700	2,700
Mn	3	2,100	670	1,400	410
Mo	3	<2.3	<2.1	<2.2	0.058
Na	3	<280	<270	<280	3.3
Ni	3	48	32	38	4.9
P	3	500	330	400	50
Pb	3	42	34	37	2.5
Sb	3	<2.8	<2.7	<2.8	0.033
Se	3	<2.8	<2.7	<2.8	0.033
Si	3	2,400	2,100	2,200	100
Sn	3	<2.8	<2.7	<2.8	0.033
Sr	3	37	11	22	7.8
Ti	3	110	94	100	4.7
V	3	46	39	42	2.2
Zn	3	340	160	250	52
Zr	3	13	7.9	9.6	1.7
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.070	0.014	0.050	0.018
^{137}Cs	3	0.92	0.11	0.40	0.26
G-Alpha	3	13	8.4	9.8*	1.4
G-Beta	3	21	15	18*	1.9
^{40}K	3	4.6	3.2	4.0*	0.39
^{238}Pu	3	0.019	0	0.0099	0.0055
^{239}Pu	3	0.004	−0.019	−0.0045	0.0075
^{228}Th	3	0.57	0.30	0.40*	0.086
^{230}Th	3	0.54	0.27	0.41*	0.078
^{232}Th	3	0.38	0.17	0.26*	0.060
Total–Sr	3	0.46	0.21	0.36*	0.077
^{234}U	3	1.2	0.84	1.1*	0.11
^{235}U	3	0.65	0.062	0.26	0.20
^{238}U	3	0.68	0.54	0.62*	0.041

[a]See Fig. 2.19 in Vol. 1.

[b]Standard error of the mean.

Table 6.8. Analysis of soil at ORR air station 40, 1990[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av	Standard error[b]
		Metals (mg/kg dry wt)			
Ag	3	<0.28	<0.27	<0.27	0.0033
Al	3	23,000	21,000	22,000	670
As	3	<2.8	<2.7	<2.7	0.033
B	3	9.1	4.5	6.2	1.5
Ba	3	150	130	140	6.7
Be	3	1.0	0.98	0.99	0.0067
Ca	3	27,000	24,000	26,000	880
Cd	3	7.9	0.65	3.2	2.4
Co	3	14	13	13	0.33
Cr	3	33	27	31	1.9
Cu	3	26	23	24	0.88
Fe	3	26,000	25,000	26,000	330
Hg	3	8.0	5.0	6.9	0.95
Li	3	<850	<800	<820	15
Mg	3	6,900	5,900	6,500	300
Mn	3	830	610	710	64
Mo	3	<2.3	<2.1	<2.2	0.058
Na	3	<280	<270	<270	3.3
Ni	3	28	25	26	1.0
P	3	370	240	330	43
Pb	3	21	18	20	0.88
Sb	3	<2.8	<2.7	<2.7	0.033
Se	3	<2.8	<2.7	<2.7	0.033
Si	3	1,900	1,500	1,700	120
Sn	3	<2.8	<2.7	<2.7	0.033
Sr	3	33	30	31	0.88
Ti	3	210	200	210	3.3
V	3	26	25	26	0.33
Zn	3	67	59	62	2.4
Zr	3	11	7.6	9.3	0.98
		Radionuclides (pCi/g dry wt)			
^{7}Be	3	0.46	0.11	0.32*	0.11
^{60}Co	3	0.097	–0.027	0.045	0.037
^{137}Cs	3	0.30	0.13	0.19*	0.054
G-Alpha	3	13	6.8	9.7*	1.8
G-Beta	3	30	16	22*	4.1
^{40}K	3	18	16	17*	0.78
^{238}Pu	3	0.010	–0.003	0.0041	0.0042
^{239}Pu	3	0.004	–0.011	–0.0019	0.0046
^{228}Th	3	0.68	0.49	0.59*	0.056
^{230}Th	3	0.25	0.20	0.23*	0.015
^{232}Th	3	0.23	0.20	0.22*	0.0095
Total-Sr	3	0.65	0.16	0.45*	0.15
^{234}U	3	5.9	2.7	4.2*	0.94
^{235}U	3	0.59	0.14	0.33	0.14
^{238}U	3	3.0	1.2	2.4*	0.59

[a]See Fig. 2.19 in Vol. 1.

[b]Standard error of the mean.

Table 6.9. Analysis of soil at ORR air station 45, 1990[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av	Standard error[b]
		Metals (mg/kg dry wt)			
Ag	3	<0.28	<0.26	<0.27	0.0058
Al	3	21,000	15,000	18,000	1,700
As	3	22	15	18	2.1
B	3	6.2	<4.1	<4.9	0.64
Ba	3	62	27	46	10
Be	3	0.73	0.28	0.58	0.15
Ca	3	12,000	3,600	6,900	2,600
Cd	3	21	1.7	11	5.6
Co	3	41	19	28	6.6
Cr	3	27	23	25	1.2
Cu	3	33	27	29	2.0
Fe	3	25,000	21,000	23,000	1,200
Hg	3	0.57	0.16	0.39	0.12
Li	3	<840	<770	<800	20
Mg	3	5,700	1,200	2,800	1,400
Mn	3	970	860	900	35
Mo	3	<2.3	<2.1	<2.2	0.067
Na	3	<280	<260	<270	5.8
Ni	3	24	16	20	2.3
P	3	580	95	360	140
Pb	3	68	33	50	10
Sb	3	<2.8	<2.6	<2.7	0.058
Se	3	<2.8	<2.6	<2.7	0.058
Si	3	1,600	1,400	1,500	67
Sn	3	<2.8	<2.6	<2.7	0.058
Sr	3	13	8.8	10	1.3
Ti	3	180	150	160	8.8
V	3	51	38	43	4.2
Zn	3	83	63	75	6.0
Zr	3	17	7.1	11	3.2
		Radionuclides (pCi/g dry wt)			
^{7}Be	3	0.14	–0.14	–0.036	0.086
^{60}Co	3	0.014	0.005	0.0099*	0.0024
^{137}Cs	3	0.46	–0.008	0.28	0.14
G-Alpha	3	9.5	6.5	7.6*	0.95
G-Beta	3	18	5.4	12	3.8
^{40}K	3	5.9	1.6	4.4*	1.4
^{238}Pu	3	0.012	–0.000	0.0066	0.0038
^{239}Pu	3	0.004	–0.016	–0.0045	0.0060
^{228}Th	3	0.54	0.38	0.44*	0.050
^{230}Th	3	0.38	0.27	0.32*	0.032
^{232}Th	3	0.27	0.20	0.24*	0.020
Total-Sr	3	0.27	0.12	0.22*	0.050
^{234}U	3	3.5	2.7	3.1*	0.24
^{235}U	3	0.24	0.12	0.19*	0.038
^{238}U	3	2.0	0.62	1.5*	0.45

[a]See Fig. 2.19 in Vol. 1.

[b]Standard error of the mean.

Table 6.10. Analysis of soil at ORR air station 46, 1990[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av	Standard error[b]
		Metals (mg/kg dry wt)			
Ag	3	<0.29	<0.28	<0.28	0.0033
Al	3	21,000	15,000	18,000	1,800
As	3	6.3	3.0	4.6	0.95
B	3	7.1	<4.4	<5.4	0.85
Ba	3	100	88	96	4.0
Be	3	0.67	0.54	0.60	0.038
Ca	3	4,600	1,400	2,500	1,000
Cd	3	2.7	0.66	1.4	0.65
Co	3	11	10	10	0.33
Cr	3	16	14	15	0.67
Cu	3	180	9.9	67	56
Fe	3	15,000	13,000	14,000	580
Hg	3	0.15	0.14	0.15	0.0033
Li	3	<880	<830	<850	15
Mg	3	2,200	1,100	1,500	350
Mn	3	1,200	1,100	1,200	33
Mo	3	<2.3	<2.2	<2.3	0.033
Na	3	<290	<280	<280	3.3
Ni	3	10	7.8	8.5	0.73
P	3	330	320	330	3.3
Pb	3	81	22	42	19
Sb	3	<2.9	<2.8	<2.8	0.033
Se	3	<2.9	<2.8	<2.8	0.033
Si	3	2,000	1,900	1,900	33
Sn	3	<2.9	<2.8	<2.8	0.033
Sr	3	10	5.7	7.5	1.3
Ti	3	170	150	160	5.8
V	3	27	23	25	1.2
Zn	3	90	39	56	17
Zr	3	4.2	2.0	2.8	0.70
		Radionuclides (pCi/g dry wt)			
^{7}Be	3	0.38	–0.38	–0.063	0.23
^{60}Co	3	0.086	0.022	0.064*	0.021
^{137}Cs	3	0.92	0.41	0.64*	0.15
G-Alpha	3	7.0	5.7	6.4*	0.39
G-Beta	3	14	8.9	12*	1.5
^{40}K	3	15	9.7	12*	1.5
^{238}Pu	3	0.013	–0.011	0.00054	0.0070
^{239}Pu	3	0.004	–0.011	–0.0031	0.0043
^{228}Th	3	0.49	0.21	0.32*	0.084
^{230}Th	3	0.26	0.13	0.19*	0.041
^{232}Th	3	0.30	0.070	0.18	0.066
Total-Sr	3	0.20	–0.027	0.12	0.074
^{234}U	3	3.5	1.5	2.6*	0.61
^{235}U	3	1.1	0.14	0.54	0.28
^{238}U	3	0.92	0.59	0.73*	0.097

[a]See Fig. 2.19 in Vol. 1.
[b]Standard error of the mean.

Table 6.11. 1990 fluoride and uranium in soil from the K-25 Site perimeter[a]

Station	Number of samples	Concentration (μg/g dry wt)		U (pCi/g dry wt) June
		F	U (total)	
		(June)	(June)	
S18	1	482	6.8	5.3
S19	1	733	3.6	2.8
S20	1	157	5.3	4.1
S21	1	233	2.5	2.0
S22	0			
S23	1	147	6.5	5.1
S24	1	48	1.9	1.5
S25	1	382	4.0	3.1
S26	1	170	2.7	2.1
S27	1	395	2.2	1.7
S28	1	324	34.6	27.1
S29	1	1251	6.3	4.9
S30	1	98	3.0	2.4
S31	1	233	2.1	1.6

[a]See Fig. 6.1 in Vol. 1.

Table 6.12. 1990 concentrations of various elements in stream sediment samples near the K-25 Site[a]

Element	Concentration (μg/g dry wt)							
	SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8
Aluminum	15,000	8,500	18,000	14,000	19,000	10,000	17,000	7,900
Cadmium	3.2	2.4	3.2	3.9	3.0	3.3	3.5	1.5
Chromium	100	12	22	32	55	99	6.6	50
Copper	4	17	35	60	12	26	17	6.9
Lead	38	17	39	34	27	36	33	15
Manganese	330	360	420	680	2,100	550	1,500	510
Mercury	11	<1	11	5.4	1.2	8.1	<1.0	<1.0
Nickel	50	24	42	97	19	43	9.2	24
Thorium	<33	<28	<34	<34	<28	<31	<34	<26
Uranium	8.6	<4.1	5.1	16	<4.2	10	<5.1	6.2
Zinc	120	75	120	140	49	81	76	34

[a]See Fig. 6.2 in Vol. 1.

POTENTIAL RADIATION AND CHEMICAL DOSE TO THE PUBLIC

Table 7.1. Internal effective dose equivalent conversion factors (rem/μCi)[a]

Radionuclide (solubility)[b]		Inhalation	Ingestion
^{3}H	(G)	1.26E–4	8.99E–5
^{60}Co	(Y)	2.18E–1	9.86E–3
^{85}Kr	(G)	6.72E–7	0.00E+3
^{90}Sr	(D)	2.22E–1	1.30E–1
^{99}Tc	(D)	1.03E–3	1.45E–3
	(W)	8.39E–3	1.45E–3
^{106}Ru	(Y)	4.78E–1	2.70E–2
^{132}Te	(W)	8.08E–3	9.44E–3
^{129}I	(D)	1.74E–1	2.61E–1
^{131}I	(D)	3.30E–2	5.06E–2
^{133}I	(D)	5.92E–3	9.99E–3
^{135}I	(D)	1.37E–3	2.34E–3
^{133}Xe	(G)	6.69E–7	0.00E+0
^{134}Cs	(D)	4.51E–2	6.74E–2
^{137}Cs	(D)	3.10E–2	4.61E–2
^{140}La	(W)	5.46E–3	8.40E–3
^{154}Eu	(W)	2.88E–1	9.56E–3
^{155}Eu	(W)	4.18E–2	1.53E–3
^{191}Os	(Y)	4.34E–3	2.30E–3
^{212}Pb	(D)	1.70E–1	4.47E–2
^{228}Th	(Y)	2.55E+2	1.89E–1
^{230}Th	(Y)	2.52E+2	5.25E–1
^{232}Th	(Y)	3.63E+2	4.78E–1
^{234}Th	(Y)	3.60E–2	1.37E–2
^{234m}Pa	(W)	3.77E–6	5.90E–6
^{234}U	(D)	2.67E+0	2.74E–1
	(W)	7.94E+0	2.74E–1
	(Y)	1.32E+2	2.58E–2
^{235}U	(D)	2.54E+0	2.64E–1
	(W)	7.37E+0	2.64E–1
	(Y)	1.22E+2	2.66E–2
^{236}U	(D)	2.53E+0	2.60E–1
	(W)	7.51E+0	2.60E–1
	(Y)	1.25E+2	2.44E–2
^{238}U	(D)	2.40E+0	2.47E–1
	(W)	7.05E+0	2.47E–1
	(Y)	1.18E+2	2.35E–2
^{237}Np	(W)	4.91E+2	4.01E+0
^{238}Pu	(Y)	3.18E+2	3.85E+0
^{239}Pu	(Y)	3.42E+2	4.46E–1

[a]Factors taken from the ALLRAD88 data file provided with CAP-88.

[b]D = soluble; W = moderately soluble; Y = insoluble; and G = gas.

Table 7.2. External dose equivalent rate conversion factors[a]

Radionuclide	Immersion[b]	Ground surface[c]
^{3}H	0.00E+0	0.00E+0
^{60}Co	1.29E+10	2.26E+6
^{85}Kr	1.11E+7	2.28E+3
^{90}Sr	0.00E+0	0.00E+0
^{99}Tc	2.55E+3	6.03E-1
^{106}Ru	0.00E+0	0.00E+0
^{132}Te	1.07E+9	2.43E+5
^{129}I	4.06E+7	2.14E+4
^{131}I	1.89E+9	3.99E+5
^{133}I	3.05E+9	6.11E+5
^{135}I	8.29E+9	1.44E+6
^{133}Xe	1.69E+8	4.91E+4
^{134}Cs	8.01E+9	1.58E+2
^{137}Cs	0.00E+0	0.00E+0
^{140}La	1.23E+4	2.13E+2
^{154}Eu	6.45E+9	1.20E+6
^{155}Eu	2.76E+8	6.89E+4
^{191}Os	3.35E+8	8.20E+4
^{212}Pb	7.23E+8	1.61E+5
^{228}Th	9.59E+6	2.70E+3
^{230}Th	1.90E+6	8.88E+2
^{232}Th	9.05E+5	6.57E+2
^{234}Th	3.73E+7	9.71E+3
^{234m}Pa	5.93E+7	1.12E+4
^{234}U	7.46E+5	8.00E+2
^{235}U	7.51E+8	1.67E+5
^{236}U	5.90E+5	7.27E+2
^{238}U	5.06E+5	6.41E+2
^{237}Np	1.11E+8	3.14E+4
^{238}Pu	4.34E+5	8.53E+2
^{239}Pu	4.00E+5	3.75E+2

[a]Factors taken from the ALLRAD88 data file provided with CAP-88.

[b]Units for immersion in air are mrem/year per $\mu Ci/cm^3$.

[c]Units for contaminated ground surface are mrem/year per $\mu Ci/cm^2$.

Table 7.3. Activities (Ci), solubilities, and particle sizes (AMAD, μm) of radionuclides released from ORNL during 1990

Nuclide	Sol. class	AMAD	2026	3020	3039	Misc	7025	7512	7911	7830	Total
^{3}H	G	---			1.19E+4	5.60E–3	4.79E+2		2.84E+0		1.24E+4
^{7}Be	Y	1.0			1.10E–5					2.50E–7	1.13E–5
^{14}C	G	---				8.60E–4					8.60E–4
^{22}Na	D	1.0				2.60E–5					2.60E–5
^{54}Mn	W	1.0				1.00E–6					1.00E–6
^{55}Fe	W	1.0				1.00E–11					1.00E–11
^{59}Fe	W	1.0				1.00E–6					1.00E–6
^{57}Co	Y	1.0				1.80E–8					1.80E–8
^{60}Co	Y	1.0	1.19E–7		1.86E–4	1.00E–5			3.58E–9	5.38E–9	1.96E–4
^{63}Ni	W	1.0				1.10E–6					1.10E–6
^{65}Zn	Y	1.0				2.00E–6					2.00E–6
^{75}Se	W	1.0			7.53E–7						7.53E–7
^{82}Br	D	1.0			5.20E–6						5.20E–6
^{85}Kr	G	---			8.86E+4				2.91E+2		8.89E+4
^{89}Sr	D	1.0				1.00E–6					1.00E–6
^{90}Sr	D	1.0	3.63E–6	3.69E–6	1.03E–4	6.40E–9			3.73E–7	1.71E–8	1.11E–4
^{99}Tc	W	1.0				6.30E–5					6.30E–5
^{106}Ru	Y	1.0		1.40E–6							1.40E–6
^{132}Te	W	1.0							1.73E–6		1.73E–6
^{129}I	D	1.0	4.26E–7	2.52E–6	1.73E–5			1.29E–7	6.08E–7	2.03E–6	2.30E–5
^{131}I	D	1.0	8.28E–6	3.01E–7	1.07E–3			1.69E–7	1.88E–2	1.26E–5	1.99E–2
^{132}I	D	1.0							9.08E–4		9.08E–4
^{133}I	D	1.0	1.04E–6		4.00E–5			4.22E–7	2.18E–2	1.26E–5	2.19E–2
^{135}I	D	1.0	5.10E–6	4.18E–7					1.79E–2	7.62E–6	1.79E–2
^{133}Xe	G	---							1.42E+3		1.42E+3
^{134}Cs	D	1.0	1.28E–7			1.10E–5					1.11E–5
^{137}Cs	D	1.0	3.48E–5	1.03E–5	1.74E–4	1.50E–5			7.35E–7	2.46E–7	2.35E–4
^{133}Ba	D	1.0				4.00E–6					4.00E–6
^{137m}Ba	D	1.0	3.48E–5	1.03E–5	1.74E–4	1.50E–5			7.35E–7	2.46E–7	2.35E–4
^{140}La	W	1.0							4.92E–7		4.92E–7
^{152}Eu	W	1.0				3.00E–6					3.00E–6
^{154}Eu	W	1.0		5.84E–8							5.84E–8
^{155}Eu	W	1.0	1.73E–7			1.90E–8					1.92E–7
^{191}Os	Y	1.0			6.18E–2			1.15E–6			6.18E–2
^{194}Au	-	1.0			2.10E–5				9.03E–8		2.11E–5
^{203}Hg	W	1.0				1.30E–5					1.30E–5
^{210}Pb	W	1.0				2.00E–11					2.00E–11
^{212}Pb	D	1.0	9.46E–3	1.48E–2	4.92E–2			1.14E–4	9.45E–3	4.43E–4	8.35E–2
^{210}Po	W	1.0				1.00E–11					1.00E–11
^{226}Ra	W	1.0				1.00E–7					1.00E–7
^{228}Ra	W	1.0				1.00E–7					1.00E–7
^{228}Th	Y	1.0	1.59E–7	1.35E–8	3.01E–9				1.46E–9	1.01E–10	1.77E–7
^{230}Th	Y	1.0	2.87E–9	1.86E–9	5.82E–9	6.50E–6			1.77E–9	8.73E–11	6.51E–6
^{232}Th	Y	1.0	1.10E–9	2.37E–9	3.94E–9	1.50E–7			1.29E–9	7.89E–11	1.59E–7
^{233}U	Y	1.0				1.10E–5					1.10E–5
^{234}U	Y	1.0	2.41E–9	8.94E–9	1.09E–8				2.60E–9	3.81E–10	2.52E–8
^{235}U	Y	1.0				1.00E–9					1.00E–9
^{238}U	Y	1.0				3.63E–8					3.63E–8
^{237}Np	W	1.0				1.00E–6					1.00E–6
^{236}Pu	Y	1.0				1.00E–9					1.00E–9
^{238}Pu	Y	1.0	1.31E–7	2.91E–8		1.00E–7				8.03E–11	2.60E–7
^{239}Pu	Y	1.0	4.37E–7	1.29E–7	1.16E–8	2.50E–5			7.14E–11	2.75E–11	2.56E–5
^{241}Am	W	1.0				1.20E–6					1.20E–6
^{243}Am	W	1.0				1.00E–7					1.00E–7
^{244}Cm	W	1.0				1.00E–7					1.00E–7

Table 7.4. Activities (Ci), solubilities, and AMADs (μm) of radionuclides emitted from the K-25 Site during 1990

Nuclide	Sol. class	AMAD (μm)	Total curies released			
			K-1435	K-1420	K-1015	Total
^{137}Cs	D	1.0	8.15E–4			8.15E–4
^{137m}Ba	D	1.0	8.15E–4			8.15E–4
^{237}Np	W	1.0	9.18E–6			9.18E–6
^{234m}Pa	Y	1.0	5.56E–3			5.56E–3
^{238}Pu	Y	1.0	1.82E–7			1.82E–7
^{239}Pu	Y	1.0	1.80E–7			1.80E–7
^{99}Tc	W	1.0	1.82E–3	2.26E–3		4.08E–3
^{228}Th	Y	1.0	2.03E–5			2.03E–5
^{230}Th	Y	1.0	1.00E–6			1.00E–6
^{234}Th	Y	1.0	1.19E–3			1.19E–3
^{234}U	Y	1.0	3.63E–4		1.96E–5	3.83E–4
^{234}U	D	1.0		7.38E–5		7.38E–5
^{235}U	Y	1.0	1.97E–5		7.08E–7	2.04E–5
^{235}U	D	1.0		3.62E–6		3.62E–6
^{236}U	Y	1.0			4.35E–8	4.35E–8
^{238}U	Y	1.0	5.91E–4		3.00E–6	5.94E–4
^{238}U	D	1.0		7.26E–5		7.26E–5

Table 7.5. Activities (Ci), solubilities, and AMADs (μm) of radionuclides emitted from the Y-12 Plant during 1990

Nuclide	AMAD (μm)	Solubility class			
		D	W	Y	All
^{234}U	1.0	1.91E–2	1.74E–2	4.02E–2	7.67E–2
^{235}U	1.0	6.32E–4	2.54E–4	1.45E–3	2.34E–3
^{236}U	1.0	1.01E–4	9.18E–5	1.95E–4	3.88E–4
^{238}U	1.0	3.63E–5	1.84E–7	6.62E–3	6.66E–3
Total		1.99E–2	1.77E–2	4.84E–2	8.61E–2

SOLID WASTE MANAGEMENT PROGRAM

Table 8.1. Y-12 Plant on-site waste treatment data for FY 1990

Waste	Quantity treated (kg)[a]	Treatment method	Residue type
	Liquids		
Nonhazardous	494,143[b]	*c*	Sludge
Hazardous	2,029,655	*d*	Sludge
Low-level aqueous	569,224	*c,e*	Sludge
Mixed	3,483,949	*c*	Sludge
	Solids[f]		
Low-level solids (ft^3)	155,641	Compaction	Solid

[a]Units of kilograms except as noted.

[b]Does not include wastewater treated at the Steam Plant Wastewater Treatment Facility.

[c]Batch reactors, settling, filtration, chrome reduction, hydrated lime treatment, dewatering, effluent polishing, biodenitrification, and biological degradation.

[d]Batch reactors, settling, filtration, chrome reduction, hydrated lime treatment, dewatering, effluent polishing, biodenitrification, biological degradation, pH control, and metal precipitation.

[e]Batch reactors, settling, filtration, chrome reduction, hydrated lime treatment, dewatering, effluent polishing, and biodenitrification.

[f]Total; cannot be broken down.

Table 8.2. 1990 ORNL waste treatment data

Waste type	Quantity (kg)	Treatment	Residue
Hazardous	260	Detonation	None

Table 8.3. Y-12 Plant on-site waste disposal during 1990

Waste	Method	Quantity (kg)
Sanitary/industrial		10,756,145[a,b]
Solid/low level		1,677,646[a,b]
Classified		44,387

[a]This category includes construction/demolition spoils from the Y-12 Plant.
[b]Includes disposals from K-25 and ORNL.

Table 8.4. 1990 ORNL on-site waste disposal

Waste	Disposal method	Quantity
Hazardous[a], kg	Release to air	740
Sanitary, yd^3		
Radiological	Buried, SWSA 6	
Nonradiological[b]	Landfilled, Y-12	12,000
Asbestos, kg		
Radiological	Buried, SWSA 6	6,600
Scrap metal, kg		
Radiological	Buried, SWSA 6	21,000

[a]This is not RCRA regulated hazardous.
[b]The nonradiological sanitary waste (i.e., garbage) is disposed of in the Y-12 Centralized Sanitary Landfill.

Table 8.5. K-25 Site waste disposal at DOE Oak Ridge Facilities during 1990

Waste	Quantity	Disposal method
Asbestos		
nonradiological (m^3)	1,332	Sent to landfill at Y-12 Plant
Miscellaneous		
nonradiological (m^3)	0	Buried at K-25–classified solids
nonhazardous (m^3)	6,969	Sent to landfill at Y-12 Plant–sanitary demo

Table 8.6. Y-12 Plant 1990 off-site waste disposal

Waste	Method	Quantity (kg)
Oil and solvents	Fuels programs; incineration; recycle/recovery	119,981
PCB liquid	Incineration	241,710
PCB solids	Incineration	50,304
RCRA	Shipped off-site	964,390
Scrap metal (clean)	Public sale	431,010

Table 8.7. 1990 ORNL off-site waste disposal

Waste	Quantity (kg)	Disposal method	Location
Hazardous (not RCRA regulated)	26,921	Incineration/ landfilling	Rollins Environmental Services, Baton Rouge, LA
RCRA hazardous	18,795	Incineration/ landfilling	Rollins Environmental Services, Baton Rouge, LA
PCB	17,229	Incineration/ landfilling	Rollins Environmental Services, Deer Park, TX
PCB and RCRA hazardous	31,942	Incineration/ landfilling	Rollins Environmental Services, Deer Park, TX
Asbestos Nonradiological (lbs)	33,862		Y-12 Central Sanitary Landfill, Oak Ridge, TN
Miscellaneous nonhazardous	1,535		Y-12 Central Sanitary Landfill, Oak Ridge, TN

Table 8.8. K-25 Site off-site waste disposal activities during 1990

Waste description	Quantity (kg)	Ultimate disposal
Scrap metal—nonradiological	42,927	Sold to public
Batteries (solid)	136	Sold to public (for recycle)
Film (solid)	545	Sold to public (for recovery)
Chemicals	0	Sold to public
Office furniture tires, etc.	10,644	Sold to public
PCBs (kg)	215,350	Commercial disposal facility
Laboratory chemicals janitorial supplies etc.	10,420	Commercial disposal facility
Scrap lumber	0	Sold to public
Lead	3,309	Sold to public
Brass	3,818	Sold to public

Table 8.9. Waste placed in storage on-site at the Y-12 Plant in 1990

Waste	Quantity (kg)
Low level	197,408[a]
Mixed	176,774
PCB	20,185
PCB/uranium	13,608
RCRA	631,500
Scrap metal (contaminated)	587,865

[a]Includes wastes stored at the K-25 Site.

Table 8.10. Y-12 Plant total waste in storage at the end of 1990[a]

Waste	Quantity (kg)
Low-level	1,074,582
Mixed	677,661
Hazardous	88,112
PCB	116,573
PCB/uranium	106,594
Noncontaminated oils/ solvents	113,269
Roofing materials	3,109,000
Scrap metal	0
Clean	
Uranium-contaminated[b]	2,919,056
Mercury-contaminated soil	0

[a]Includes storage at K-25 and at SEG (to be incinerated).

[b]Segregation efforts were initiated to reduce amout of contaminated scrap metal.

Table 8.11. 1990 waste placed in storage at ORNL

Waste	Quantity (kg)	
	Long-term	Short-term
Hazardous, kg		71,000
Mixed, kg		4,900
PCB, kg		
Nonradiological		12,000
Radiological		22
Transuranic, m^3		
Contact handled	5.5	
Remote handled	0	
Low-level, m^3[a]	33	
Asbestos		
Nonradiological		0
Radiological	6,600	
Scrap metal		
Nonradiological		0
Radiological	24,000	
Miscellaneous		
Radiological (m^3)	0	

[a]Low-level concentrated sludge.

Table 8.12. Waste remaining in storage at ORNL at year's end for 1990

Waste	Quantity
Hazardous, kg	110,000
Mixed, kg	80,000
PCB, kg	
Nonradiological	260
Radiological	3,200
Transuranic, m^3	
Contact handled	110,000
Remote handled	470,000

Table 8.13. 1990 K-25 Site waste placed in on-site storage

Waste description	Quantity	Type storage[a]		Ultimate disposal
		Short-term	Long-term	
Scrap metal (kg)	226,362		X	Under review
PCB liquids (kg)	535	X		TSCA incinerator
PCB solids (kg)	33,721	X		TSCA incinerator
CNF centrifuge sludge (kg)	69,295		X	Under review
Plating solutions (kg)	8,850		X	Shipped off-site from storage
Oils possibly contaminated with solvents	47,921	X		TSCA incinerator
Sludge	None		X	Under review
Laboratory waste (kg) BMP	32,633	X		Analyses and treatment plan under review
Sludge from close-out of K-1407-B/C ponds (kg)	8,955		X	Delisting effort under way
Photographic solutions (kg)	7,570	X		ORNL for silver recovery
Paint and aerosol contents (kg)	11,209	X		TSCA incinerator
TSCA ash (kg)[b]	19,506		X	Under review
TSCA sludge (kg)	26,225		X	Under review
Gas cylinders (kg)	29		X	Under review
Metallic mercury (kg)	781	X		Off-site recycle
Solvent-contaminated rags (kg)	9	X		TSCA incinerator
Laundry sludge (kg)	2,727	X		TSCA incinerator
LLW (m^3)	491		X	Under review
Flammable liquids (kg)	13,342	X		Offsite
Flammable solids (kg)	37	X		Offsite
Corrosive liquids (kg)	12,905	X		Offsite
Corrosive solids (kg)	1	X		Offsite
Poisonous solids (kg)	3	X		Offsite
Oxidizers, liquid (kg)	14	X		Offsite
Oxidizers, solid (kg)	6	X		Offsite
Combustible liquids (kg)	728	X		Offsite
PCB/RCRA liquids (kg)	60,572		X	Under review
PCB/RCRA solids (kg)	47,517		X	Under review
Hazardous waste solids (kg)	5,478	X		Offsite
Hazardous waste liquids (kg)	12,695	X		Offsite

[a]Short-term storage = <5 years; long-term storage = >5 years.

[b]TSCA and RCRA test burns; includes caustic sludges from scrubbing system.

Table 8.14. Waste placed in storage at the K-25 Site from other DOE facilities during 1990

Waste description	Quantity[a]	Type storage[b]		Ultimate disposal
		Short-term	Long-term	
Metal sludges and activated carbon (kg)	184,630			Under review
LLW (m^3)	1051			Under review
Acetonitrile (kg)	12,045	X		Blended, TSCA incinerated
Hazardous waste radioactive materials, mixed (kg)	6,530		X	Under review
Hazardous waste contaminated soils (kg)	239,093		X	Under review

[a]Numbers are liters unless otherwise noted.
[b]Short-term storage = <5 years; long-term storage = >5 years.

Table 8.15. Total waste in storage at the K-25 Site—end of 1990

Waste description	Quantity	Ultimate disposal
K-25 low-level waste (m^3)	687	Incineration
K-1420 nitric acid (mixed) (kg)	8,850	Under review
K-1420 electroless nickel solution (mixed) (kg)	830	Under review
Spent solvents oils, & PCB liquids (mixed) (L)	628,351	Incineration
Paint waste (kg)	40,869	Incineration
K-1232 spent carbon filter agent (mixed) (kg)	25,284	Under review
PCB solids and liquids (PCB radiological) (L)	1,326	Incineration
Portsmouth PCB contaminated soil (kg)	909,000	Under review
Incineration ash/sludge (kg)	199,841	Under review
K-1407B/C pond sludge (mixed) (kg)	14,883,190	To be fixed in concrete
K-1407B/C pond sludge (mixed) (kg)	24,982,170	Stabilized
RMI lead contaminated liquid (mixed) (kg)	23,843	Under review
WMCO hazardous waste liquid (mixed) (kg)	79,067	Incineration
WMCO hazardous waste solid (mixed) (kg)	9,728	Under review
Y-12 LLW (m^3)	4,628	Under review
X-10 LLW (m^3)	783	Under review
Y-12 hazardous liquids (kg)	134,623	Under review
PORTS hazardous solids (kg)	7,845	Under review
PORTS hazardous liquids (kg)	25,263	Under review
RMI spent solvents (mixed) (kg)	1,245	Under review
X-10 hazardous liquids (L)	440	Under review
Lab pack chemicals (kg)	1,531	Incineration
Centrifuge epoxies/resins (kg)	7,581	Under review
CNF centrifuge sludge (kg)	595,495	Under review
Laboratory BMP solutions (kg)	140,725	Under review
Photo wastes (kg)	33,924	Under review
Metallic mercury (kg)	1,177	Under review
Rags contaminated with solvents (kg)	2,409	Under review
Test burn materials (kg)	32,081	Under review
Metal shavings/lead (kg)	68	Under review
Hazardous waste liquids (kg)	77,565	Under review
Asbestos covered lead pipe (kg)	2,318	Under review
Hazardous waste solids (kg)	54,339	Under review
Gases/cylinders (kg)	648	Under review
TSCA + IWS sludge (kg)	129,129	Under review
Laundry sludge (kg)	35,193	Under review
Waste from treatment of WMCO hazardous waste liquid (kg)	57,821	Under review

SPECIAL STUDIES

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

QUALITY ASSURANCE

Table 10.1. Example of inorganic QC results for sampling GW-514

Y-12 Plant, 1990

Parameter	GW-514	Field replicate	Field blank
Concentration (mg/L)			
As	<0.005	<0.005	*a*
Ba	0.008	0.008	*a*
Cd	<0.002	<0.002	*a*
Cr	<0.01	<0.01	*a*
Pb	<0.004	<0.004	*a*
Se	<0.005	<0.005	*a*
Ag	<0.01	0.01	*a*
Hg	<0.0002	<0.0002	*a*
Total organic carbon	<1.0	<1.0	*a*
pH (standard units)	7.1	7.1	*a*
Activity (pCi/L)			
Alpha	−1.2	3.0	*a*
Beta	3.6	7.0	*a*
Suspended solids (mg/L)	2.0	1.0	*a*
U (mg/L)	<0.001	<0.001	*a*
Conductivity (μmho/cm)	345.0	342.0	*a*
Alkalinity (mg/L)			
CO_3	<1.0	<1.0	*a*
HCO_3	176.0	176.0	*a*

[a]Not applicable.

Table 10.2. Example of organic QC data at GW-514

Y-12 Plant, 1990

Parameter	GW-514	Field duplicate	Field blank
	Volatile organic compounds (μg/L)		
Chloromethane	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Methylene chloride	5 U	5 U	5U
Acetone	10 U	10 U	10 U
Carbon disulfide	5 U	5 U	5 U
1,1-dichloroethene	5 U	5 U	5 U
1,1-dichloroethane	5 U	5 U	5 U
Chloroform	5 U	5 U	5 U
1,2-dichloroethane	5 U	5 U	5 U
2-butanone	10 U	10 U	10 U
1,1,1-trichloroethane	3 J	2 J	5 U
Carbon tetrachloride	5 U	5 U	5 U
Vinyl acetate	10 U	10 U	10 U
Bromodichloromethane	5 U	5 U	5 U
1,1,2,2-tetrachloroethane	5 U	5 U	5 U
1,2-dichloropropane	5 U	5 U	5 U
Trans-1,3-dichloropropene	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U
1,1,2-trichloroethane	5 U	5 U	5 U
Benzene	5 U	5 U	5 U
Cis-1,3-dichloropropene	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U
2-hexanone	10 U	10 U	10 U
4-methyl-2-pentanone	10 U	10 U	10 U
Tetrachloroethene	5 U	5 U	5 U
Toluene	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U
Styrene	5 U	5 U	5 U
Xylenes	5 U	5 U	5 U
	Surrogate recovery (%)		
Toluene-D8	94	96	103
Bromofluorobenzene	98	99	101
1,2-dichloroethane D-4	98	98	105

U = compound analyzed for but not detected.

J = indicates an estimated value.

Table 10.3. 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		0.1
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 10.3 (continued)

Parameter	Energy Systems procedure	EPA method	Lowest concentration reported[a]
Pesticides (organochlorine), GC method (μg/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 (μg/L)			
Without conc.	EC-1590	420.1	50
With conc.	EC-1590	420.1	5
pH, electrometric (standard 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 (μg/L)	EC-1620	608	0.5
Priority pollutants, organic (base/neutral/acid), each (μg/L)	EC-1701	625	Mostly 10–50[f]
Priority pollutants, organic (volatile, purgeable), each (μg/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}
Th, spectrophotometric (mg/L)	EC-1871		2×10^{-3}
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

[a]The 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.

[b]Approved 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.

[d]All references to *Standard Methods* for the 15th Edition, 1980.

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

[f]For 81 compounds.

[g]For 31 compounds.

Table 10.4. 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	*b*	0.005	0.1
Ba	0.2	0.01	0.005
Ca	0.05	*b*	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	*b*	0.01
K	0.2	*b*	2.0
Li	0.01	*b*	0.02
			(ORNL) 0.2
Mg	0.02	*b*	0.002
Mn	0.03	0.01	0.005
Mo	0.2	0.01	0.05
Na	0.05	*b*	0.04
			(ORNL) 0.5
Ni	0.1	0.01	0.05
Pb	0.2	0.004	0.2
Se	*b*	0.005	0.2
Zn	0.02	*b*	0.005

[a]The 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.

[b]Element not normally determined using this technique.

Table 10.5. 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		*d*
Fluoride, air, SIE (μg/sample)	EC-2360		5
Fluoride, stacks, SIE ($\mu g/m^3$)	EC-2370		30
Gamma-ray spec., air filters (pCi/filter)	EC-2400		30
^{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. ($\mu g/m^3$)	EC-2890		1.7
Dichlorotetrafluoroethane, GC method (mg/m^3)	IHA-230	NIOSH S108	3500
Dioctyl 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 ($\mu g/m^3$)	IHA-270	NIOSH 244	10
Quinoline, air	IHA-273		*d*
Toluene disocyanate, air ($\mu g/m^3$)	IHA-239	NIOSH 141	7
Tributyl phos. air, GC method (mg/m^3)	IHA-285	NIOSH S208	2.7
Vinyl chloride, air, GC method ($\mu g/m^3$)	IHA-294	NIOSH 178	8

[a] *NIOSH Manual of Analytical Methods*, 2nd ed., U.S. Dept. of Health, Education, and Welfare, 1977.

[b] The 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.

[c] *APHA Methods*, American Public Health Assoc., 1977.

[d] Procedure in preparation.

Table 10.6. Energy Systems environmental analysis procedures for soil and sediment

Parameter	Energy Systems procedure	EPA method	Lowest concentration reported[a]
Fluoride	EC-3050		*b*
Gamma-ray spectrum analysis (pCi/kg)	EC-3070		30
Hg (total), flameless atomic absorption (mg/kg)	EC-3100	245.5	0.2
Metals, atomic absorption	EC-3200	200 Series	*c*
Metals, inductively coupled plasma-optical emission spectrometric (ICP-OES)	EC-3250	200.7	*c*
Np, direct gamma spectrum	EC-3300		*b*
^{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

[a]The 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 documentaion. The LCRs applied by Energy Systems laboratories meet the needs of the programs they support.

[b]Procedure in preparation.

[c]See Table 10.4.

[d]References to Standard Methods are from the 14th Edition, 1975.

Table 10.7. 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		*b*
Gamma-ray spectrometry of fish	EC-4150		*b*
Gamma-ray spectrometry of vegetation (pCi/kg)	EC-4170		30
^{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		*b*
^{99}Tc in vegetation	EC-4635		*b*
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		*b*
U isotopes in vegetation (pCi/kg)	EC-4840		40 (ORNL) 4

[a]The 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.

[b]Procedure in preparation.

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

Table 10.8. EPA EMSL-LV Intercomparison Radionuclide Control Program

Y-12, 1990

Analysis and sample date	Values		Normalized deviation	Performance evaluation
	EPA	Y-12		
		Water, (pCi/L)		
Gross alpha				
1–26	12.0 ± 5	16.0	1.39	Acceptable
4–17	90.0 ± 23	92.3	0.18	Acceptable
5–11	22.0 ± 6	29.0	2.02	Acceptable
9–21	10.0 ± 5	12.7	0.92	Acceptable
10–30	62.0 ± 16	83.7	2.35	Acceptable
Gross beta				
1–26	12.0 ± 5	15.0	1.04	Acceptable
4–17	52.0 ± 5	46.0	2.08	Acceptable
5–11	15.0 ± 5	25.0	3.46	Unacceptable
9–21	10.0 ± 5	16.0	2.08	Acceptable
10–30	53.0 ± 5	57.3	1.50	Acceptable
^{3}H				
2–23	4,976 ± 498	4,933	0.15	Acceptable
6–22	2,933 ± 358	3,777	4.08	Unacceptable
10–19	7,203 ± 720	8,643	3.46	Unacceptable
^{239}Pu				
1–19	5.6 ± 0.6	5.07	1.54	Acceptable
8–24	9.1 ± 0.9	9.83	1.41	Acceptable
U				
3–16	4.0 ± 6	4.00	0.0	Acceptable
4–17	20.0 ± 6	20.3	0.1	Acceptable
7–20	20.8 ± 3	22.7	1.08	Acceptable
10–30	10.2 ± 3.0	9.73	0.27	Acceptable
11–16	35.5 ± 3.6	35.4	0.03	Acceptable
^{89}Sr				
10–30	20.0 ± 5	25.0	1.73	Acceptable
^{90}Sr				
10–30	15.0 ± 5	18.0	1.04	Acceptable
^{134}Cs				
10–30	7.0 ± 5	8.3	0.46	Acceptable
^{137}Cs				
10–30	5.0 ± 5	5.3	0.12	Acceptable
		Air filter, (pCi/filter)		
Gross alpha				
3–30	5.0 ± 5	6.3	0.46	Acceptable
8–31	10.0 ± 5	10.3	0.12	Acceptable
Gross beta				
3–30	31.0 ± 5	34.3	1.15	Acceptable
8–31	62.0 ± 5	59.7	0.81	Acceptable
^{90}Sr				
3–30	10.0 ± 1.5	10.3	0.38	Acceptable

Table 10.9. EPA EMSL-LV Intercomparison Radionuclide Control Program

ORNL Low-Level Radiochemical Laboratory, 1990

Analysis and sample date	Values		Ratio[b] (ORNL/EPA)	Performance evaluation[c]
	EPA[a]	ORNL		
		Water (pCi/L)		
Gross alpha				
1/90	12 ± 5	8	0.67	Acceptable
5/90	22 ± 6	20	0.91	Acceptable
10/90	10 ± 5	10	1.00	Acceptable
10/90	62 ± 16	66.7	1.08	Acceptable
Gross beta				
1/90	12 ± 5	12	1.00	Acceptable
5/90	15 ± 5	13.3	0.89	Acceptable
10/90	10 ± 5	12.2	1.20	Acceptable
10/90	53 ± 5	61	1.15	Acceptable
^{133}Ba				
2/90	74 ± 7	66.4	0.90	Acceptable
6/90	99 ± 10	92.3	0.93	Acceptable
10/90	110 ± 11	102	0.93	Acceptable
^{134}Cs				
2/90	18 ± 5	16	0.89	Acceptable
4/90	15 ± 5	13.7	0.91	Acceptable
6/90	24 ± 5	22	0.92	Acceptable
10/90	12 ± 5	10	0.83	Acceptable
10/90	7 ± 5	6.9	0.99	Acceptable
^{137}Cs				
2/90	18 ± 5	18.7	1.04	Acceptable
4/90	15 ± 5	16	1.07	Acceptable
6/90	25 ± 5	25.7	1.03	Acceptable
10/90	12 ± 5	17.7	1.48	Acceptable
10/90	5 ± 5	4.9	0.98	Acceptable
^{60}Co				
2/90	15 ± 5	15	1.00	Acceptable
6/90	24 ± 5	23	0.96	Acceptable
10/90	20 ± 5	20	1.00	Acceptable
^{239}Pu				
1/90	5.6 ± 0.6	4.9	0.88	Acceptable
8/90	9.1 ± 0.9	9.4	1.03	Acceptable
^{226}Ra				
10/90	13.6 ± 2	15.6	1.15	Acceptable
^{228}Ra				
10/90	5 ± 1.3	9.2	1.84	Acceptable

Table 10.9 (continued)

Analysis and sample date	Values		Ratio[b] (ORNL/EPA)	Performance evaluation[c]
	EPA[a]	ORNL		
		Water (pCi/L)		
^{106}Ru				
2/90	139 ± 14	124	0.89	Acceptable
6/90	210 ± 21	188	0.89	Acceptable
10/90	151 ± 15	138	0.91	Acceptable
^{89}Sr				
1/90	25 ± 5	33	1.32	Acceptable
5/90	7 ± 5	5	0.71	Acceptable
10/90	20 ± 5	27	1.35	Acceptable
^{90}Sr				
1/90	20 ± 1.5	18	0.90	Acceptable
5/90	7 ± 5	10	1.43	Acceptable
10/90	15 ± 5	10.7	0.71	Acceptable
U				
4/90	20 ± 6	20	1.00	Acceptable
7/90	20.8 ± 3	20.2	0.97	Acceptable
10/90	10.2 ± 3	9.6	0.94	Acceptable
11/90	35.5 ± 3.6	34	0.96	Acceptable
^{65}Zn				
2/90	139 ± 14	138	0.99	Acceptable
6/90	148 ± 15	150	1.01	Acceptable
10/90	115 ± 12	117	1.02	Acceptable
^{131}I				
8/90	39 ± 6	47.7	1.20	Acceptable
		Air filters (pCi/filter)		
Gross alpha				
3/90	5 ± 5	5	1.00	Acceptable
8/90	10 ± 5	11	1.10	Acceptable
Gross beta				
3/90	31 ± 5	33	1.06	Acceptable
8/90	62 ± 5	61	0.98	Acceptable

Table 10.9 (continued)

Analysis and sample date	Values		Ratio[b] (ORNL/EPA)	Performance evaluation[c]
	EPA[a]	ORNL		
		Air filters (pCi/filter)		
^{137}Cs				
3/90	10 ± 5	10.7	1.07	Acceptable
8/90	20 ± 5	29	1.45	Acceptable
^{90}Sr				
3/90	10 ± 2	12.7	1.27	Acceptable
8/90	20 ± 5	21.6	1.08	Acceptable
		Milk (pCi/L)		
^{137}Cs				
4/90	24 ± 5	24	1.00	Acceptable
9/90	20 ± 5	25	1.25	Acceptable
^{131}I				
4/90	99 ± 10	102	1.03	Acceptable
9/90	58 ± 6	67	1.16	Acceptable

[a]Values and uncertainty were provided by the EPA and are published as provided.

[b]Ratio is given as an indication of performance in comparison to EPA values. Ratio is not used as a measure of acceptability of data and may vary widely in relation to the individual precision associated with a particular radionuclide.

[c]The EPA gives three classes of performance based on the number of standard deviations that a result is from the true value; these are acceptable (< sigma), warning (2 to 3 sigma), and unacceptable (>3 sigma).

Table 10.10. EPA EMSL-LV Intercomparison Radionuclide Control Program—K-25 Site, 1990

Analysis and sample data	Values (pCi/unit)[a]		Ratio[b] (EPA/K-25)	Performance evaluation
	EPA	K-25		
		Water		
^{239}Pu				
8/90	9.1 ± 0.9	5.40 ± 0.66	1.69	Unacceptable
U				
11/90	35.50 ± 3.60	16.03 ± 0.13	2.21	Unacceptable
Gross alpha				
1/90	8.00 ± 5.00	5.67 ± 0.58	1.41	Acceptable
Gross beta				
1/90	4.00 ± 5.00	5.67 ± 0.58	0.70	Acceptable
^{3}H				
10/90	7203 ± 720	8571 ± 231	0.84	Unacceptable
^{134}Cs				
10/90	12.00 ± 5.00	10.67 ± 0.24	1.12	Acceptable
^{137}Cs				
10/90	12.00 ± 5.00	15.00 ± 0.35	0.80	Acceptable
^{60}Co				
10/90	20.00 ± 5.00	21.33 ± 0.12	0.94	Acceptable
^{65}Zn				
10/90	115.00 ± 12.00	128.67 ± 0.49	0.89	Acceptable
^{106}Ru				
10/90	151.00 ± 15.00	129.00 ± 0.63	1.17	Acceptable
Gross alpha				
8/90	10.00 ± 5.00	26.33 ± 0.59	0.37	Unacceptable
Gross beta				
8/90	62.00 ± 5.00	181.67 ± 0.94	0.34	Unacceptable
^{90}Sr				
8/90	*c*	*c*	*c*	*c*
^{137}Cs				
8/90	20.00 ± 5.00	21.00 ± 0.26	1.05	Acceptable

[a]Unit for water is "liter." Unit for air is "filter."
[b]Acceptable ratio is 0.50–1.50.
[c]No data reported.

Table 10.11. EML intercomparison study QAP-32

Y-12 Radiochemistry Laboratory, May 1990

Parameter	EML value	Y-12 value	Y-12 percent error[a]	Ratio Y-12/EML	Performance evaluation
		Air			
^{241}Am (Bq/filter)	0.0540	0.0469		0.87	Acceptable
^{239}Pu (Bq/filter)	0.039	0.058		1.49	Acceptable
U (μg/filter)	2.01	2.10		1.04	Acceptable
		Soil			
^{239}Pu (Bq/kg)	212	179	33	0.84	Acceptable
U (μg/g)	10.3	8.72		0.85	Acceptable
		Vegetation			
U (μg/g)	0.0418	0.054		1.29	Acceptable
		Water			
^{3}H (Bq/L)	1,960	2,160		1.10	Acceptable
^{239}Pu (Bq/L)	1.04	1.34	7	1.29	Acceptable
U (μg/ml)	0.0788	0.071		0.90	Acceptable

[a]Percent error for the laboratory based on three replicate analyses.

Table 10.12. 1990 EML Intercomparison Study

ORNL Low-Level Radiochemical Laboratory, March 1990

Parameter	EML value	ORNL value	ORNL % error[a]	Ratio (ORNL/EPA)	Performance evaluation
		Air (pCi/filter)			
^{7}Be	0.514E+02	0.420E+02	4	0.82	Acceptable
^{7}Be	0.514E+02	0.480E+02	4	0.93	Acceptable
^{54}Mn	0.960E+01	0.840E+01	2	0.87	Acceptable
^{54}Mn	0.960E+01	0.100E+02	10	1.04	Acceptable
^{57}Co	0.650E+01	0.530E+01	5	0.82	Acceptable
^{57}Co	0.650E+01	0.620E+01	3	0.95	Acceptable
^{60}Co	0.940E+01	0.790E+01	2	0.84	Acceptable
^{60}Co	0.940E+01	0.920E+01	6	0.98	Acceptable
^{90}Sr	0.240E+00	0.230E+00	21	0.96	Acceptable
^{90}Sr	0.240E+00	0.150E+00	46	0.63	Acceptable
^{134}Cs	0.182E+02	0.130E+02	7	0.71	Acceptable
^{134}Cs	0.182E+02	0.160E+02	6	0.88	Acceptable
^{137}Cs	0.204E+02	0.170E+02	5	0.83	Acceptable
^{137}Cs	0.204E+02	0.200E+02	5	0.98	Acceptable
^{144}Ce	0.312E+02	0.250E+02	4	0.80	Acceptable
^{144}Ce	0.312E+02	0.300E+02	3	0.96	Acceptable
^{239}Pu	0.390E-01	0.410E-01	19	1.05	Acceptable
^{239}Pu	0.390E-01	0.400E-01	20	1.03	Acceptable
^{241}Am	0.540E-01	0.370E-01	18	0.69	Acceptable
^{241}Am	0.540E-01	0.550E-01	20	1.02	Acceptable
U, Bq	0.510E-01	0.700E-01	20	1.37	Acceptable
U, Bq	0.510E-01	0.440E-01	20	0.86	Acceptable
		Soil (pCi/g)			
^{40}K	0.608E+03	0.580E+03	8	0.95	Acceptable
^{40}K	0.608E+03	0.620E+03	6	1.02	Acceptable
^{90}Sr	0.665E+03	0.725E+03	4	1.09	Acceptable
^{90}Sr	0.665E+03	0.790E+03	3	1.19	Acceptable
^{137}Cs	0.175E+05	0.170E+05	5	0.97	Acceptable
^{137}Cs	0.175E+05	0.180E+05	5	1.03	Acceptable
^{239}Pu	0.212E+03	0.140E+03	21	0.66	Acceptable
^{239}Pu	0.212E+03	0.120E+03	16	0.57	Acceptable
^{241}Am	0.106E+03	0.990E+02	20	0.93	Acceptable
^{241}Am	0.106E+03	0.870E+02	22	0.82	Acceptable
U, Bq	0.280E+03	0.260E+03	19	0.93	Acceptable
U, Bq	0.280E+03	0.250E+03	20	0.89	Acceptable
		Vegetation (pCi/g)			
^{40}K	0.323E+03	0.310E+03	9	0.96	Acceptable
^{40}K	0.323E+03	0.290E+03	13	0.90	Acceptable
^{90}Sr	0.702E+02	0.810E+02	19	1.15	Acceptable
^{90}Sr	0.702E+02	0.700E+02	14	1.00	Acceptable
^{137}Cs	0.285E+02	0.300E+02	6	1.05	Acceptable
^{137}Cs	0.285E+02	0.300E+02	6	1.05	Acceptable
^{239}Pu	0.333E+00	0.430E+00	20	1.29	Acceptable
^{239}Pu	0.333E+00	0.440E+00	25	1.32	Acceptable
U, Bq	0.106E+01	0.110E+01	18	1.04	Acceptable
U, Bq	0.106E+01	0.190E+01	15	1.79	Unacceptable

Table 10.12 (continued)

Parameter	EML value	ORNL value	ORNL % error[a]	Ratio (ORNL/EPA)	Performance evaluation
		Water (pCi/mL)			
^{3}H	0.196E+04	0.170E+04	5	0.87	Acceptable
^{3}H	0.196E+04	0.170E+04	5	0.87	Acceptable
^{54}Mn	0.103E+03	0.100E+03	10	0.97	Acceptable
^{54}Mn	0.103E+03	0.980E+02	10	0.95	Acceptable
^{57}Co	0.198E+03	0.180E+03	16	0.91	Acceptable
^{57}Co	0.198E+03	0.190E+03	15	0.96	Acceptable
^{60}Co	0.206E+03	0.170E+03	5	0.83	Acceptable
^{60}Co	0.206E+03	0.180E+03	5	0.87	Acceptable
^{90}Sr	0.111E+03	0.120E+03	8	1.08	Acceptable
^{90}Sr	0.111E+03	0.110E+03	9	0.99	Acceptable
^{134}Cs	0.462E+03	0.420E+03	2	0.91	Acceptable
^{134}Cs	0.462E+03	0.380E+03	2	0.82	Acceptable
^{137}Cs	0.198E+03	0.190E+03	5	0.96	Acceptable
^{137}Cs	0.198E+03	0.190E+03	5	0.96	Acceptable
^{144}Ce	0.403E+03	0.430E+03	2	1.07	Acceptable
^{144}Ce	0.403E+03	0.440E+03	2	1.09	Acceptable
^{239}Pu	0.104E+01	0.110E+01	9	1.06	Acceptable
^{239}Pu	0.104E+01	0.940E+00	20	0.90	Acceptable
^{241}Am	0.860E+00	0.810E+00	19	0.94	Acceptable
^{241}Am	0.860E+00	0.840E+00	20	0.98	Acceptable
U, Bq	0.200E+01	0.220E+01	18	1.10	Acceptable
U, Bq	0.200E+01	0.190E+01	21	0.95	Acceptable

[a]Counting error = 2 sigma.

Table 10.13. 1990 EML Intercomparison Study

ORNL Low-Level Radiochemical Laboratory, September 1990

Parameter	EML value	ORNL value	ORNL % error[a]	Ratio (ORNL/EPA)	Performance evaluation
		Air (pCi/filter)			
^{54}Mn	0.333E+02	0.330E+02	3	0.99	Acceptable
^{54}Mn	0.333E+02	0.310E+02	3	0.93	Acceptable
^{57}Co	0.114E+02	0.110E+02	9	0.96	Acceptable
^{57}Co	0.114E+02	0.110E+02	9	0.96	Acceptable
^{60}Co	0.254E+02	0.230E+02	4	0.91	Acceptable
^{60}Co	0.254E+02	0.210E+02	4	0.83	Acceptable
^{90}Sr	0.930E-01	0.160E+00	56	1.72	Acceptable
^{90}Sr	0.930E-01	0.130E+00	53	1.40	Acceptable
^{134}Cs	0.163E+02	0.140E+02	7	0.86	Acceptable
^{134}Cs	0.163E+02	0.140E+02	7	0.86	Acceptable
^{137}Cs	0.157E+02	0.150E+02	6	0.96	Acceptable
^{137}Cs	0.157E+02	0.140E+02	7	0.89	Acceptable
^{144}Ce	0.165E+02	0.150E+02	6	0.91	Acceptable
^{144}Ce	0.165E+02	0.150E+02	6	0.91	Acceptable
^{239}Pu	0.510E-01	0.490E-01	14	0.96	Acceptable
^{239}Pu	0.510E-01	0.440E-01	15	0.86	Acceptable
^{241}Am	0.360E-01	0.480E-01	22	1.33	Acceptable
^{241}Am	0.360E-01	0.450E-01	15	1.25	Acceptable
U, Bq	0.250E-01	0.330E-01	21	1.32	Acceptable
U, Bq	0.250E-01	0.290E-01	31	1.16	Acceptable
		Soil (pCi/g)			
^{40}K	0.513E+03	0.460E+03	15	0.90	Acceptable
^{40}K	0.513E+03	0.510E+03	5	0.99	Acceptable
^{90}Sr	0.833E+01	0.120E+02	50	1.44	Acceptable
^{90}Sr	0.833E+01	0.900E+01	50	1.08	Acceptable
^{137}Cs	0.196E+03	0.180E+03	5	0.92	Acceptable
^{137}Cs	0.196E+03	0.190E+03	5	0.97	Acceptable
^{239}Pu	0.115E+01	0.900E+00	44	0.78	Acceptable
^{239}Pu	0.115E+01	0.140E+01	21	1.22	Acceptable
^{241}Am	0.738E+00	0.170E+01	41	2.30	Unacceptable
^{241}Am	0.738E+00	0.110E+01	54	1.49	Acceptable
		Vegetation (pCi/g)			
^{40}K	0.103E+04	0.810E+03	11	0.79	Acceptable
^{40}K	0.103E+04	0.930E+03	5	0.90	Acceptable
^{90}Sr	0.889E+03	0.110E+04	9	1.24	Acceptable
^{90}Sr	0.889E+03	0.110E+04	2	1.24	Acceptable
^{137}Cs	0.182E+02	0.140E+02	28	0.77	Acceptable
^{137}Cs	0.182E+02	0.170E+02	11	0.93	Acceptable
		Water (pCi/mL)			
^{3}H	0.390E+04	0.400E+04	2	1.03	Acceptable
^{3}H	0.390E+04	0.390E+04	2	1.00	Acceptable
^{54}Mn	0.301E+03	0.300E+03	3	1.00	Acceptable
^{54}Mn	0.301E+03	0.300E+03	3	1.00	Acceptable
^{57}Co	0.130E+04	0.140E+04	7	1.08	Acceptable
^{57}Co	0.130E+04	0.140E+04	7	1.08	Acceptable

Table 10.13 (continued)

Parameter	EML value	ORNL value	ORNL % error[a]	Ratio (ORNL/EPA)	Performance evaluation
		Water (pCi/mL)			
^{60}Co	0.491E+03	0.500E+03	6	1.02	Acceptable
^{60}Co	0.491E+03	0.490E+03	6	1.00	Acceptable
^{90}Sr	0.993E+01	0.130E+02	7	1.31	Acceptable
^{90}Sr	0.993E+01	0.110E+02	9	1.11	Acceptable
^{134}Cs	0.355E+03	0.360E+03	2	1.01	Acceptable
^{134}Cs	0.355E+03	0.370E+03	2	1.04	Acceptable
^{137}Cs	0.390E+03	0.420E+03	2	1.08	Acceptable
^{137}Cs	0.390E+03	0.420E+03	2	1.08	Acceptable
^{144}Ce	0.923E+03	0.910E+03	1	0.99	Acceptable
^{144}Ce	0.923E+03	0.940E+03	1	1.02	Acceptable
^{239}Pu	0.109E+01	0.870E+00	6	0.80	Acceptable
^{239}Pu	0.109E+01	0.900E+00	7	0.83	Acceptable
^{241}Am	0.567E+00	0.570E+00	14	1.01	Acceptable
^{241}Am	0.567E+00	0.620E+00	8	1.09	Acceptable
U, Bq	0.480E+00	0.600E+00	16	1.25	Acceptable
U, Bq	0.480E+00	0.470E+00	12	0.98	Acceptable

[a]Counting error = 2 sigma.

Table 10.14. EML intercomparison study results for K-25 Site in May 1990

Parameter	EML value	K-25 value	Error, K-25 %	Ratio (K-25/EML)	Performance evaluation[a]
		Water (pCi/mL)			
^{3}H	0.196×10^{4}	0.159×10^{4}	4	0.81 ± 0.04	Acceptable
^{54}Mn	0.103×10^{3}	0.107×10^{3}	1	1.04 ± 0.05	Acceptable
^{57}Co	0.198×10^{3}	0.205×10^{3}	0	1.04 ± 0.05	Acceptable
^{60}Co	0.206×10^{3}	0.195×10^{3}	0	0.95 ± 0.05	Acceptable
^{90}Sr	0.111×10^{3}	0.109×10^{3}	3	0.98 ± 0.06	Acceptable
^{134}Cs	0.462×10^{3}	0.440×10^{3}	0	0.95 ± 0.05	Acceptable
^{137}Cs	0.198×10^{3}	0.200×10^{3}	0	1.01 ± 0.05	Acceptable
^{239}Pu	0.104×10^{1}	0.118×10^{1}	4	1.13 ± 0.12	Acceptable
^{241}Am	0.860	0.701	7	0.82 ± 0.10	Acceptable
U, Bq	0.200×10^{1}	0.187×10^{1}	3	0.94 ± 0.05	Acceptable
^{144}Ce	0.403×10^{3}	0.655×10^{3}	1	1.63 ± 0.08	Unacceptable
		Air (pCi/filter)			
^{54}Mn	0.960×10^{1}	0.107×10^{2}	4	1.11 ± 0.07	Acceptable
^{57}Co	0.650×10^{1}	0.725×10^{1}	3	1.12 ± 0.08	Acceptable
^{60}Co	0.940×10^{1}	0.999×10^{1}	3	1.06 ± 0.08	Acceptable
^{134}Cs	0.182×10^{2}	0.186×10^{2}	2	1.02 ± 0.09	Acceptable
^{137}Cs	0.204×10^{2}	0.222×10^{2}	2	1.09 ± 0.05	Acceptable
^{144}Ce	0.312×10^{2}	0.367×10^{2}	4	1.18 ± 0.08	Acceptable
^{239}Pu	0.390×10^{-1}	0.323×10^{-1}	25	0.83 ± 0.23	Acceptable
^{241}Am	0.540×10^{-1}	0.443×10^{-1}	18	0.82 ± 0.17	Acceptable
U, Bq	0.510×10^{-1}	0.611×10^{-1}	16	1.20 ± 0.20	Acceptable
^{90}Sr	0.240	0.179	184	0.75 ± 1.38	Acceptable
		Soil (pCi/g)			
^{90}Sr	0.665×10^{3}	0.748×10^{3}	6	1.12 ± 0.08	Acceptable
^{137}Cs	0.175×10^{5}	0.149×10^{5}	0	0.85 ± 0.01	Acceptable
^{239}Pu	0.212×10^{3}	0.186×10^{3}	2	0.88 ± 0.05	Acceptable
^{241}Am	0.106×10^{3}	0.813×10^{2}	3	0.77 ± 0.08	Acceptable
U, Bq	0.280×10^{3}	0.200×10^{3}	2	0.71 ± 0.03	Acceptable

[a]Acceptable ratio is 0.5 to 1.5.

Table 10.15. EML intercomparison study results for K-25 Site in September 1990

Parameter	EML value	K-25 value	Error, K-25 %	Ratio (K-25/EML)	Performance evaluation[a]
		Water (pCi/mL)			
^{54}Mn	0.301×10^3	0.310×10^3	0	1.03 ± 0.02	Acceptable
^{57}Co	0.130×10^4	0.152×10^4	0	1.17 ± 0.02	Acceptable
^{60}Co	0.491×10^3	0.525×10^3	0	1.07 ± 0.03	Acceptable
^{134}Cs	0.355×10^3	0.389×10^3	0	1.10 ± 0.05	Acceptable
^{137}Cs	0.390×10^3	0.422×10^3	0	1.08 ± 0.04	Acceptable
^{144}Ce	0.923×10^3	0.940×10^3	0	1.02 ± 0.03	Acceptable
^{239}Pu	0.109×10^1	0.823	5	0.76 ± 0.04	Acceptable
^{241}Am	0.567	0.452	8	0.80 ± 0.04	Acceptable
		Air (pCi/filter)			
^{54}Mn	0.333×10^2	0.346×10^2	2	1.04 ± 0.03	Acceptable
^{57}Co	0.114×10^2	0.126×10^2	2	1.11 ± 0.04	Acceptable
^{60}Co	0.254×10^2	0.234×10^2	1	0.92 ± 0.02	Acceptable
^{134}Cs	0.163×10^2	0.174×10^2	2	1.07 ± 0.03	Acceptable
^{137}Cs	0.157×10^2	0.165×10^2	2	1.05 ± 0.04	Acceptable
^{144}Ce	0.165×10^2	0.178×10^2	6	1.08 ± 0.08	Acceptable
^{239}Pu	0.510×10^{-1}	0.430×10^{-1}	20	0.84 ± 0.21	Acceptable
^{241}Am	0.360×10^{-1}	0.352×10^{-1}	20	0.98 ± 0.21	Acceptable
		Soil (pCi/g)			
^{137}Cs	0.196×10^3	0.156×10^3	9	0.80 ± 0.09	Acceptable
^{239}Pu	0.115×10^1	0.109×10^1	45	0.94 ± 0.43	Acceptable
U, Bq	0.586×10^2	0.236×10^2	6	0.42 ± 0.03	Unacceptable

[a]Acceptable ratio is 0.5 to 1.5.

Table 10.16. Proficiency Environmental Testing Control Program at the Y-12 Environmental Laboratory in 1990

Level 1 Concentrations

Parameter	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Warning	Unacceptable
Biochemical oxygen demand	100.30	0.454	12	0	0
Chemical oxygen demand	92.35	0.450	12	0	0
Total organic carbon	101.46	0.366	12	0	0
Ammonia nitrogen	94.86	0.365	12	0	0
Nitrate nitrogen	106.92	0.700	12	0	0
Phosphate-P	101.55	0.203	10	0	0
Kjeldahl nitrogen	108.15	0.356	12	0	0
Total phosphorus	105.80	0.682	11	0	0
Total suspended solids	89.15	0.526	12	0	0
Total dissolved solids	92.55	0.544	12	0	0
Oil and grease	95.24	0.373	12	0	0
Alkalinity	98.18	0.190	12	0	0
Calcium	99.89	0.261	12	0	0
Chloride	100.01	0.270	12	0	0
Conductivity	92.34	0.256	12	0	0
Magnesium	101.67	0.381	12	0	0
Potassium	101.98	0.583	12	0	0
Sodium	100.08	0.282	12	0	0
Sulfate	98.79	0.302	12	0	0
Total hardness	97.72	0.594	11	0	1
pH	100.58	0.578	11	1	0
Aluminum	101.16	0.327	12	0	0
Arsenic	93.18	0.909	9	0	1
Barium	100.43	0.513	12	0	0
Beryllium	101.30	0.510	12	0	0
Cadmium	102.77	0.318	12	0	0
Chromium	99.66	0.240	12	0	0
Copper	103.70	0.428	12	0	0
Iron	102.19	0.328	12	0	0
Lead	104.20	0.554	9	0	0
Manganese	103.76	0.579	12	0	0
Mercury	95.46	0.281	12	0	0
Nickel	99.54	0.366	12	0	0
Selenium	100.45	0.893	9	1	0
Silver	103.19	0.425	11	0	0
Thallium	102.60	0.763	8	1	0
Vanadium	101.88	0.298	12	0	0
Zinc	104.99	0.275	12	0	0
Antimony	96.50	0.321	3	0	0
Boron	118.96	0.922	3	0	0
Cobalt	101.21	0.666	3	0	0
Molybdenum	110.87	0.901	3	0	0
Phenol	127.68	1.532	10	1	1
Cyanide	92.75	0.472	12	0	0
Residual chlorine	98.03	0.203	12	0	0
Fluoride	99.84	0.823	10	1	0
Organic halide	97.29	0.500	5	0	0
Hexavalent chromium	95.05	0.531	12	0	0
Uranium	98.44	0.888	12	0	0

Table 10.16 (continued)

Parameter	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Warning	Unacceptable
Benzene	102.57	0.106	4	0	0
Chlorobenzene	98.24	0.256	3	0	0
1,2-Dichlorobenzene	101.06	0.193	2	0	0
1,4-Dichlorobenzene	102.30	0.058	2	0	0
Ethyl benzene	96.87	0.479	3	0	0
Toluene	104.14	0.204	3	0	0
Carbon tetrachloride	90.84	0.066	1	0	0
Chloroform	101.19	0.676	2	0	0
Tetrachloroethene	101.85	1.058	1	1	0
1,1,1-Trichloroethane	104.78	0.541	4	0	0
1,1,2-Trichloroethane	101.32	0.176	3	0	0
4-Chloro-3-methyl phenol	67.85	0.774	1	0	0
2,4-Dinitrophenol	4.40	1.348	1	0	0
4-Nitrophenol	70.45	1.529	1	0	0
2,4,6-Trichlorophenol	72.02	0.533	1	0	0
Bis(2-Ethylhexyl) phthalate	101.54	0.606	1	0	0
Diethylphthalate	31.48	0.898	1	0	0
Dimethylphthalate	11.19	1.025	1	0	0
2,4-Dinitrotoluene	45.31	1.432	1	0	0
Anthracene	153.78	5.594	0	0	1
Napthalene	75.82	0.147	1	0	0
Phenanthrene	151.96	2.364	0	1	0
1,2,4-Trichlorobenzene	59.90	0.778	1	0	0

[a]Average of all results for the Y-12 laboratory. All parameters were not measured every month.

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

[c]The adopted limits place the warning (marginal) level at 1.96 standard deviations and the acceptance level at 2.58 deviations from the mean.

Table 10.17. Proficiency Environmental Testing Control Program at the Y-12 Environmental Laboratory in 1990

Level 2 Concentrations

Parameter	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Warning	Unacceptable
Biochemical oxygen demand	99.67	0.397	12	0	0
Chemical oxygen demand	89.54	0.286	12	0	0
Total organic carbon	101.97	0.330	12	0	0
Ammonia nitrogen	96.67	0.332	12	0	0
Nitrate nitrogen	102.44	0.539	12	0	0
Phosphate-P	101.21	0.201	10	0	0
Kjeldahl nitrogen	101.48	0.354	12	0	0
Total phosphorus	99.17	0.392	11	0	0
Total suspended solids	93.25	0.561	12	0	0
Total dissolved solids	98.22	0.397	12	0	0
Oil and grease	98.13	0.443	12	0	0
Alkalinity	98.54	0.330	12	0	0
Calcium	100.42	0.340	12	0	0
Chloride	99.77	0.385	12	0	0
Conductivity	91.90	0.389	12	0	0
Magnesium	102.38	0.523	11	1	0
Potassium	100.47	0.483	12	0	0
Sodium	100.07	0.404	11	1	0
Sulfate	97.85	0.291	12	0	0
Total hardness	97.55	1.409	11	0	1
pH	100.66	0.395	12	0	0
Aluminum	99.03	0.276	12	0	0
Arsenic	97.99	0.470	12	0	0
Barium	100.40	0.532	12	0	0
Beryllium	100.21	0.463	12	0	0
Cadmium	102.98	0.532	12	0	0
Chromium	98.57	0.357	12	0	0
Copper	102.50	0.445	12	0	0
Iron	101.87	0.455	12	0	0
Lead	102.07	0.435	12	0	0
Manganese	103.27	0.884	12	0	0
Mercury	97.44	0.344	12	0	0
Nickel	99.50	0.305	12	0	0
Selenium	109.02	0.979	10	1	0
Silver	103.26	0.599	12	0	0
Thallium	99.33	0.297	12	0	0
Vanadium	100.20	0.416	12	0	0
Zinc	103.27	0.588	11	1	0
Antimony	99.79	0.400	3	0	0
Boron	99.14	0.339	3	0	0
Cobalt	102.12	0.804	3	0	0
Molybdenum	101.57	0.705	3	0	0
Phenol	107.88	0.873	10	1	0
Cyanide	94.96	0.554	12	0	0
Residual chlorine	99.97	0.297	12	0	0
Fluoride	102.45	0.566	11	0	1
Organic halide	102.44	0.904	4	1	0
Hexavalent chromium	98.04	0.993	9	3	0
Uranium	99.48	0.933	12	0	0

Table 10.17 (continued)

Parameter	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Warning	Unacceptable
Benzene	107.69	0.711	4	0	0
Chlorobenzene	103.33	0.376	3	0	0
1,2-Dichlorobenzene	112.25	1.059	2	0	0
1,4-Dichlorobenzene	109.56	0.371	2	0	0
Ethyl benzene	107.34	0.821	3	0	0
Toluene	106.94	0.879	2	1	0
Carbon tetrachloride	120.34	0.649	1	0	0
Chloroform	112.08	0.621	2	0	0
Tetrachloroethene	105.98	1.036	2	0	0
1,1,1-Trichloroethane	105.60	0.698	4	0	0
1,1,2-Trichloroethane	104.74	0.223	3	0	0
4-Chloro-3-methyl phenol	77.20	0.053	1	0	0
2,4-Dinitrophenol	107.64	1.560	1	0	0
4-Nitrophenol	103.83	1.890	1	0	0
2,4,6-Trichlorophenol	99.18	1.280	1	0	0
Bis(2-Ethylhexyl) phthalate	117.06	1.145	1	0	0
Diethylphthalate	98.58	1.457	1	0	0
Dimethylphthalate	94.35	1.248	1	0	0
2,4-Dinitrotoluene	90.85	0.547	1	0	0
Anthracene	100.25	1.125	1	0	0
Napthalene	70.79	0.389	1	0	0
Phenanthrene	133.41	2.203	0	1	0
1,2,4-Trichlorobenzene	62.46	0.183	1	0	0

[a]Average of all results for the Y-12 laboratory. All parameters were not measured every month.

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

[c]The adopted limits place the warning (marginal) level at 1.96 standard deviations and the acceptance level at 2.58 deviations from the mean.

Table 10.18. Proficiency Environmental Testing Control Program at ORNL in 1990

Level 1 Concentration, Inorganics

Parameter	Average recovery (%)[a]	Average number of standard deviations[b]	Performance		
			Acceptable[c]	Marginal[c]	Unacceptable[c]
Biochemical O demand	94	0.33	12	0	0
TOC	99	0.27	5	0	0
Ammonia as N	123	0.96	10	0	1
Nitrate as N	100	0.28	1	0	0
Kjeldahl N	92	0.46	1	0	0
Orthophosphate as P	106	0.66	2	0	0
Total P	95	0.37	5	0	0
Suspended solids	93	0.83	9	0	1
Dissolved solids	105	0.44	8	0	0
Oil and grease	47	1.21	5	2	0
Alkalinity	98	0.14	11	0	0
Ca	98	0.38	2	0	0
Chloride	98	0.43	10	0	0
Conductivity	93	0.40	11	0	0
Mg	100	0.07	2	0	0
K	100	0.70	3	0	0
Na	104	0.80	1	0	0
Sulfate	100	0.17	10	0	0
Total hardness as $CaCO_3$	99	0.24	11	0	0
pH	103	0.55	11	0	0
Ag	92	0.59	12	0	0
Al	113	0.64	7	1	0
As	106	0.75	7	1	0
Ba	98	0.31	12	0	0
Be	96	0.38	12	0	0
B	104	0.15	3	0	0
Cd	95	0.46	12	0	0
Co	96	0.52	3	0	0
Cr	96	0.37	12	0	0
Cu	98	0.33	12	0	0
Fe	102	0.28	11	0	0
Hg	75[d]	1.71	3	0	1
Mo	93	0.34	3	0	0
Mn	92	0.64	12	0	0
Ni	95	0.47	10	0	0
Pb	94	0.56	5	0	0
Sb	102	0.54	3	0	0
Se	89	0.87	4	0	0
U	95	0.71	4	0	0
V	98	0.24	12	0	0
Zn	91	0.75	11	1	0
Phenol	93	0.58	9	0	1
Cyanide	101	0.38	10	0	0
Total residual Cl	102	0.43	10	0	0
Total organic halides	100	0.73	3	0	0

[a]Average of all results at ORNL. All parameters were not analyzed each month.

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

[c]For EPA, the warning level is 1.96 standard deviations, and the acceptance level is 2.58 standard deviations from the mean.

[d]Would be 97% and 0.21 if outlier is removed.

Table 10.19. Proficiency Environmental Testing Control Program at ORNL in 1990

Level 2 Concentration, Inorganics

Parameter	Average recovery (%)[a]	Average number of standard deviations[b]	Performance		
			Acceptable[c]	Marginal[c]	Unacceptable[c]
Biochemical oxygen demand	96	0.29	12	0	0
TOC	100	0.35	5	0	0
Ammonia as N	115	0.95	10	0	1
Nitrate as N	105	0.86	1	0	0
Orthophosphate as P	108	0.53	2	0	0
Total P	91	0.48	5	0	0
Suspended solids	94	1.33	8	1	1
Dissolved solids	98	0.45	8	0	0
Oil and grease	78	0.79	8	0	0
Alkalinity	96	0.48	11	0	0
Ca	95	0.50	2	0	0
Chloride	92	1.46	9	0	1
Conductivity	91	0.42	11	0	0
Mg	102	0.23	2	0	0
K	101	0.15	3	0	0
Na	101	0.17	1	0	0
Sulfate	100	0.22	10	0	0
Total hardness as $CaCO_3$	101	0.44	11	0	0
pH	103	0.52	11	0	0
Ag	100	0.28	12	0	0
Al	90	0.71	11	0	0
As	102	0.43	11	0	0
Ba	99	0.33	12	0	0
Be	97	0.39	12	0	0
B	101	0.33	3	0	0
Cd	98	0.43	12	0	0
Co	96	0.36	3	0	0
Cr	96	0.35	12	0	0
Cu	99	0.20	12	0	0
Fe	99	0.35	12	0	0
Hg	76[d]	1.36	3	0	1
Mo	95	0.28	3	0	0
Mn	97	0.49	12	0	0
Ni	97	0.44	12	0	0
Pb	93	0.80	12	0	0
Sb	105	0.68	3	0	0
Se	94	0.50	7	0	0
U	94	0.72	4	0	0
V	98	0.44	12	0	0
Zn	96	0.59	12	0	0
Phenol	93	0.64	9	0	1
Cyanide	106	0.63	10	0	0
Total residual Cl	100	0.48	10	0	0
Total organic halides	95	0.45	3	0	0

[a]Average of all results at ORNL. All parameters were not analyzed each month.

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

[c]For EPA, the warning level is 1.96 standard deviations, and the acceptance level is 2.58 standard deviations from the mean.

[d]Would be 98% and 0.23 if outlier is removed.

Table 10.20. Proficiency Environmental Testing Control Program at ORNL in 1990

Level 1 Concentration, Organics

Parameter	Average recovery (%)[a]	Average number of standard deviations[b]	Performance		
			Acceptable[c]	Marginal[c]	Unacceptable[c]
Chloroform	103	0.31	5	0	0
1,1,1-Trichloroethane	99	0.22	6	0	0
Carbon tetrachloride	93	0.21	4	0	0
Trichloroethene	100	0.20	1	0	0
1,1,2-Trichloroethane	103	0.19	4	0	0
Benzene	98	0.24	7	0	0
Tetrachloroethane	96	0.29	5	0	0
Toluene	99	0.29	8	0	0
Chlorobenzene	99	0.31	9	0	0
Ethyl benzene	96	0.19	6	0	0
1,2-Dichlorobenzene	127	1.44	1	0	0
Phenol	67	0.36	3	0	0
1,4-Dichlorobenzene	52	1.16	2	1	0
1,2-Dichlorobenzene	78	0.06	1	0	0
Hexachloroethane	53	0.70	7	0	0
Nitrobenzene	59	0.54	1	0	0
2,4-Dichlorophenol	60	0.62	5	0	0
1,2,4-Trichlorobenzene	61	0.79	5	1	0
Naphthalene	71	0.66	3	0	0
4-Chloro-3-methyl phenol	57	0.78	6	0	0
2,4,6-Trichlorophenol	70	0.98	2	0	0
Dimethyl phthalate	75	0.57	5	0	0
Acenaphthene	68	0.86	6	0	0
2,4-Dinitrophenol	25	0.78	5	0	0
4-Nitrophenol	44	0.45	5	0	0
2,4-Dinitrotoluene	47	1.23	6	0	0
Diethyl phthalate	81	0.45	6	0	0
Pentachlorophenol	54	0.74	5	0	0
Phenanthrene	78	1.09	4	0	0
Anthracene	76	0.57	7	0	0
Di-n-butyl phthalate	76	0.19	4	0	0
Pyrene	83	0.39	2	0	0
Bis(2-ethylhexyl)phthalate	70	0.37	2	0	0
Gamma-BHC	86	0.34	8	0	0
Heptachlor	76	1.06	6	0	1
Aldrin	103	1.05	1	0	0
Dieldrin	98	0.47	7	1	0
Endrin	107	0.31	2	0	0
4,4'-DDT	102	1.08	7	0	1

[a]Average of all results at ORNL. All parameters were not analyzed each month.

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

[c]For EPA, the warning level is 1.96 standard deviations, and the acceptance level is 2.58 standard deviations from the mean.

Table 10.21. Proficiency Environmental Testing Control Program at ORNL in 1990

Level 2 Concentration, Organics

Parameter	Average recovery (%)[a]	Average number of standard deviations[b]	Performance		
			Acceptable[c]	Marginal[c]	Unacceptable[c]
Chloroform	102	0.33	5	0	0
1,1,1-Trichloroethane	99	0.23	6	0	0
Carbon tetrachloride	100	0.18	4	0	0
Trichloroethene	102	0.82	1	0	0
1,1,2-Trichloroethane	104	0.42	4	0	0
Benzene	96	0.34	7	0	0
Tetrachloroethane	92	0.07	5	0	0
Toluene	94	0.30	8	0	0
Chlorobenzene	97	0.33	9	0	0
Ethyl benzene	93	0.50	6	0	0
1,2-Dichlorobenzene	120	0.54	1	0	0
Phenol	71	0.52	3	0	0
1,4-Dichlorobenzene	52	0.78	3	0	0
1,2-Dichlorobenzene	77	0.45	1	0	0
Hexachloroethane	60	0.68	7	0	0
Nitrobenzene	64	1.09	1	0	0
2,4-Dichlorophenol	66	0.54	5	0	0
1,2,4-Trichlorobenzene	65	0.73	6	0	0
Naphthalene	75	0.37	3	0	0
4-Chloro-3-methyl phenol	69	0.52	7	1	0
2,4,6-Trichlorophenol	76	0.22	2	0	0
Dimethyl phthalate	79	0.89	5	0	0
Acenaphthene	74	0.53	6	0	0
2,4-Dinitrophenol	41	0.66	6	0	0
4-Nitrophenol	53	0.58	6	0	0
2,4-Dinitrotoluene	62	0.97	6	0	0
Diethyl phthalate	84	0.73	6	0	0
Pentachlorophenol	64	0.62	6	0	0
Phenanthrene	84	0.61	4	0	0
Anthracene	83	0.17	7	0	0
Di-n-butyl phthalate	73	0.57	4	0	0
Pyrene	94	0.71	2	0	0
Bis(2-ethylhexyl)phthalate	72	0.30	2	0	0
Gamma-BHC	83	0.54	8	0	0
Heptachlor	69	0.68	7	0	0
Aldrin	72	0.48	1	0	0
Dieldrin	92	0.49	8	0	0
Endrin	79	0.81	2	0	0
4,4′-DDT	99	0.66	8	0	0

[a]Average of all results at ORNL. All parameters were not analyzed each month.

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

[c]For EPA, the warning level is 1.96 standard deviations, and the acceptance level is 2.58 standard deviations from the mean.

Table 10.22. Proficiency Environmental Testing Control Program at K-25 in 1990

Level 1 Concentrations

Parameter[a]	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Marginal	Unacceptable
Alkalinity	94.787	–0.63	12	0	0
Aluminum	150.737	1.47	7	3	2
Ammonia nitrogen	98.719	–0.10	12	0	0
Antimony	95.521	0.21	3	0	0
Arsenic	92.784	–0.54	11	0	1
Barium	96.005	–0.43	12	0	0
Beryllium	97.828	0.05	12	0	0
Biochemical oxygen demand	110.291	0.75	12	0	0
Boron	113.882	0.51	3	0	0
Cadmium	103.785	0.14	11	1	0
Calcium	95.599	–0.46	12	0	0
Chemical oxygen demand	93.346	–0.27	12	0	0
Chloride	102.024	0.44	11	0	1
Chromium	102.201	0.04	12	0	0
Chromium +6	103.794	0.32	12	0	0
Cobalt	93.172	–0.80	3	0	0
Conductivity	91.136	0.04	12	0	0
Copper	109.121	0.46	10	1	1
Cyanide	163.998	2.56	11	0	1
Fluoride	100.485	0.29	12	0	0
Iron	121.589	0.93	11	0	1
Lead	127.292	0.86	11	0	1
Magnesium	97.362	–0.25	12	0	0
Manganese	97.928	–0.03	12	0	0
Mercury	90.736	0.01	12	0	0
Molybdenum	93.634	0.18	3	0	0
Nickel	101.763	0.11	12	0	0
Nitrate nitrogen	98.323	–0.02	12	0	0
Oil and grease	97.306	0.19	12	0	0
Orthophosphate as P	94.255	–0.49	11	0	0
pH	102.944	0.28	12	0	0
Phenol	141.006	0.94	11	0	1
Potassium	96.721	–0.29	12	0	0
Selenium	90.577	–0.42	11	0	1
Silver	94.862	–0.42	12	0	0
Sodium	97.645	–0.23	12	0	0
Sulfate	100.161	0.29	12	0	0
Thallium	123.651	1.39	11	0	1
Total dissolved solids	106.592	0.15	12	0	0
Total hardness as $CaCO_3$	95.891	–0.47	12	0	0
Total Kjeldahl nitrogen	133.434	0.73	12	0	0
Total organic carbon	99.105	–0.15	11	0	0
Total organic halides (TO_x)	89.288	–0.73	11	1	0
Total phosphorus as P	101.354	–0.16	12	0	0
Total residual chlorine	93.356	–0.22	12	0	0
Total suspended solids	92.849	–0.01	12	0	0
Uranium	99.613	–0.13	12	0	0
Vanadium	96.140	–0.25	12	0	0
Zinc	120.358	0.68	10	1	1

[a]Average of all results for K-25. All parameters were not measured every month.

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

[c]For the EPA, the warning (marginal) level is 1.96 standard deviations, and the acceptance level is 2.58 standard deviations from the mean.

Table 10.23. Proficiency Environmental Testing Control Program at K-25 in 1990

Level 2 Concentrations

Parameter[a]	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Marginal	Unacceptable
Alkalinity	95.106	–0.61	12	0	0
Aluminum	104.665	0.28	12	0	0
Ammonia nitrogen	100.404	–0.05	12	0	0
Antimony	100.875	0.34	3	0	0
Arsenic	85.841	–0.70	10	0	2
Barium	97.040	–0.40	12	0	0
Beryllium	97.505	–0.02	12	0	0
Biochemical oxygen demand	104.479	0.45	12	0	0
Boron	105.362	0.82	3	0	0
Cadmium	97.178	–0.51	12	0	0
Calcium	95.373	–0.51	12	0	0
Chemical oxygen demand	97.121	0.11	12	0	0
Chloride	99.341	0.02	11	1	0
Chromium	98.254	–0.16	12	0	0
Chromium +6	100.165	0.12	12	0	0
Cobalt	94.130	–0.80	3	0	0
Conductivity	90.620	0.14	12	0	0
Copper	97.452	–0.31	12	0	0
Cyanide	99.706	0.16	12	0	0
Fluoride	101.879	0.44	12	0	0
Iron	100.897	0.17	12	0	0
Lead	89.948	–0.55	10	1	1
Magnesium	97.607	–0.15	12	0	0
Manganese	97.668	–0.19	12	0	0
Mercury	95.714	–0.26	12	0	0
Molybdenum	100.898	0.47	3	0	0
Nickel	99.833	–0.03	12	0	0
Nitrate nitrogen	93.641	–0.42	12	0	0
Oil and grease	93.498	0.23	12	0	0
Orthophosphate as P	97.131	–0.18	11	0	0
pH	103.032	0.50	12	0	0
Phenol	95.925	0.05	12	0	0
Potassium	98.710	–0.05	12	0	0
Selenium	102.178	0.03	10	0	2
Silver	93.960	–0.76	12	0	0
Sodium	99.522	0.04	12	0	0
Sulfate	98.532	0.02	11	1	0
Thallium	94.383	–0.18	11	1	0
Total dissolved solids	106.302	0.28	12	0	1
Total hardness as $CaCO_3$	97.235	–0.29	12	0	0
Total Kjeldahl nitrogen	109.967	0.32	12	0	0
Total organic carbon	98.305	–0.36	11	0	0
Total organic halides (TO_x)	76.204	–1.10	12	0	0
Total phosphorus as P	98.313	–0.02	12	0	0
Total residual chlorine	131.125	3.00	10	0	2
Total suspended solids	96.218	0.18	12	0	0
Uranium	98.820	–0.10	12	0	0
Vanadium	96.271	–0.61	12	0	0
Zinc	103.427	0.20	11	0	1

[a]Average of all results for K-25. All parameters were not measured every month.

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

[c]For the EPA, the warning (marginal) level is 1.96 standard deviations, and the acceptance level is 2.58 standard deviations from the mean.

Table 10.24. 1990 performance evaluation report, DMR-QA study number 010—Y-12 Environmental Laboratory

Analytes	Values		Limits		Performance evaluation
	Reported	True	Acceptable	Warning	
		Trace metals (μg/L)			
Aluminum	788	750	587–910	628–869	Acceptable
Arsenic	182	180	139–215	149–205	Acceptable
Beryllium	185	180	153–206	159–199	Acceptable
Cadmium	125	110	92.9–124	96.7–120	Unacceptable
Chromium	708	700	562–819	595–787	Acceptable
Cobalt	315	300	259–342	270–332	Acceptable
Copper	527	500	444–547	457–534	Acceptable
Iron	1590	1650	1420–1860	1480–1810	Acceptable
Lead	329	275	234–309	243–299	Unacceptable
Manganese	674	650	585–707	601–692	Acceptable
Mercury	1.40	1.25	0.729–1.88	0.873–1.74	Acceptable
Nickel	843	800	695–899	721–874	Acceptable
Selenium	12	16.0	9.71–19.7	11.0–18.5	Acceptable
Vanadium	1950	1900	1650–2150	1710–2080	Acceptable
Zinc	612	550	477–614	494–597	Warning
		Miscellaneous analytes			
pH, standard units	8.42	8.50	8.19–8.84	8.27–8.76	Acceptable
Total suspended solids, mg/L	60.6	60.0	48.5–62.0	50.2–60.3	Warning
Oil and grease, mg/L	10.7	10.0	3.51–15.2	4.97–13.8	Acceptable
Total cyanide, mg/L	0.712	0.700	0.469–0.878	0.521–0.827	Acceptable
Total phenolics, mg/L	0.479	0.531	0.287–0.795	0.351–0.731	Acceptable
Total residual chlorine, mg/L	0.23	0.220	0.0828–0.333	0.116–0.300	Acceptable
		Nutrients (mg/L)			
Ammonia-nitrogen	10.7	11.0	8.76–13.0	9.27–12.5	Acceptable
Nitrate-nitrogen	6.35	6.50	5.34–7.67	5.62–7.39	Acceptable
Kjeldahl-nitrogen	0.98	1.00	0.396–1.72	0.555–1.56	Acceptable
Total phosphorus	3.97	4.00	3.12–4.66	3.31–4.48	Acceptable
Orthophosphate	1.01	0.95	0.779–1.12	0.820–1.08	Acceptable
		Demands (mg/L)			
COD	45	50.0	35.8–62.4	39.1–59.1	Acceptable
TOC	20.3	20.2	16.9–24.2	17.8–23.2	Acceptable
5-day BOD	33.0	33.2	18.9–47.4	22.5–43.9	Acceptable

Table 10.25. EPA performance evaluation DMR-QA study number 010—ORNL, 1990

Analytes	Values		Limits		Performance evaluation
	Reported	True[a]	Acceptable	Warning	
		Trace metals, μg/L			
Al	1,200	1,200	949–1,440	1,010–1,380	Acceptable
As	30	30.0	20.6–37.6	22.7–35.5	Acceptable
Be	73.3	75.6	63.4–87.3	66.4–84.3	Acceptable
Cd	332	300	244–343	257–331	Warning
Cr	48.7	50.0	37.2–61.0	40.2–58.0	Acceptable
Co	756	750	651–851	677–825	Acceptable
Cu	86	85.0	72.9–94.5	75.6–91.8	Acceptable
Fe	664	650	559–737	581–715	Acceptable
Pb	96.6	100	76.0–121	81.5–115	Acceptable
Mn	203	200	178–217	183–212	Acceptable
Hg	7.17	7.0	5.19–8.74	5.64–8.30	Acceptable
Ni	218	200	172–227	179–220	Acceptable
Se	70	70.0	47.8–81.1	52.0–77.0	Acceptable
V	1,150	1,150	995–1,300	1,040–1,260	Acceptable
Zn	923	900	783–1,000	810–976	Acceptable
		Miscellaneous analytes, mg/L[b]			
pH, standard units	5.99	6.00	5.86-6.12	5.89-6.09	Acceptable
Total suspended solids	72	73.0	61.3–78.0	63.3–75.9	Acceptable
Oil and grease	16.5	18.0	10.6–23.2	12.2–21.7	Acceptable
Total cyanide	0.059	0.055	0.0191–.0791	0.0267–0.0715	Acceptable
Total phenolics	0.154	0.162	0.0776–0.261	0.101–0.237	Acceptable
Total residual chlorine	1.42	1.50	0.896–1.82	1.02–1.70	Acceptable
		Nutrients, mg/L			
Ammonia as N	3.73	3.60	2.80–4.34	2.99–4.16	Acceptable
Nitrate as N	2.42	2.20	1.73–2.67	1.85–2.56	Acceptable
Kjeldahl N	18.9	21.0	16.1–25.1	17.1–24.0	Acceptable
Total phosphorous	8.42	9.00	6.91–10.5	7.34–10.1	Acceptable
Ortho phosphorous	4.81	4.50	3.91–5.10	4.05–4.96	Acceptable
		Demands, mg/L			
TOC	29.7	30.7	25.7–36.2	27.1–34.8	Acceptable
5-d BOD	44	50.9	29.1–72.8	34.5–67.4	Acceptable

[a]Based on theoretical calculations or a reference value when necessary.

[b]Units are mg/L except for pH, which is reported in pH units.

Table 10.26. EPA performance evaluation DMR-QA study number 010—K-25 Site, 1990

Analytes	Values		Limits		Performance evaluation
	Reported	True[a]	Acceptance	Warning	
		Trace metals (μg/L)			
Al	804	750	587–910	628–869	Acceptable
As[a]	145	180	139–215	149–205	Warning[b]
Be	179	180	153–206	159–199	Acceptable
Cd	100	110	92.9–124	96.7–120	Acceptable
Cr	739	700	562–819	595–787	Acceptable
Co	310	300	259–342	270–332	Acceptable
Cu	520	500	444–547	457–534	Acceptable
Fe	1630	1650	1420–1860	1480–1810	Acceptable
Pb	274	275	234–309	243–299	Acceptable
Mn[a]	697	650	585–707	601–692	Warning
Hg	0.97	1.25	0.729–1.88	0.873–1.74	Acceptable
Ni	857	800	695–899	721–874	Acceptable
Se	15	16.0	9.71–19.7	11.0–18.5	Acceptable
V	1920	1900	1650–2150	1710–2080	Acceptable
Zn	585	550	477–614	494–597	Acceptable
		Miscellaneous analytes (mg/L)			
pH, standard units	8.45	8.50	8.19–8.84	8.27–8.76	Acceptable
Total suspended solids	54	60.0	48.5–62.0	50.2–60.3	Acceptable
O&G	8.0	10.0	3.51–15.2	4.97–13.8	Acceptable
		Nutrients (mg/L)			
Ammonia-nitrogen	11.1	11.0	8.76–13.0	9.27–12.5	Acceptable
Nitrate-nitrogen	6.5	6.50	5.34–7.67	5.62–7.39	Acceptable
Kjeldahl-nitrogen	1.01	1.00	0.396–1.72	0.555–1.56	Acceptable
Total P	3.81	4.00	3.12–4.66	3.31–4.48	Acceptable
Orthophosphate	0.91	0.95	0.779–1.12	0.820–1.08	Acceptable
		Demands (mg/L)			
COD	46	50.0	35.8–62.4	39.1–59.1	Acceptable
TOC	19.4	20.2	16.9–24.2	17.8–23.2	Acceptable
5-day BOD	38	33.2	18.9–47.4	22.5–43.9	Acceptable
		Additional miscellaneous analytes (mg/L)			
Total cyanide	0.772	0.700	0.469–0.878	0.521–0.827	Acceptable
Total phenolics	0.55	0.531	0.287–0.795	0.351–0.731	Acceptable
Total residual chlorine	0.52	0.220	0.0828–0.333	0.116–0.300	Unacceptable[c]

[a]Based upon theoretical calculations, or a reference value when necessary.

[b]Possible dilution error.

[c]Calculation error.

Table 10.27. 1990 performance evaluation report, water supply study number WS026—Y-12 Environmental Laboratory

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True		
		Trace metals (μg/L)			
Antimony	3	14.5	14.0	10.0–19.2	Acceptable
	4	121	120	96.5–150	Acceptable
Arsenic	1	164	150	126–168	Acceptable
	2	54.9	54.3	43.5–62.2	Acceptable
Barium	1	728	743	669–800	Acceptable
	2	598	633	558–683	Acceptable
Beryllium	3	22.9	23.1	18.7–25.5	Acceptable
	4	0.56	0.530	0.384–0.703	Acceptable
Cadmium	1	9.56	9.20	7.80–10.8	Acceptable
	2	56.3	53.9	44.9–60.2	Acceptable
Chromium	1	90.9	94.6	82.7–107	Acceptable
	2	48.3	50.2	43.5–57.0	Acceptable
Copper	1	90.5	93.1	84.1–104	Acceptable
	2	482	483	445–523	Acceptable
Lead	1	4.3	2.95	1.78–4.66	Acceptable
	2	49.2	49.2	42.3–56.4	Acceptable
Mercury	1	5.0	4.56	3.45–5.50	Acceptable
	2	2.66	2.47	1.76–3.01	Acceptable
Nickel	3	147	151	128–167	Acceptable
	4	347	331	292–366	Acceptable
Selenium	1	9.5	9.99	7.46–11.6	Acceptable
	2	44	41.1	31.5–46.5	Acceptable
Silver	1	106	97.0	83.9–110	Acceptable
	2	23.5	22.4	19.0–26.9	Acceptable
Thallium	3	71.5	80.0	59.5–94.6	Acceptable
	4	3.0	4.0	2.39–5.31	Acceptable
		Trihalomethanes (μg/L)			
Bromodichloromethane	1	26.1	25.8	20.6–31.0	Acceptable
	2	58.3	60.5	48.4–72.6	Acceptable
Bromoform	1	16.0	15.4	12.3–18.5	Acceptable
	2	75.0	77.4	61.9–92.9	Acceptable
Chlorodibromomethane	1	23.6	22.1	17.7–26.5	Acceptable
	2	68.0	72.9	58.3–87.5	Acceptable
Chloroform	1	7.10	7.53	6.02–9.04	Acceptable
	2	61.1	59.1	47.3–70.9	Acceptable
Total trihalomethane	1	72.80	70.8	56.6–85.0	Acceptable
	2	262.4	270	216–324	Acceptable

Table 10.27 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True		
		Volatile organic compounds (μg/L)			
Benzene	1	10.7	10.3	8.24–12.4	Acceptable
Carbon tetrachloride	1	17.4	16.7	13.4–20.0	Acceptable
1,4-Dichlorobenzene	1	15.0	14.6	11.7–17.5	Acceptable
1,2-Dichloroethane	1	11.6	10.8	8.64–13.0	Acceptable
1,1-Dichloroethylene	1	7.20	6.64	3.98–9.30	Acceptable
1,1,1-Trichloroethane	1	13.0	13.6	10.9–16.3	Acceptable
Trichloroethylene	1	6.90	6.63	3.98–9.28	Acceptable
Vinyl chloride	1	10.2	8.70	5.22–12.2	Acceptable
sec-Butylbenzene	2	12.0	12.2	9.76–14.6	Acceptable
Chlorobenzene	2	17.5	18.3	14.6–22.0	Acceptable
2-Chlorotoluene	2	21.9	22.0	17.6–26.4	Acceptable
Dibromomethane	2	28.4	28.2	22.6–33.8	Acceptable
1,2-Dichlorobenzene	2	25.2	24.3	19.4–29.2	Acceptable
Dichloromethane	2	16.2	15.2	12.2–18.2	Acceptable
1,2-Dichloropropane	2	17.4	18.1	14.5–21.7	Acceptable
1,3-Dichloropropane	2	21.0	23.4	18.7–28.1	Acceptable
1,1,2-Trichloroethane	2	25.0	26.9	21.5–32.3	Acceptable
		Nitrate/nitrite/fluoride (mg/L)			
Nitrate as N	1	0.989	0.850	0.650–1.10	Acceptable
	2	11.7	9.00	7.63–10.6	Unacceptable
Nitrite as N	1	0.156	0.125	0.107–0.152	Unacceptable
	2	1.03	0.850	0.772–1.01	Unacceptable
Fluoride	1	3.55	3.41	3.07–3.75	Acceptable
	2	1.32	1.25	1.12–1.38	Acceptable
		Insecticides (μg/L)			
Endrin	1	3.164	2.86	1.82–3.55	Acceptable
	2	0.2845	0.254	0.150–0.323	Acceptable
Lindane	1	4.823	4.28	2.46–5.39	Acceptable
	2	0.3694	0.352	0.205–0.473	Acceptable
Methoxychlor	1	87.80	92.8	57.5–118	Acceptable
	2	2.323	2.18	1.45–2.88	Acceptable
Toxaphene	3	4.129	3.68	2.16–4.82	Acceptable
	4	12.20	10.8	6.88–13.9	Acceptable
		Polychlorinated biphenyls (μg/L)			
Decachlorobiphenyl	1	0.352	0.450	D.L.–1.28	Acceptable
	2	0.111	0.397	D.L.–1.16	Acceptable

Table 10.27 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True		
		Miscellaneous analytes			
Turbidity (NTUs)	1	5.50	5.95	4.89–6.46	Acceptable
	2	1.42	1.36	1.03–1.66	Acceptable
Total filterable residue (mg/L)	1	328	254	188–376	Acceptable
Calcium (as $CaCO_3$) (mg/L)	1	122	125	112–135	Acceptable
pH (standard units)	1	9.02	9.12	8.85–9.33	Acceptable
Alkalinity (as $CaCO_3$) (mg/L)	1	35.9	39.2	37.9–45.1	Unacceptable
Corrosivity (Langelier ind. at 20°C	1	+0.69	1.00	0.634–1.09	Acceptable
Sodium (mg/L)	1	18.4	18.0	16.4–20.3	Acceptable
Sulfate (mg/L)	1	24.2	24.0	21.0–26.8	Acceptable
	2	8.05	7.50	5.17–9.71	Acceptable
Total cyanide (mg/L)	1	0.0939	0.100	0.0654–0.123	Acceptable
	2	0.380	0.370	0.217–0.495	Acceptable
Residual free chlorine (mg/L)	1	0.865	0.908	0.620–0.999	Acceptable
	2	0.268	0.301	0.141–0.472	Acceptable

Table 10.28. Water supply performance evaluation study WP-024-ORNL, 1990

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
			Trace metals, mg/L			
Al	1	1,210	1,200	949–1,440	1,010–1,380	Acceptable
	2	750	750	587–910	628–869	Acceptable
As	1	28.8	30.0	20.6–37.6	22.7–35.5	Acceptable
	2	186	180	139–215	149–205	Acceptable
Be	1	73.1	75.6	63.4–87.3	66.4–84.3	Acceptable
	2	174	180	153–206	159–199	Acceptable
Cd	1	302	300	244–343	257–331	Acceptable
	2	101	110	92.9–124	96.7–120	Acceptable
Co	1	763	750	651–851	677–825	Acceptable
	2	285	300	259–342	270–332	Acceptable
Cr	1	46.6	50.0	37.2–61.0	40.2–58.0	Acceptable
	2	697	700	562–819	595–787	Acceptable
Cu	1	88.4	85.0	72.9–94.5	75.6–91.8	Acceptable
	2	516	500	444–547	457–534	Acceptable
Fe	1	671	650	559–737	581–715	Acceptable
	2	1,680	1,650	1,420–1,860	1,480–1,810	Acceptable
Hg	1	6.83	7.00	5.19–8.74	5.64–8.30	Acceptable
	2	1.24	1.25	0.729–1.88	0.873–1.74	Acceptable
Mn	1	205	200	178–217	183–212	Acceptable
	2	659	650	585–707	601–692	Acceptable
Ni	1	217	200	172–227	179–220	Acceptable
	2	814	800	695–899	721–874	Acceptable
Pb	1	95.0	100	76.0–121	81.5–115	Acceptable
	2	271	275	234–309	243–299	Acceptable
Se	1	67.7	70.0	47.8–81.1	52.0–77.0	Acceptable
	2	15.1	16.0	9.71–19.7	11.0–18.5	Acceptable
V	1	1,170	1,150	995–1,300	1,040–1,260	Acceptable
	2	1,890	1,900	1,650–2,150	1,710–2,080	Acceptable
Zn	1	930	900	783–1,000	810–976	Acceptable
	2	566	550	477–614	494–597	Acceptable

Table 10.28 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
		Trace metals, mg/L				
Sb	3	18.0	19.6	10.5–27.2	12.6–25.1	Acceptable
	4	69.5	70.4	45.4–87.7	50.7–82.3	Acceptable
Ag	3	4.13	4.43	3.27–5.58	3.57–5.28	Acceptable
	4	1.60	1.68	1.14–2.24	1.28–2.11	Acceptable
Tl	3	4.73	4.75	2.65–6.58	3.15–6.08	Acceptable
	4	81.5	84.6	63.1–107	69.1–101	Acceptable
Sr	4	59.5	57.0	46.9–66.0	49.4–63.5	Acceptable
		Minerals, mg/L (except as noted)				
pH, standard units	3	5.97	600	5.86–6.12	5.89–6.09	Acceptable
	4	8.44	8.50	8.19–8.84	8.27–8.76	Acceptable
Specific conductivity (μmhos/cm at 25°C)	1	744	728	645–789	663–771	Acceptable
	2	734	715	629–788	649–768	Acceptable
TDS at 180°C	1	539	441	216–628	267–577	Acceptable
	2	397	395	287–515	316–486	Acceptable
Total hardness (as $CaCO_3$)	1	261	267	242–283	247–278	Acceptable
	2	54.6	56.1	47.8–61.4	49.5–59.7	Acceptable
Ca	1	37.2	41.0	34.0–42.2	35.0–41.2	Acceptable
	2	12.3	12.9	10.8–14.0	11.2–13.6	Acceptable
Mg	1	41.3	40.0	34.0–45.8	35.5–44.3	Acceptable
	2	6.08	5.80	4.91–6.66	5.13–6.44	Acceptable
Na	1	7.41	6.72	5.73–7.94	6.01–7.66	Acceptable
	2	126	123	109–135	112–132	Acceptable
K	1	23.3	24.0	20.0–27.2	20.9–26.3	Acceptable
	2	6.77	7.00	5.73–8.46	6.07–8.12	Acceptable
Total alkalinity (as $CaCO_3$)	1	9.25	9.10	6.68–13.9	7.58–13.0	Acceptable
	2	87.5	87.5	81.6–93.7	83.1–92.2	Acceptable
Chloride	1	198	194	177–205	180–201	Acceptable
	2	100	95.0	86.4–101	88.2–99.2	Warning

Table 10.28 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
		Minerals, mg/L (except as noted)				
Fluoride	1	0.520	0.58	0.472–0.682	0.499–0.656	Acceptable
	2	2.17	2.30	2.03–2.52	2.09–2.46	Acceptable
Sulfate	1	25.9	25.0	19.0–29.3	20.2–28.0	Acceptable
	2	102	100	83.4–113	87.2–110	Acceptable
		Nutrients, mg/L				
Ammonia as N	1	3.72	3.60	2.80–4.34	2.99–4.16	Acceptable
	2	11.1	11.0	8.76–13.0	9.27–12.5	Acceptable
Nitrate as N	1	2.26	2.20	1.73–2.67	1.85–2.56	Acceptable
	2	6.36	6.50	5.34–7.67	5.62–7.39	Acceptable
Orthophosphate	1	4.82	4.50	3.91–5.10	4.05–4.96	Acceptable
	2	1.01	0.95	0.779–1.12	0.820–1.08	Acceptable

[a]Based upon theoretical calculations, or a reference value when necessary.

Table 10.29. Water supply performance evaluation study WP-025—ORNL, 1990

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
			Trace metals, mg/L			
Al	1	1,410	1,428	1,150–1,680	1,220–1,620	Acceptable
	2	49.7	45.7	20.6–85.7	28.8–77.4	Acceptable
As	1	342	312	252–373	267–358	Acceptable
	2	54.7	51.9	39.4–61.9	42.3–59.1	Acceptable
Be	1	844	806	660–917	693–884	Acceptable
	2	21.3	20.9	16.2–25.5	17.4–24.4	Acceptable
Cd	1	5.00	6.35	4.20–8.85	4.78–8.27	Acceptable
	2	72.6	72.0	60.4–82.5	63.2–79.7	Acceptable
Co	1	440	452	382–509	398–493	Acceptable
	2	27.3	27.2	22.6–32.2	23.8–30.9	Acceptable
Cr	1	11.6	11.0	5.67–16.3	7.00–14.9	Acceptable
	2	104	106	82.0–124	87.3–119	Acceptable
Cu	1	729	720	638–789	657–770	Acceptable
	2	24.4	25.2	19.9–31.0	21.3–29.6	Acceptable
Fe	1	35.8	32.5	22.5–48.9	25.8–45.6	Acceptable
	2	1,250	1,230	1,070–1,390	1,110–1,350	Acceptable
Hg	1	5.72	6.01	4.27–6.54	4.55–6.25	Acceptable
	2	47.0	44.0	33.2–53.4	35.7–50.9	Acceptable
Mn	1	560	551	468–628	488–608	Acceptable
	2	17.4	19.3	15.4–23.6	16.4–22.6	Acceptable
Ni	1	947	940	820–1,050	849–1,020	Acceptable
	2	41.0	41.8	33.8–49.5	35.8–47.5	Acceptable
Pb	1	26.3	32.2	24.7–40.7	26.7–38.7	Warning
	2	1,340	1,344	1,140–1,550	1,190–1,500	Acceptable
Se	1	27.1	30.0	20.1–36.8	22.2–34.7	Acceptable
	2	140	130	90.7–155	98.9–147	Acceptable
V	1	58.7	58.1	46.6–69.8	49.7–66.7	Acceptable
	2	258	255	218–291	228–281	Acceptable
Zn	1	27.6	25.4	17.6–36.9	20.1–34.5	Acceptable
	2	809	768	671–853	694–831	Acceptable

Table 10.29 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
			Trace metals, mg/L			
Sb	3	24.5	24.0	14.4–31.6	16.6–29.4	Acceptable
	4	164	157	110–201	122–189	Acceptable
Ag	3	0.888	1.20	0.748–1.61	0.856–1.50	Acceptable
	4	10.2	12.4	9.58–15.2	10.3–14.5	Warning
Tl	3	11.8	11.0	6.79–15.9	7.96–14.7	Acceptable
	4	60.5	67.9	51.1–85.1	55.7–80.5	Acceptable
Mo	3	6.04	9.58	4.74–14.3	6.09–12.9	Warning
	4	55.6	56.0	33.8–74.7	39.6–68.9	Acceptable
Sr	3	18.1	16.8	13.5–21.2	14.5–20.2	Acceptable
	4	48.3	46.7	36.1–57.6	39.0–54.7	Acceptable
Ti	3	270	260	216–297	227–286	Acceptable
	4	51.9	50.9	38.5–62.1	41.7–58.9	Acceptable
			Minerals, mg/L (except as noted)			
pH, standard units	3	8.20	4.60	4.52–4.68	4.54–4.66	Unacceptable
	4	4.59	8.33	7.96–8.50	8.03–8.44	Unacceptable
Specific conductivity (μmhos/cm at 25°C)	1	69.8	67.8	57.5–76.4	59.8–74.0	Acceptable
	2	789	770	676–838	696–818	Acceptable
Total hardness (as $CaCO_3$)	1	11.5	12.0	8.28–15.6	9.19–14.6	Acceptable
	2	202	200	183–216	187–212	Acceptable
Ca	1	2.48	3.00	2.49–3.58	2.63–3.44	Unacceptable
	2	50.8	55.4	48.1–62.1	49.8–60.3	Acceptable
Mg	1	1.10	1.10	0.929–1.31	0.978–1.26	Acceptable
	2	14.9	15.0	12.9–17.1	13.4–16.6	Acceptable
Na	1	5.43	5.45	4.47–6.60	4.74–6.33	Acceptable
	2	50.1	50.7	44.7–56.0	46.1–54.5	Acceptable
K	1	2.80	3.00	2.41–3.44	2.54–3.31	Acceptable
	2	25.2	26.0	21.6–30.9	22.8–29.8	Acceptable
Total alkalinity (as $CaCO_3$)	1	5.50	6.69	2.62–9.74	3.51–8.85	Acceptable
	2	43.8	47.3	39.5–50.4	40.8–49.1	Acceptable
Chloride	1	9.90	8.66	7.19-11.7	7.75-11.1	Acceptable
	2	150	142	131–154	134–151	Acceptable

Table 10.29 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
			Minerals, mg/L (except as noted)			
Fluoride	2	1.01	0.910	0.772–1.03	0.804–0.997	Warning
Sulfate	1	8.13	8.00	5.00–10.5	5.70–9.84	Acceptable
	2	91.8	90.0	74.7–102	78.1–98.6	Acceptable
			Nutrients (mg/L)			
Ammonia as N	1	8.30	8.76	6.97–10.4	7.38–10.0	Acceptable
	2	1.61	1.60	1.20–1.99	1.29–1.90	Acceptable
Nitrate as N	1	3.34	3.20	2.52–3.85	2.68–3.69	Acceptable
	2	0.70	0.650	0.473–0.828	0.515–0.786	Acceptable
Orthophosphate	1	0.21	0.190	0.145–0.235	0.155–0.224	Acceptable
	2	5.62	5.30	4.48–6.10	4.67–5.90	Acceptable
Kjeldahl N	3	10.7	7.00	5.01–8.72	5.45–8.28	Unacceptable
	4	28.2	26.9	19.5–32.1	21.0–30.6	Acceptable
			Demands (mg/L)			
TOC	1	51.0	48.0	40.8–55.4	42.7–53.5	Acceptable
	2	9.13	7.20	5.72–8.96	6.14–8.54	Unacceptable
5-Day BOD	1	72	76.6	45.1–108	52.9–100	Acceptable
	2	9.2	12.6	6.15–18.9	7.74–17.4	Acceptable
			Miscellaneous parameters (mg/L)			
Total cyanide	1	0.597	0.540	0.392–0.681	0.428–0.645	Acceptable
	2	0.109	0.110	0.0613–0.146	0.0720–0.135	Acceptable
Nonfilterable residue	1	15.1	16.6	11.9–21.2	13.1–20.0	Acceptable
	2	42.8	42.4	34.9–50.0	36.7–48.1	Acceptable
Oil and grease	1	35.4	38.0	23.9–45.1	26.6–42.5	Acceptable
	2	19.7	20.0	10.6–25.4	12.4–23.6	Acceptable
Total phenolics	1	3.32	3.14	1.63–4.66	2.01–4.27	Acceptable
	2	0.409	0.372	0.149–0.596	0.205–0.539	Acceptable
Total residual chlorine	1	0.37	0.175	DL[b]–0.351	0.0378–0.304	Unacceptable
	2	1.72	1.65	1.07–1.99	1.19–1.87	Acceptable

[a]Based upon theoretical calculations, or a reference value when necessary.
[b]Detection limit.

Table 10.30. Water supply performance evaluation study WS–025—ORNL, 1990

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Trace metals (g/L)			
Sb	3	26.4	21.0	14.8–29.6	Acceptable
	4	8.18	6.00	3.16–9.09	Acceptable
As	1	52.7[b]	51.0	41.1–56.5	Acceptable
	2	8.11	8.50	6.16–10.1	Acceptable
Ba	1	116	115	96.9–128	Acceptable
	2	379	369	318–402	Acceptable
Be	3	1.84	2.00	1.81-2.23	Acceptable
	4	0.248	0.400	0.252–0.529	Unacceptable
Cd	1	2.80	2.30	1.79–2.92	Acceptable
	2	31.1	27.6	21.8–33.0	Acceptable
Cr	1	13.8	15.0	12.0–18.1	Acceptable
	2	60.2	60.0	52.2–68.7	Acceptable
Cu	1	61.5	59.4	51.2–67.2	Acceptable
	2	1030	990	895–1060	Acceptable
Pb	1	6.55	6.26	4.47–8.51	Acceptable
	2	18.5	20.0	16.2–23.0	Acceptable
Hg	1	0.572	0.720	0.287–1.06	Acceptable
	2	4.34	4.32	3.12–5.50	Acceptable
Ni	3	6.42	7.00	5.33–8.19	Acceptable
	4	2.45	3.00	1.20–4.68	Acceptable
Se	1	14.4[b]	14.4	10.4–16.7	Acceptable
	2	70.1	72.0	56.6–86.1	Acceptable
Ag	1	4.51	4.30	3.37–5.57	Acceptable
	2	44.8	43.0	35.8–51.0	Acceptable
Tl	3	35.1	36.0	29.0–42.7	Acceptable
	4	3.03	3.00	1.75–4.25	Acceptable

Table 10.30 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Nitrate/nitrite/fluoride (mg/L)			
Nitrate as N	1	0.689	0.700	0.507–0.951	Acceptable
	2	5.65	5.50	4.58–6.57	Acceptable
Nitrite as N	1	0.217	0.200	0.168–0.232	Acceptable
	2	0.715	0.700	0.609–0.796	Acceptable
Fluoride	1	2.66	2.50	2.25–2.75	Acceptable
	2	1.57	1.50	1.35–1.65	Acceptable
		Insecticides (mg/L)			
Chlordane	5	2.23[b]	3.30	1.58–4.22	Acceptable
	6	10.1[b]	12.6	5.84–16.0	Acceptable
Endrin	1	0.357	0.390	0.262–0.498	Acceptable
	2	5.96	5.27	3.70–6.65	Acceptable
Heptachlor	7	0.853[b]	1.42	0.690–1.80	Acceptable
	8	0.058	0.113	.0444–0.157	Acceptable
Heptachlor epoxide	7	0.577	0.771	0.500–0.963	Acceptable
	8	0.075	0.094	0.0565–0.128	Acceptable
Hexachlorocyclopentadiene	7	0.375[b]	1.87	DL–2.89	Acceptable
	8	0.596	0.267	DL–0.495	Unacceptable
Lindane	1	0.107	0.158	0.0833–0.220	Acceptable
	2	2.94	2.85	1.74–3.84	Acceptable
Methoxychlor	1	3.54[b]	3.17	2.02–3.60	Acceptable
	2	24.0[b]	48.8	30.0–54.4	Unacceptable
Toxaphene	3	4.29	4.22	2.41–5.66	Acceptable
	4	1.13	1.41	0.558–2.06	Acceptable

Table 10.30 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Trihalomethanes (mg/L)			
Bromodichloromethane	1	65.6	71.4	57.1–85.7	Acceptable
	2	6.70	8.40	6.72–10.1	Unacceptable
Bromoform	1	47.3	48.1	38.5–57.7	Acceptable
	2	5.62	9.12	7.30-10.9	Unacceptable
Chlorodibromomethane	1	44.1	47.8	38.2–57.4	Acceptable
	2	11.3	15.6	12.5–18.7	Unacceptable
Chloroform	1	74.8	77.8	62.2–93.4	Acceptable
	2	23.2	24.4	19.5–29.3	Acceptable
Total trihalomethane	1	231.8	245.1	196–294	Acceptable
	2	46.82	57.5	46.0–69.0	Acceptable
		Miscellaneous analytes (mg/L, except as noted)			
Residual free chlorine	1	0.56	0.505	0.292–0.727	Acceptable
	2	1.49	1.40	1.11–1.66	Acceptable
Turbidity (NTUs)	1	0.52	0.450	0.265–0.660	Acceptable
	2	0.64	0.600	0.415–0.755	Acceptable
Total filterable residue	1	238[b]	232	166–359	Acceptable
Calcium (as $CaCO_3$)	1	140	135	123–144	Acceptable
pH (standard units)	1	9.15[b]	9.18	8.88–9.28	Acceptable
Alkalinity (as $CaCo_3$)	1	28.5[b]	28.3	26.6–34.3	Acceptable
Corrosivity (Langelier Ind. at 20ÊC)	1	0.820[b]	0.827	0.502–1.01	Acceptable
Sodium	1	13.0	13.0	12.0–14.2	Acceptable
Sulfate	1	9.68	9.70	6.92–12.2	Acceptable
	2	34.1	34.0	28.5–38.1	Acceptable
Total cyanide	1	0.451	0.500	0.348–0.608	Acceptable
	2	0.106	0.220	0.150–0.269	Unacceptable

[a]Based upon theoretical calculations, or a reference value when necessary.
[b]Significant general method bias is anticipated for this result.
[c]Detection limit.

Table 10.31. Water supply performance evaluation study WS–026—ORNL, 1990

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Trace metals (g/L)			
Sb	3	13.9	14.0	10.0–19.2	Acceptable
	4	114	120	96.5–150	Acceptable
As	1	125	150	126–168	Unacceptable
	2	46.5	54.3	43.5–62.2	Acceptable
Ba	1	719	743	669–800	Acceptable
	2	619	633	558–683	Acceptable
Be	3	23.6[b]	23.1	18.7–25.5	Acceptable
	4	0.470	0.530	0.384–0.703	Acceptable
Cd	1	9.12	9.20	7.80–10.8	Acceptable
	2	55.9	53.9	44.9–60.2	Acceptable
Cr	1	96.0	94.6	82.7–107	Acceptable
	2	50.3	50.2	43.5–57.0	Acceptable
Cu	1	93.0	93.1	84.1–104	Acceptable
	2	492	483	445–523	Acceptable
Pb	1	2.84	2.95	1.78–4.66	Acceptable
	2	48.2	49.2	42.3–56.4	Acceptable
Hg	1	4.50	4.56	3.45–5.50	Acceptable
	2	2.39	2.47	1.76–3.01	Acceptable
Ni	3	155	151	128–167	Acceptable
	4	300	331	292–366	Acceptable
Se	1	10.1	9.99	7.46–11.6	Acceptable
	2	43.7[b]	41.1	31.5–46.5	Acceptable
Ag	1	95.6	97.0	83.9–110	Acceptable
	2	21.4	22.4	19.0–26.9	Acceptable
Tl	3	81.8	80.0	59.5–94.6	Acceptable
	4	3.85	4.00	2.39–5.31	Acceptable

Table 10.31 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Nitrate/nitrite/fluoride (mg/L)			
Nitrate as N	1	0.827	0.850	0.650–1.10	Acceptable
	2	9.40	9.00	7.63–10.6	Acceptable
Nitrite as N	1	0.150	0.125	0.107–0.152	Acceptable
	2	1.00[b]	0.850	0.772–1.01	Acceptable
Fluoride	1	3.47	3.41	3.07–3.75	Acceptable
	2	1.24	1.25	1.12–1.38	Acceptable
		Insecticides (mg/L)			
Chlordane	5	6.19[b]	9.60	4.89–11.9	Acceptable
	6	2.04	2.70	1.69–3.61	Acceptable
Endrin	1	2.16	2.86	1.82–3.55	Acceptable
	2	0.271	0.254	0.150–0.323	Acceptable
Heptachlor	7	0.227	0.325	0.145–0.467	Acceptable
	8	1.51	2.27	1.26–2.91	Acceptable
Heptachlor epoxide	7	0.203	0.198	0.133–0.262	Acceptable
	8	1.58	1.81	1.25–2.23	Acceptable
Hexachlorocyclopentadiene	7	0.147	0.367	DL[c]–0.648	Acceptable
	8	1.07	2.47	0.154–4.03	Acceptable
Lindane	1	2.76	4.28	2.46–5.39	Acceptable
	2	0.380	0.352	0.205–0.473	Acceptable
Methoxychlor	1	65.0	92.8	57.5–118	Acceptable
	2	3.01	2.18	1.45–2.88	Unacceptable
Toxaphene	3	388	3.68	2.16–4.82	Unacceptable
	4	913	10.8	6.88–13.9	Unacceptable

Table 10.31 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Adipate/phthalates (mg/L)			
Bis (2-Ethylhexyl) Adipate	1	2.80	4.57	DL[c]–9.31	Acceptable
	2	14.6	21.3	DL[c]–37.7	Acceptable
Bis (2-Ethylhexyl) Phthalate	1	10.1	7.73	DL[c]–20.6	Acceptable
	2	58.9	34.2	DL[c]–75.2	Acceptable
Diethyl phthalate	1	6.62	3.48	DL[c]–5.61	Unacceptable
	2	57.2[b]	27.8	2.30–42.0	Unacceptable
		Trihalomethanes (mg/L)			
Bromodichloromethane	1	23.6	25.8	20.6–31.0	Acceptable
	2	54.4	60.5	48.4–72.6	Acceptable
Bromoform	1	15.7	15.4	12.3–18.5	Acceptable
	2	79.4	77.4	61.9–92.9	Acceptable
Chlorodibromomethane	1	21.8	22.1	17.7–26.5	Acceptable
	2	71.1	72.9	58.3–87.5	Acceptable
Chloroform	1	7.81	7.53	6.02–9.04	Acceptable
	2	55.7	59.1	47.3–70.9	Acceptable
Total trihalomethane	1	68.91	70.8	56.6–85.0	Acceptable
	2	260.6	270	216–324	Acceptable
		Volatile organic compounds (mg/L)			
Benzene	1	12.8	10.3	8.24–12.4	Unacceptable
Carbon tetrachloride	1	15.8	16.7	13.4–20.0	Acceptable
1,4-Dichlorobenzene	1	15.9	14.6	11.7–17.5	Acceptable
1,2-Dichloroethane	1	10.4	10.8	8.64–13.0	Acceptable
1,1-Dichloroethylene	1	6.93	6.64	3.98–9.30	Acceptable
1,1,1-Trichloroethane	1	12.7	13.6	10.9–16.3	Acceptable
Trichloroethylene	1	6.33	6.63	3.98–9.28	Acceptable
Vinyl chloride	1	11.0	8.70	5.22–12.2	Acceptable

Table 10.31 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Miscellaneous analytes (except as noted)			
Residual free chlorine	1	0.930[b]	0.908	0.620–0.999	Acceptable
	2	0.310	0.301	0.141–0.472	Acceptable
Turbidity (NTUs)	1	5.20[b]	5.95	4.89–6.46	Acceptable
	2	1.30	1.36	1.03–1.66	Acceptable
Total filterable residue	1	382[b]	254	188–376	Unacceptable
Calcium (as $CaCO_3$)	1	123	125	112–135	Acceptable
pH (standard units)	1	9.16	9.12	8.85–9.33	Acceptable
Alkalinity (as $CaCo_3$)	1	38.9[b]	39.2	37.0–45.1	Acceptable
Corrosivity (Langelier Ind. at 20°C)	1	0.880[b]	1.00	0.634–1.09	Acceptable
Sodium	1	9.35	18.0	16.4–20.3	Unacceptable
Sulfate	1	23.5	24.0	21.0–26.8	Acceptable
	2	7.31	7.50	5.17–9.71	Acceptable
Total cyanide	1	0.093	0.100	0.0654–0.123	Acceptable
	2	0.316	0.370	0.217–0.495	Acceptable

[a]Based upon theoretical calculations, or a reference value when necessary.
[b]Significant general method bias is anticipated for this result.
[c]Detection limit.

Table 10.32. Water supply performance evaluation study number WP-024—K-25 Site, 1990

Parameter	Number of samples	Values		Limits		Performance evaluation
		Reported[a]	True	Acceptable	Warning	
			Minerals (mg/L)			
pH	3	5.98	6.00	5.86–6.12	5.89–6.09	Acceptable
	4	8.45	8.50	8.19–8.84	8.27–8.76	Acceptable
Special conditions,	1	729	728	645–789	663–771	Acceptable
μmhos/cm at 25°C	2	718	715	629–788	649–768	Acceptable
TDS at 180°C	1	486.0	441	216–628	267–577	Acceptable
	2	387.0	395	287–515	316–486	Acceptable
Total hardness,	1	264.0	267	242–283	247–278	Acceptable
as $CaCO_3$	2	56.0	56.1	47.8–61.4	49.5–59.7	Acceptable
Total alkalinity,	1	9.0	9.10	6.68–13.9	7.58–13.0	Acceptable
as $CaCO_3$	2	85.0	87.5	81.6–93.7	83.1–92.2	Acceptable
Chloride	1	196.0	194	177–205	180–201	Acceptable
	2	97.9	95.0	86.4–101	88.2–99.2	Acceptable
Fluoride	1	0.576	0.58	0.472–0.682	0.499–0.656	Acceptable
	2	2.334	2.30	2.03–2.52	2.09–2.46	Acceptable
Sulfate	1	26.0	25.0	19.0–29.3	20.2–28.0	Acceptable
	2	101.0	100	83.4–113	87.2–110	Acceptable
			Nutrients (mg/L)			
Ammonia-N	1	3.64	3.60	2.80–4.34	2.99–4.16	Acceptable
	2	11.7	11.0	8.76–13.0	9.27–12.5	Acceptable
Nitrate-N	1	2.18	2.20	1.73–2.67	1.85–2.56	Acceptable
	2	6.49	6.50	5.34–7.67	5.62–7.39	Acceptable
Orthophosphate	1	4.26	4.50	3.91–5.10	4.05–4.96	Acceptable
	2	0.88	0.95	0.779–1.12	0.820–1.08	Acceptable
Kjeldahl-N	3	20.0	21.0	16.1–25.1	17.1–24.0	Acceptable
	4	1.40	1.00	0.396–1.72	0.555–1.56	Acceptable
Total phosphorus	3	8.48	9.00	6.91–10.5	7.34–10.1	Acceptable
	4	3.86	4.00	3.12–4.66	3.31–4.48	Acceptable
			Demands (mg/L)			
COD	1	73.0	76.2	58.3–93.6	62.7–89.2	Acceptable
	2	50.0	50.0	35.8–62.4	39.1–59.1	Acceptable
TOC	1	27.6	30.7	25.7–36.2	27.1–34.8	Acceptable
	2	18.6	20.2	16.9–24.2	17.8–23.2	Acceptable
5-d BOD	1	45.0	50.9	29.1–72.8	34.5–67.4	Acceptable
	2	33.0	33.2	18.9–47.4	22.5–43.9	Acceptable
			Miscellaneous parameters (mg/L)			
Total cyanide	1	0.058	0.055	0.0191–0.0791	0.0267–0.0715	Acceptable
	2	0.731	0.700	0.469–0.878	0.521–0.827	Acceptable
Nonfilterable residue	1	71.0	73.0	61.3–78.0	63.3–75.9	Acceptable
	2	60.0	60.0	48.5–62.0	50.2–60.3	Acceptable
Oil and grease	1	16.1	18.0	10.6–23.2	12.2–21.7	Acceptable
	2	8.6	10.0	3.51–15.2	4.97–13.8	Acceptable
Total phenolics	1	0.17	0.162	0.0776–0.261	0.101–0.237	Acceptable
	2	0.58	0.531	0.287–0.795	0.351–0.731	Acceptable
Total residual chlorine	1	3.10	1.50	0.896–1.82	1.02–1.70	Unacceptable[b]
	2	0.50	0.220	0.0828–0.333	0.116–0.300	Unacceptable[b]

[a]Based on theoretical calculations or a reference value when necessary.
[b]Errors due to dilution.

Table 10.33. Water supply performance evaluation study number WP-025—K-25 Site, 1990

Parameter	Number of samples	Values		Limits		Performance evaluation
		Reported[a]	True	Acceptable	Warning	
			Minerals (mg/L)			
pH	3	4.59	4.60	4.52–4.68	4.54–4.66	Acceptable
	4	8.45	8.33	7.96–8.50	8.03–8.44	Acceptable
Special conditions,	1	67	67.8	57.5–76.4	59.8–74.0	Acceptable
μmhos/cm at 25°C	2	770	770	676–838	696–818	Acceptable
TDS at 180°C	1	43	32.8	11.0–58.8	16.9–52.9	Acceptable
	2	457	412	294–542	325–511	Acceptable
Total hardness,	1	12	12.0	8.28–15.6	9.19–14.6	Acceptable
as $CaCO_3$	2	198	200	183–216	187–212	Acceptable
Total alkalinity,	1	7	6.69	2.62–9.74	3.51–8.85	Acceptable
as $CaCO_3$	2	43	47.3	39.5–50.4	40.8–49.1	Acceptable
Chloride	1	9.59	8.66	7.19–11.7	7.75–11.1	Acceptable
	2	146.8	142	131–154	134–151	Acceptable
Fluoride	1	0.168	0.180	0.110–0.256	0.128–0.238	Acceptable
	2	0.880	0.910	0.772–1.03	0.804–0.997	Acceptable
Sulfate	1	7.865	8.00	5.00–10.5	5.70–9.84	Acceptable
	2	90.13	90.0	74.7–102	78.1–98.6	Acceptable
			Nutrients (mg/L)			
Ammonia-N	1	8.30	8.76	6.97–10.4	7.38–10.0	Acceptable
	2	1.56	1.60	1.20–1.99	1.29–1.90	Acceptable
Nitrate-N	1	2.780	3.20	2.52–3.85	2.68–3.69	Acceptable
	2	0.593	0.650	0.473–0.828	0.515–0.786	Acceptable
Orthophosphate	1	0.17	0.190	0.145–0.235	0.155–0.224	Acceptable
	2	5.09	5.30	4.48–6.10	4.67–5.90	Acceptable
Kjeldahl-N	3	0.420	7.00	5.01–8.72	5.45–8.28	Unacceptable[b]
	4	26.9	26.9	19.5–32.1	21.0–30.6	Acceptable
Total phosphorus	3	7.84	8.20	6.32–9.62	6.72–9.23	Acceptable
	4	0.65	0.625	0.449–0.772	0.488–0.733	Acceptable
			Demands (mg/L)			
COD	1	113	121	96.0–138	101–133	Acceptable
	2	16	18.2	8.16–28.3	10.7–25.8	Acceptable
TOC	1	47.0	48.0	40.8–55.4	42.7–53.5	Acceptable
	2	7.38	7.20	5.72–8.96	6.14–8.54	Acceptable
5-d BOD	1	89	76.6	45.1–108	52.9–100	Acceptable
	2	12	12.6	6.15–18.9	7.74–17.4	Acceptable
			Miscellaneous parameters (mg/L)			
Total cyanide	1	0.264	0.540	0.392–0.681	0.428–0.645	Unacceptable[c]
	2	0.092	0.110	0.0613–0.146	0.0720–0.135	Acceptable
Nonfilterable residue	1	18	16.6	11.9–21.2	13.1–20.0	Acceptable
	2	44	42.4	34.9–50.0	36.7–48.1	Acceptable
Oil and grease	1	34.5	38.0	23.9–45.1	26.6–42.5	Acceptable
	2	17.7	20.0	10.6–25.4	12.4–23.6	Acceptable
Total phenolics	1	3.28	3.14	1.63–4.66	2.01–4.27	Acceptable
	2	0.390	0.372	0.149–0.596	0.205–0.539	Acceptable
Total residual chlorine	1	0.15	0.175	DL[d]–0.351	0.0378–0.304	Acceptable
	2	1.50	1.65	1.07–1.99	1.19–1.87	Acceptable

[a]Based on theoretical calculations or a reference value when necessary.
[b]Error is believed to be caused by sample mix-up.
[c]Calculation error.
[d]Detection limit.

Table 10.34. Water supply performance evaluation study number WP-026—K-25 Site, 1990

Parameter	Number of samples	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Trace metals (μg/L)			
Sb	3	15	14.0	10.0–19.2	Acceptable
	4	126	120	96.5–150	Acceptable
As	1	148	150	126–168	Acceptable
	2	55	54.3	43.5–62.2	Acceptable
Ba	1	720	743	669–800	Acceptable
	2	608	533	558–683	Acceptable
Be	3	21.7[b]	23.1	18.7–25.5	Acceptable
	4	0.840	0.530	0.384–0.703	Unacceptable[c]
Cd	1	11	9.20	7.80–10.8	Unacceptable[c]
	2	66	53.9	44.0–60.2	Unacceptable[c]
Cr	1	96.9	94.6	82.7–107	Acceptable
	2	56.7	50.2	43.5–57.0	Acceptable
Cu	1	93.1	93.1	84.1–104	Acceptable
	2	482	483	445–523	Acceptable
Pb	1	3.5	2.95	1.78–4.66	Acceptable
	2	56	49.2	42.3–56.4	Acceptable
Hg	1	2.11	4.56	3.45–5.50	Unacceptable[c]
	2	1.10	2.47	1.76–3.01	Unacceptable[c]
Ni	3	146	151	128–167	Acceptable
	4	334	331	292–366	Acceptable
Se	1	9.7	9.99	7.46–11.6	Acceptable
	2	38[b]	41.1	31.5–46.5	Acceptable
Ag	1	100	97.0	83.9–110	Acceptable
	2	21	22.4	19.0–26.9	Acceptable
Tl	3	81	80.0	59.5–94.6	Acceptable
	4	4.3	4.00	2.39–5.31	Acceptable
		Nitrate/nitrite/fluoride (mg/L)			
Nitrate, as N	1	0.462	0.850	0.650–1.10	Unacceptable[d]
	2	4.907	9.00	7.63–10.6	Unacceptable[d]
Nitrite, as N	1	0.116	0.125	0.107–0.152	Acceptable
	2	0.559[b]	0.850	0.772–1.01	Unacceptable[d]
Fluoride	1	1.66	3.41	3.07–3.75	Unacceptable[d]
	2	0.647	1.25	1.12–1.38	Unacceptable[d]
		Insecticides (μg/L)			
Chlordane	5	8.49[b]	9.60	4.89–11.9	Acceptable
	6	2.50	2.70	1.69–3.61	Acceptable
Endrin	1	2.84	2.86	1.82–3.55	Acceptable
	2	0.250	0.254	0.150–0.323	Acceptable
Heptachlor	7	0.230	0.325	0.145–0.467	Acceptable
	8	1.73	2.27	1.26–2.91	Acceptable
Heptachlor epoxide	7	0.193	0.198	0.133–0.262	Acceptable
	8	1.76	1.81	1.25–2.23	Acceptable
Lindane	1	4.08	4.28	2.46–5.39	Acceptable
	2	0.381	0.352	0.205–0.473	Acceptable
Methoxychlor	1	87.5	92.8	57.5–118	Acceptable
	2	2.08	2.18	1.45–2.88	Acceptable
Toxaphene	3	3.67	3.68	2.16–4.82	Acceptable
	4	10.4	10.8	6.88–13.9	Acceptable

Table 10.34 (continued)

Parameter	Number of samples	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Herbicides (μg/L)			
2,4-D	1	6.30	8.67	3.44–11.8	Acceptable
	2	59.0[b]	62.0	25.0–32.4	Acceptable
2,4,5-TP, Silvex	1	1.93[b]	2.50	1.06–3.21	Acceptable
	2	37.8[b]	44.4	19.5–58.6	Acceptable
		Trihalomethanes (μg/L)			
Bromodichloromethane	1	26.5	25.8	20.6–31.0	Acceptable
	2	59.5	60.5	48.4-72.6	Acceptable
Bromoform	1	16.5	15.4	12.3–18.5	Acceptable
	2	79.6	77.4	61.9–92.9	Acceptable
Chlorodibromomethane	1	23.6	22.1	17.7–26.5	Acceptable
	2	73.7	72.9	58.3–87.5	Acceptable
Chloroform	1	8.4	7.53	6.02–9.04	Acceptable
	2	61.1	59.1	47.3–70.9	Acceptable
Total trihalomethane	1	75.00	70.8	56.6–85.0	Acceptable
	2	273.9	270	216–324	Acceptable
		Volatile organic compounds in (μg/L)			
Benzene	1	10.3	10.3	8.24–12.4	Acceptable
Carbon tetrachloride	1	17.0	16.7	13.4–20.0	Acceptable
1,4-Dichlorobenzene	1	14.8	14.5	11.7–17.5	Acceptable
1,2-Dichloroethane	1	12.6	10.8	8.64–13.0	Acceptable
1,1-Dichloroethylene	1	7.2	6.64	3.98–9.30	Acceptable
1,1,1-Trichloroethane	1	13.1	13.6	10.9–16.3	Acceptable
Trichloroethylene	1	7.7	6.63	3.98–9.28	Acceptable
Vinyl chloride	1	11.8	8.70	5.22–12.2	Acceptable
SEC-Butylbenzene	2	12.6	12.2	0.76–14.6	Acceptable
Chlorobenzene	2	19.1	18.8	14.6–22.0	Acceptable
2-Chlorotoluene	2	22.3	22.0	17.6–26.4	Acceptable
Dibromomethane	2	30.9	28.2	22.6-33.8	Acceptable
1,2-Dichlorobenzene	2	24.4	24.3	19.4–29.2	Acceptable
Dichloromethane	2	16.9	15.2	12.2–18.2	Acceptable
1,2-Dichloropropane	2	23.7	18.1	14.5–21.7	Unacceptable
1.3-Dichloropropane	2	23.4	23.4	18.7–28.1	Acceptable
1,1,2-Trichloroethane	2	29.4	26.9	21.5–32.3	Acceptable
		Miscellaneous analytes			
Residual free chlorine (mg/L)	1	0.78[b]	0.908	0.620–0.999	Acceptable
	2	0.23	0.301	0.141–0.472	Acceptable
Turbidity (NTUs)	1	5.5[b]	5.95	4.89–6.46	Acceptable
	2	1.3	1.36	1.03–1.66	Acceptable
Sulfate (mg/L)	1	24.76	24.0	21.0–26.8	Acceptable
	2	7.397	7.50	5.17–9.71	Acceptable
Total cyanide (mg/L)	1	0.076	0.100	0.0654–0.123	Acceptable
	2	0.380	0.370	0.217–0.495	Acceptable

[a]Based on theoretical calculations, or a reference value when necessary.
[b]Significant general method bias is anticipated for this result.
[c]The problem with the metals was operational and due to poor technique.

Table 10.35. CLP performance evaluation results

Inorganics—ORNL, 1990

Scoring classification	Points deducted			
	1st quarter	2nd quarter	3rd quarter	4th quarter
Duplicate precision	0.0	0.0	0.0	1.0
Matrix spikes	1.0	1.5	0.5	1.5
Water sample				
Identification	0.0	0.0	0.0	30.3
Quantitation	3.7	6.6	9.5	17.4
False positives and unmet CRDLs[a]	0.0	0.0	0.0	6.7
Soil sample				
Identification	0.0	0.0	0.0	0.0
Quantitation	9.9	9.5	2.7	2.2
False positives and unmet CRDLs[a]	0.0	1.3	0.0	0.0
Total points deducted	14.6	18.9	12.7	59.1
Laboratory score[b]	85.4	81.1	87.3	40.9[c]

[a]Points deducted for false positive values and for not meeting the contract-required detection limits (CRDLs).

[b]The maximum number of possible points is 100.

[c]In the sample preparation step, a second aliquot of Water 1 was inadvertently prepared and analyzed as Water 2, which caused the overall score to be much lower than normal.

Table 10.36. CLP performance evaluation results

Organics—ORNL, 1990

Scoring classification	Points deducted			
	1st quarter	2nd quarter	3rd quarter	4th quarter
Number of TCL compounds not-identified	21.5	0.0	0.0	0.0
Number of TCL compounds misquantified	10.7	24.5	14.0	0.0
Number of TCL contaminants	0.0	0.0	0.0	0.0
Number of non-TCL compounds not-identified	0.0	0.0	2.2	0.0
Number of non-TCL contaminants	0.0	2.2	0.0	0.0
Total points deducted	32.2	24.7	16.2	0.0
Laboratory score[a]	67.8	75.3	83.8	100.0

[a]The maximum number of possible points is 100.

Table 10.37. CLP performance evaluation results—inorganics (K-25 Site, 1990)

Scoring classification	Points deducted	
	1st quarter	2nd quarter
Duplicate precision[a]	0	1
Matrix spikes[b]	1	2
Water sample		
Identification	0	0
Quantitation	1	1
False positives and unmet CRDLs[c]	0	0
Soil sample		
Identification	0	0
Quantitation	0	2
False positives and unmet CRDLs[c]	0	0
Total points deducted	5.7	16.1
Laboratory score[d]	94.8	83.9

[a]Maximum of 10 points deducted based on number of duplicate results that are outside of the control limits.

[b]Maximum of 10 points deducted based on number of matrix spike results that are outside of the control limits.

[c]Points deducted for false positive values and for not meeting the contract-required detection limits (CRDLs).

[d]The maximum number of possible points is 100.

Table 10.38. CLP performance evaluation results—organics (K-25 Site, FY 1990)

Scoring classification	Points deducted			
	1st quarter	2nd quarter	3rd quarter[b]	4th quarter
Number of TCL compounds not identified	0	0	0	0
Number of TCL compounds misquantified	2	0	1	3
Number of TCL contaminants	0	0	0	0
Number of non-TCL compounds not identified	0	1	1	1
Number of non-TCL contaminants	0	1	1	1
Total points deducted	10.7	4.4	7.9	15.9
Laboratory score[a]	89.3	95.6	92.1	84.1

[a]The maximum number of possible points is 100.

[b]EPA did not evaluate any data.

Table 10.39. Environmental audits and reviews at the Y-12 Plant during 1990

Date	Audit	Reviewer	Subject	Findings
February 6–7	TSCA inspection	EPA	TSCA—Y-12	*a*
February 28	QA audit	TDC	Ambient sulfur dioxide monitoring stations	0
February	CWA inspection	TDC	Groundwater Treatment Facility	1
March 27–April 19	Compliance evaluation inspection	TDC	Groundwater Monitoring Program	0
April 11–12	RCRA inspection	TDC	RCRA—Y-12 Plant	0
May 25	QA audit	TDC	Ambient sulfur dioxide monitoring stations	0
June 18–19	Compliance evaluation inspection	EPA-IV	NPDES	*a*
June 28–July 3	Air permitting inspection	TDC	CAA—Y-12 Plant	*a*
July 16–27	Appraisal	DOE–ORO	ESH and QA	62
November 26–30	Surveillance	DOE–ORO	ESH and QA	23
November 29	SWMA inspection	TDC	Sanitary Landfill II and Industrial Waste Landfill IV	2

[a]Report not available.

Table 10.40. Environmental audits and reviews at ORNL during 1990

Date	Audit/review	Reviewer	Subject	Findings/outcome
December 1989–February 1990	Review of ORNL Nonradioactive Air Asbestos Programs	DOE-ORO	Nonradioactive air pollution control, asbestos management, and environmental quality assurance monitoring	63 findings.
February 8	Inspection of PCB Management Program	Environmental Protection Agency (EPA), Region IV	PCB	No findings.
February 13–15	Resource Conservation and Recovery Act (RCRA) inspection	Tennessee Department of Conservation (TDC)	RCRA	No findings.
April 16–27	Functional and Multidisciplinary Appraisal of ORNL	DOE-ORO	ES&H and QA	161 findings.
June 9	Air Emission Source Inspection	TDC	Air permitted sources	No findings.
June 21	Compliance Evaluation Inspection	EPA-Region IV	NPDES Permit	5 minor deficiencies; received rating of 4 out of possible 5.
July 23–29	MMES Corporate Technical Audit of ORNL	MMES Corporate	ES&H	148 findings.
October 1–5	Environmental Compliance Review	Energy Systems	Environmental Management	27 findings.
October 22–November 30	Tiger Team Review	DOE-HQ	ES&H	42 findings.

Table 10.41. Environmental audits and reviews at the K-25 Site during 1990

Date	Audit/review	Reviewer	Subject	Findings
January 16–26	Environment, Safety, DOE-ORO Health, and QA Appraisal	ESH & QA	Several findings and	recommendations were made. An action plan has been prepared to address all items.
February	Groundwater Compliance	TDC	Review of groundwater program	No findings.
February	TSCA Compliance	EPA	Review of TSCA program	Several items concerning PCB storage were identified.
June	Clean Air Compliance	TDC	Review of air program	Need to document permit conditions.
June 18	Compliance Evaluation Inspection	EPA	Review of NPDES program	Minor deficiencies were noted in sampling methods. These have been corrected.
August 8–16	RCRA/TSCA/Waste Management	DOE-EPD	RCRA/TSCA/Waste management compliance	Most findings dealt with quality assurance.
August 27–29	RCRA Compliance	TDC	Compliance of RCRA program	Storage violations at K-1417 Storage Yard.
December 11–12	TSCA Readiness	DOE	Surveillance	Request for Service form was not completed correctly.

Table 10.42. Proficiency Analytical Testing Program at the Y-12 Environmental Laboratory, 1990

Analysis and sample date	Sample	Values		Performance limits	Evaluation
		Reference	Y-12		
Lead (mg)					
2/90	1	0.0443	0.0451	0.0386–0.0501	Acceptable
	2	0.0591	0.0590	0.0519–0.0665	Acceptable
	3	0.0201	0.0189	0.0169–0.0233	Acceptable
	4	0.0328	0.0324	0.0293–0.0364	Acceptable
5/90	1	0.0241	0.0242	0.0206–0.0276	Acceptable
	2	0.0419	0.0418	0.0370–0.0469	Acceptable
	3	0.0575	0.0566	0.0508–0.0642	Acceptable
	4	0.0361	0.0354	0.0319–0.0403	Acceptable
8/90	1	0.0642	0.0656	0.0543–0.0741	Acceptable
	2	0.0268	0.0273	0.0227–0.0310	Acceptable
	3	0.0843	0.0878	0.0731–0.0955	Acceptable
	4	0.0483	0.0491	0.0414–0.0552	Acceptable
11/90	1	0.0717	0.0712	0.0639–0.0795	Acceptable
	2	0.0265	0.0267	0.0225–0.0304	Acceptable
	3	0.0392	0.0392	0.0339–0.0445	Acceptable
	4	0.0598	0.0588	0.0519–0.0676	Acceptable
Cadmium (mg)					
2/90	1	0.0089	0.0091	0.0078–0.0100	Acceptable
	2	0.0118	0.0118	0.0106–0.0132	Acceptable
	3	0.0157	0.0160	0.0142–0.0174	Acceptable
	4	0.0099	0.0101	0.0091–0.0109	Acceptable
5/90	1	0.0150	0.0151	0.0135–0.0165	Acceptable
	2	0.0080	0.0081	0.0073–0.0089	Acceptable
	3	0.0119	0.0120	0.0107–0.0133	Acceptable
	4	0.0100	0.0099	0.0089–0.0113	Acceptable
8/90	1	0.0090	0.0091	0.0079–0.0101	Acceptable
	2	0.0117	0.0120	0.0102–0.0133	Acceptable
	3	0.0192	0.0199	0.0166–0.0217	Acceptable
	4	0.0119	0.0121	0.0104–0.0134	Acceptable
11/90	1	0.0072	0.0074	0.0062–0.0082	Acceptable
	2	0.0107	0.0109	0.0090–0.0123	Acceptable
	3	0.0111	0.0111	0.0094–0.0126	Acceptable
	4	0.0185	0.0188	0.0157–0.0213	Acceptable
Zinc (mg)					
2/90	1	0.1457	0.1480	0.1230–0.1685	Acceptable
	2	0.1043	0.1040	0.0897–0.1190	Acceptable
	3	0.0847	0.0849	0.0733–0.0962	Acceptable
	4	0.1704	0.1740	0.1478–0.1932	Acceptable
5/90	1	0.2153	0.2190	0.1917–0.2390	Acceptable
	2	0.1842	0.1890	0.1637–0.2049	Acceptable
	3	0.1275	0.1290	0.1119–0.1432	Acceptable
	4	0.1009	0.1010	0.0840–0.1179	Acceptable
8/90	1	0.1071	0.1073	0.0922–0.1220	Acceptable
	2	0.1297	0.1300	0.1134–0.1459	Acceptable
	3	0.2185	0.2240	0.1880–0.2491	Acceptable
	4	0.1751	0.1760	0.1512–0.1990	Acceptable
Chromium (mg)					
11/90	1	0.0894	0.0894	0.0743–0.1046	Acceptable
	2	0.0528	0.0534	0.0437–0.0618	Acceptable
	3	0.1015	0.1010	0.0828–0.1200	Acceptable
	4	0.1947	0.1940	0.1578–0.2315	Acceptable

Table 10.42 (continued)

Analysis and sample date	Sample	Values		Performance limits	Evaluation
		Reference	Y-12		
Asbestos (F/MM2)					
2/90	1	763.4	757.5	426.0–1198.5	Acceptable
	2	503.5	375.3	255.7–834.6	Acceptable
	3	158.5	124.2	73.5–275.8	Acceptable
	4	383.3	320.3	193.5–637.5	Acceptable
5/90	1	217.8	224.1	37.1–548.9	Acceptable
	2	147.1	115.1	15.6–412.9	Acceptable
	3	246.8	401.8	42.3–621.0	Acceptable
	4	459.6	403.7	169.3–892.2	Acceptable
8/90	1	369.3	276.3	194.7–599.5	Acceptable
	2	573.2	445.8	201.4–1135.2	Acceptable
	3	783.1	691.8	435.7–1231.5	Acceptable
	4	224.8	208.2	104.8–390.1	Acceptable
11/90	1	173.3	237.8	55.9–355.4	Acceptable
	2	361.6	411.8	111.9–753.8	Acceptable
	3	521.3	480	221.3–948	Acceptable
	4	554.4	599.3	253.9–970.8	Acceptable
Benzene (mg)					
8/90	1	0.1909	0.1855	0.1628–0.2189	Acceptable
	2	0.2445	0.2460	0.2165–0.2726	Acceptable
	3	0.2894	0.2854	0.2546–0.3242	Acceptable
	4	0.1477	0.1591	0.1257–0.1696	Acceptable
O-xylene (mg)					
8/90	1	1.0888	1.0574	0.9120–1.2657	Acceptable
	2	0.8029	0.7824	0.6725–0.9333	Acceptable
	3	1.2496	1.1791	1.0490–1.4501	Acceptable
	4	1.5362	1.5409	1.2765–1.7959	Acceptable
Toluene (mg)					
8/90	1	1.5987	1.5199	1.3999–1.7975	Acceptable
	2	0.9020	0.8636	0.7683–1.0357	Acceptable
	3	1.1526	1.1040	1.0167–1.2884	Acceptable
	4	1.3808	1.3767	1.2171–1.5446	Acceptable
1,1,1-Trichloroethane (mg) (methyl chloroform)					
5/90	1	0.7153	0.7160	0.6037–0.8270	Acceptable
	2	0.8474	0.7698	0.7412–0.9537	Acceptable
	3	0.4361	0.3758	0.3684–0.5039	Acceptable
	4	1.0451	0.9811	0.9039–1.1864	Acceptable
Tetrachloroethylene (mg)					
5/90	1	0.4979	0.4900	0.4209–0.5750	Acceptable
	2	0.7694	0.7151	0.6495–0.8894	Acceptable
	3	1.0992	1.0296	0.9228–1.2757	Acceptable
	4	0.3605	0.3180	0.2962–0.4249	Acceptable
Carbon tetrachloride (mg)					
2/90	1	0.5744	0.5947	0.4856–0.6632	Acceptable
	2	0.8073	0.8210	0.6943–0.9204	Acceptable
	3	1.0167	1.0510	0.8710–1.1624	Acceptable
	4	0.4581	0.4967	0.3926–0.5236	Acceptable
11/90	1	1.2119	1.3650	1.0775–1.3462	Outlier
	2	0.4495	0.5122	0.3899–0.5090	Outlier
	3	0.9283	1.0270	0.8026–1.0540	Acceptable
	4	0.6597	0.7336	0.5731–0.7461	Acceptable

Table 10.42 (continued)

Analysis and sample date	Sample	Values		Performance limits	Evaluation
		Reference	Y-12		
Trichloroethylene (mg)					
2/90	1	0.8394	0.8391	0.7156–0.9632	Acceptable
	2	0.9611	0.9480	0.8290–1.0932	Acceptable
	3	0.6908	0.7013	0.6026–0.7791	Acceptable
	4	0.7723	0.7640	0.6743–0.8703	Acceptable
5/90	1	0.8619	0.8820	0.6996–1.0244	Acceptable
	2	0.4305	0.3622	0.3706–0.4904	Outlier
	3	0.6061	0.5254	0.5040–0.7083	Acceptable
	4	0.6869	0.6328	0.5736–0.8004	Acceptable
11/90	1	0.8790	0.9767	0.7757–0.9821	Acceptable
	2	0.5839	0.6183	0.5086–0.6592	Acceptable
	3	0.9533	1.0300	0.8522–1.0544	Acceptable
	4	1.1533	1.2510	1.0130–1.2934	Acceptable
1,2-Dichloroethane (mg)					
2/90	1	0.8692	0.8908	0.7273–1.0111	Acceptable
	2	0.6752	0.6875	0.5721–0.7784	Acceptable
	3	0.4394	0.4723	0.3721–0.5068	Acceptable
	4	1.0773	1.0928	0.9256–1.2290	Acceptable
11/90	1	0.6528	0.7106	0.5748–0.7308	Acceptable
	2	0.9434	0.9635	0.8229–1.0639	Acceptable
	3	1.1060	1.1490	0.9805–1.2315	Acceptable
	4	0.7943	0.8190	0.6935–0.8950	Acceptable

INTERNAL DISTRIBUTION

1. F. D. Adams
2. A. D. Arms
3. L. D. Armstrong
4. D. L. Ashburn
5. L. D. Bates
6. B. A. Berven
7. R. E. Blake
8. H. L. Boston
9. A. K. Bracknell
10. K. L. Brady
11. W. D. Burch
12. G. E. Butterworth
13. T. R. Butz
14. J. B. Cannon
15. R. S. Carlsmith
16–18. W. W. Chance
19. R. B. Clapp
20. R. J. Cloutier
21. D. M. Counce
22. J. H. Cushman
23. G. D. Del Cul
24. R. J. Devol
25. T. O. Early
26–40. R. A. Evans
41. J. M. Forstrom
42. M. W. Francis
43. R. E. Frounfelker
44. C. W. Gehrs
45. C. G. Giltner
46–60. S. T. Goodpasture
61. G. A. Goslow
62–63. R. L. Grant
64. L. E. Hall
65. S. G. Hildebrand
66. C. C. Hill
67. F. O. Hoffman
68–69. T. G. Jett
70. W. A. Kelly
71. R. H. Ketelle
72. R. M. Keyser
73. C. W. Kimbrough
74. F. C. Kornegay
75. E. H. Krieg
76. J. M. Loar
77. L. W. Long
78. P. Y. Lu
79. A. P. Malinauskas
80. W. D. Malis
81. R. J. McElhaney
82. L. W. McMahon
83. W. McMaster
84. L. J. Mezga
85. M. E. Mitchell
86. G. K. Moore
87. R. W. Morrow
88. J. B. Murphy
89. J. M. Napier
90. T. J. Newsom
91. F. R. O'Donnell
92. W. F. Ohnesorge
93. P. D. Parr
94. G. P. Patterson
95. G. V. Pierce
96. S. Polston
97. H. Pulley
98. D. E. Reichle
99–104. J. G. Rogers
105. P. S. Rohwer
106. R. T. Roseberry
107. R. H. Ross
108. T. H. Row
109–159. G. W. Rymer
160. C. W. Sheward
161. J. E. Shoemaker
162. S. P. N. Singh
163. E. L. Smith, Jr.

164–165. G. W. Snyder
166. K. W. Sommerfeld
167. A. J. Stewart
168. L. E. Stokes
169. J. E. Stone
170. S. H. Stow
171–186. M. F. Tardiff
187. F. G. Taylor, Jr.
188. L. D. Taylor
189. T. Thomas
190. J. R. Trabalka
191. J. H. Turner
192. J. W. Turner
193. R. R. Turner
194. L. D. Voorhees
195. R. C. Ward
196. J. S. Wassom
197. D. A. Waters
198. C. W. Weber
199. S. H. Welch
200–250. D. C. West
251. M. C. Wiest
252. S. W. Wiley
253. J. K. Williams
254. W. R. Williams
255. A. R. Wilson
256. S. W. Wohlfort
257. Central Research Library
258. ESD Library
259–261. ORNL Laboratory Records
262. ORNL Laboratory Records - RC
263. ORNL Patent Section
264. ORNL Y-12 Technical Library
265. PGDP Library
266. PORTS Library
267. ORGDP Library

EXTERNAL DISTRIBUTION

268. Assistant Manager for Energy Research and Development, U.S. Department of Energy/Oak Ridge Operations, P.O. Box E, Oak Ridge, TN 37831.
269-295. Office of Scientific and Technical Information
296-600. This report is distributed widely by the Department of Energy's Oak Ridge Operations Office to local, state, and federal government agencies, the Congress, the public, and the news media.