Volume 2

Oak Ridge

RESERVATION

ENVIRONMENTAL REPORT FOR 1991

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OAK RIDGE RESERVATION ENVIRONMENTAL REPORT FOR 1991

VOLUME 2: DATA PRESENTATION

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CONTENTS

ACRONYMS AND ABBREVIATIONS

AA	atomic absorption
ACD	Analytical Chemistry Division
ACL	alternate concentration limit
ACN	acetonitrile
ADB	Ash Disposal Basin
ADI	acceptable daily intake
AEA	Atomic Energy Act
AEC	Atomic Energy Commission
AESG	Analytical Environmental Support Group
AGM	average geometric mean
ALARA	as low as reasonably achievable
Am	americium
AMAD	activity median aerodynamic diameter
ANAP	Abandoned Nitric Acid Pipeline
ARAR	applicable and appropriate requirements
As	arsenic
ASTM	American Society for Testing and Materials
ATDL	Atmospheric Turbulence and Diffusion Laboratory
ATLC	Atomic Trades and Labor Council
AVLIS	atomic vapor laser isotopic separation
BAT	best available technology
BC	Beaver Creek
BCBG	Bear Creek Burial Grounds
BCHR	Beaver Creek Hydrogeologic Regime
BCK	Bear Creek kilometer
BCV	Bear Creek Valley
BCVWDA	Bear Creek Valley Waste Disposal Area
BF	Brushy Fork
BMAP	Biological Monitoring and Abatement Programs
BMP	best management practices
BOD	biochemical oxygen demand
BRC	below regulatory concern
BTM	breakthrough monitors
CAA	Clean Air Act
CAPCA	Closure and Post Closure Activities
CARL	Comparative Animal Research Laboratory
CAS	Chemical Abstracts Service
CC	Copper Creek
CDI	calculated daily intake
CEI	Compliance Evaluation Inspection
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH	contact-handled
Ci	curie

CLP	Contract Laboratory Program
Cm	curium
CNF	Central Neutralization Facility
Co	cobalt
COD	chemical oxygen demand
CPCF	Central Pollution Control Facility
CRDL	contract-required detection limit
CRHR	Chestnut Ridge Hydrogeologic Regime
CRK	Clinch River kilometer
CRM	Clinch River mile
CRRI	Clinch River Remedial Investigation
CRSDP	Chestnut Ridge Sediment Disposal Basin
CRSP	Chestnut Ridge Security Pits
Cs	cesium
CWA	Clean Water Act
CX	categorical exclusion
CY	calendar year
CYRTF	coal yard runoff treatment facility
DAC	derived air concentration
DCF	dose conversion factor
DCG	derived concentration guide
diam	diameter
DMR	discharge monitoring report
DNA	deoxyribonucleic acid
DNAPL	dense nonaqueous phase liquid
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DWL	drinking water limits
EA	Environmental Assessment
EAP	Environmental Assessment Plan
ECRWP	East Chestnut Ridge Waste Pile
EDE	effective dose equivalent
EFK	East Fork Poplar Creek kilometer
EFPC	East Fork Poplar Creek
EIS	Environmental Impact Statement
EMD	Environmental Management Department
EML	Environmental Measurements Laboratory
EMSL-LV	Environmental Monitoring System Laboratory at Las Vegas
ENE	east–northeast
Energy Systems	Martin Marietta Energy Systems, Inc.
EP	extraction procedure
EPA	U.S. Environmental Protection Agency
ERD	Environmental Restoration Division
ERDS	Environmental Review and Documentation Section
ERP	Environmental Restoration Program
E&SA	Environmental and Safety Activities
ESD	Environmental Sciences Division
ESP	Environmental Surveillance and Protection
ET&I	Equipment Testing and Inspection Division
FAC	free available chlorine
FDA	Food and Drug Administration

FFA	Federal Facility Agreement
FFCA	Federal Facility Compliance Agreement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FS	feasibility study
FWPCA	Federal Water Pollution Control Act
FY	fiscal year
GQM	groundwater quality monitoring
GUT	garage underground tank
GW	groundwater
GWPP	Groundwater Protection Program
GWPS	Groundwater Protection Standard
GWQAP	groundwater quality assessment plans
GWQAR	groundwater quality assessment reports
H	hydrogen
HAP	hazardous air pollutants
HAZWDDD	Hazardous Waste Development, Demonstration, and Disposal
HAZWRAP	Hazardous Waste Remedial Actions Program
HCK	Hinds Creek kilometer
HEPA	high-efficiency particulate air
HFIR	High Flux Isotope Reactor
Hg	mercury
HRE	Homogenous Reactor Experiment
HSWA	Hazardous and Solid Waste Amendments
HWDU	hazardous waste disposal unit
I	iodine
IAG	interagency agreement
IBI	Index of Biotic Integrity
ICP	inductively coupled plasma
ICRP	International Commission on Radiological Protection
IRIS	Integrated Risk Information System
ISV	in situ vitrification
IWC	instream waste concentration
IWMF	Interim Waste Management Facility
K-25 Site	Oak Ridge K-25 Site
K	Kingston
KHQ	Kerr Hollow Quarry
Kr	krypton
LCR	lowest concentration reported
LDR	land disposal restricted
LLLW	liquid low-level waste
LLW	low-level waste
LLWDDD	low-level waste disposal development and demonstration
LLWDF	Low-Level Waste Disposal Facilities
LSF	Liquid Storage Facility
MAA	material access area
MACT	Maximum Achievable Control Technology
MB	Melton Branch

MCL	maximum contaminant level
MDA	minimum detectable activity
MDL	method detection limits
MHD	Melton Hill Dam
MSRE	Molten Salt Reactor Experiment
MT	meteorological tower
NAS	National Academy of Sciences
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
ND	not detected
NDB	Numeric Data Base
NE	northeast
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHP	New Hope Pond
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NNE	north–northeast
NOAA	National Oceanic and Atmospheric Administration
NOEC	no-observed-effect concentration
NOV	Notice of Violation
Np	neptunium
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	U.S. Nuclear Regulatory Commission
NRWTF	Nonradiological Wastewater Treatment Facility
NWT	Northwest Tributary
O&G	oil and grease
OLF	Oil Landfarm Area
OR	Oak Ridge Field Office
ORAU	Oak Ridge Associated Universities
ORGDP	Oak Ridge Gaseous Diffusion Plant
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
ORRER	Oak Ridge Reservation Environmental Report
ORS	Occurrence Reporting System
Pa	protactinium
PA	preliminary assessment
PAM	perimeter air monitoring
Pb	lead
PC	Pond Closure
PCB	polychlorinated biphenyl
PCK	Poplar Creek kilometer
PCP	pentachlorophenol
PET	Proficiency Environmental Testing
PGDP	Paducah Gaseous Diffusion Plant
PIDAS	Perimeter Intrusion Detection and Alarm System
PM10	particulate matter less than 10 microns in diameter
PRTF	Plating Rinsewater Treatment Facility
Pu	plutonium
pvc	polyvinyl chloride

PWA	Process Waste Assessment
PWTF	Process Waste Treatment Facility
PWTP	process waste treatment plant
QA	quality assurance
QC	quality control
Ra	radium
RAM	remote air monitoring
RAP	Remedial Action Program
RCRA	Resource Conservation and Recovery Act
RCW	recirculating cooling water
R&D	research and development
REDC	Radiochemical Engineering Development Center
RFA	RCRA Facility Assessment
RfD	reference dose
RFI	RCRA facility investigation
RH	remote-handled
RMA	Rocky Mountain Arsenal
RMP	radiological monitoring plan
RMPE	Reduction of Mercury in Plant Effluent
ROD	Record of Decision
RWMD	Reservation Waste Management Division
S-3	S-3 Site
S&A	sampling and analysis
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
Se	selenium
SE	standard error of the mean
SERAM	Stack Emission Reduction and Monitoring Project
SF	slope factor
SIE	specific ion electrode
SLF	sanitary landfill
SMCL	secondary maximum contaminant level
SO	sulfur dioxide
SOP	standard operating procedure
SPAD	Steam Plant Ash Disposal
SPCC	Spill Prevention, Control, and Countermeasures
SPWTF	Steam Plant Wastewater Treatment Facility
Sr	strontium
STP	sewage treatment plant
SW	southwest
SWDF	solid waste disposal facility
SWMU	solid waste management unit
SWSA	solid waste storage areas
Tc	technetium
TCLP	toxicity characteristic leaching procedure
TCMP	toxicity control and monitoring program
TDC	Tennessee Department of Conservation
TDEC	Tennessee Department of Environment and Conservation (formerly TDC)
TDS	total dissolved solids
Th	thorium

TOC	total organic carbon
TOX	total organic halogens
TRC	total residual chlorine
TRE	Toxicity Reduction Evaluation
TRK	Tennessee River kilometer
TRM	Tennessee River mile
TRU	transuranic
TRV	thermal relief valve
TSCA	Toxic Substances Control Act
TSF	Tower Shielding Facility
TSP	total suspended particulates
TSS	total suspended solids
TSWMA	Tennessee Solid Waste Management Act
TURF	Thorium-Uranium Process Facility
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
U	uranium
UEFPC	Upper East Fork Poplar Creek
UEFPCHR	Upper East Fork Poplar Creek Hydrogeologic Regime
UF	uranium hexafluoride
UNC	United Nuclear Corporation
USGS	United States Geological Survey
UST	underground storage tank
VC7002	Vehicle Cleaning Facility
VOA	volatile organic aromatics
VOC	volatile organic compound
WAC	waste acceptance criteria
WAG	waste area grouping
WCK	White Oak Creek kilometer
WCPA	Waste Coolant Processing Area
WCPF	Waste Coolant Processing Facility
WETF	West End Treatment Facility
WIPP	Waste Isolation Pilot Plant
WMA	Waste Management Area
WMCBF	Waste Machine Coolant Biodegradation Facility
WOC	White Oak Creek
WOCE	White Oak Creek Embayment
WOD	White Oak Dam
WOL	White Oak Lake
WOM	White Oak Mountain
WSW	west–southwest
WTF	Waste Treatment Facility
Xe	xenon
Y-12 Plant	Oak Ridge Y-12 Plant

UNITS

µCi	microcurie
µg	microgram
Bq	Becquerel
Btu	British thermal unit
cfm	cubic feet per minute
Ci	curie
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
CY	calendar year
d	day
ft	foot
ft^2	square foot
ft^3	cubic foot
FY	fiscal year
g	gram
gal	gallon
gpd	gallons per day
gpm	gallons per minute
h	hour
ha	hectare
in.	inch
kg	kilogram
km	kilometer
km^2	square kilometer
L	liter
lb	pound
m	meter
M	million
m^2	square meter
m^3	cubic meter
mCi	millicurie
mg	milligram
Mgd	million gallons per day
mil	1/1000 in.
$mile^2$	square mile
min	minute
mL	milliliter
mm	millimeter
mrad	millirad
mrem	millirem
NTU	nephelometric turbidity unit
pCi	picocurie
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
psi	pounds per square inch
R	roentgen
s	second
SU	standard unit
°C	degrees celsius
°F	degrees Fahrenheit
yd^3	cubic yard

CONVERSION TABLE

Multiply	By	To obtain	Multiply	By	To obtain
acre	0.405	ha	ha	2.47	acres
in.	2.54	cm	cm	0.394	in.
ft	0.305	m	m	3.28	ft
mile	1.61	km	km	0.621	mile
lb	0.4536	kg	kg	2.205	lb
liq qt-U.S.	0.946	L	L	1.057	liq qt-U.S.
ft^2	0.093	m^2	m^2	10.764	ft^2
$mile^2$	2.59	km^2	km^2	0.386	$mile^2$
ft^3	0.028	m^3	m^3	35.31	ft^3
Bq	27	pCi	pCi	0.037	Bq
nCi	1×10^3	pCi	pCi	1×10^{-3}	nCi
dpm/L	0.45×10^{-9}	$\mu Ci/cm^3$	$\mu Ci/cm^3$	2.22×10^9	dpm/L
pCi/L (water)	10^{-9}	µCi/mL (water)	µCi/mL (water)	10^9	pCi/L (water)
pCi/m^3 (air)	10^{-12}	$\mu Ci/cm^3$ (air)	$\mu Ci/cm^3$	10^{12}	pCi/m^3 (air)
mCi/km^2	1	nCi/m^2	nCi/m^2	1	mCi/km^2
sievert (Sv)	100	rem	rem	0.01	sievert (Sv)

1. RESERVATION DESCRIPTION AND SETTING

1. RESERVATION DESCRIPTION AND SETTING

The first two volumes of this report present data and supporting narratives regarding the impact of the U.S. Department of Energy's (DOE's) Oak Ridge Reservation (ORR) on its surrounding environs and the public during 1991. Volume 1 includes all narrative descriptions, summaries, and conclusions and is intended to be a "stand-alone" report for the reader who does not want to review in detail all of the 1991 data for the ORR. Volume 2 includes the detailed data in formats that ensure all the environmental data are represented. Narratives are not included in Vol. 2. The information in Vol. 2 is addressed and analyzed 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.

Table 1.1. Administrative[a] units on the ORR in 1991

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	8,972
Lake City	2,166
Norris	1,303
Oak Ridge	27,310
Oliver Springs	3,433
Blount County	
Friendsville	792
Alcoa	6,400
Maryville	19,208
Knox County	
Knoxville	165,121
Loudon County	
Greenback	611
Lenoir City	6,147
Loudon	4,026
Morgan County	
Wartburg	932
Roane County	
Harriman	7,119
Kingston	4,552
Rockwood	5,348
Sevier County	
Sevierville	7,178
Union County	
Luttrell	812
Maynardville	1,298
Campbell County	
Caryville	1,751
Jellico	2,447
Jacksboro	1,568
LaFollette	7,192

[a]*Source: 1990 Census of Population and Housing Public Law 94–171 Data*, U.S. Department of Commerce, Bureau of the Census, Washington, D.C., April 1991.

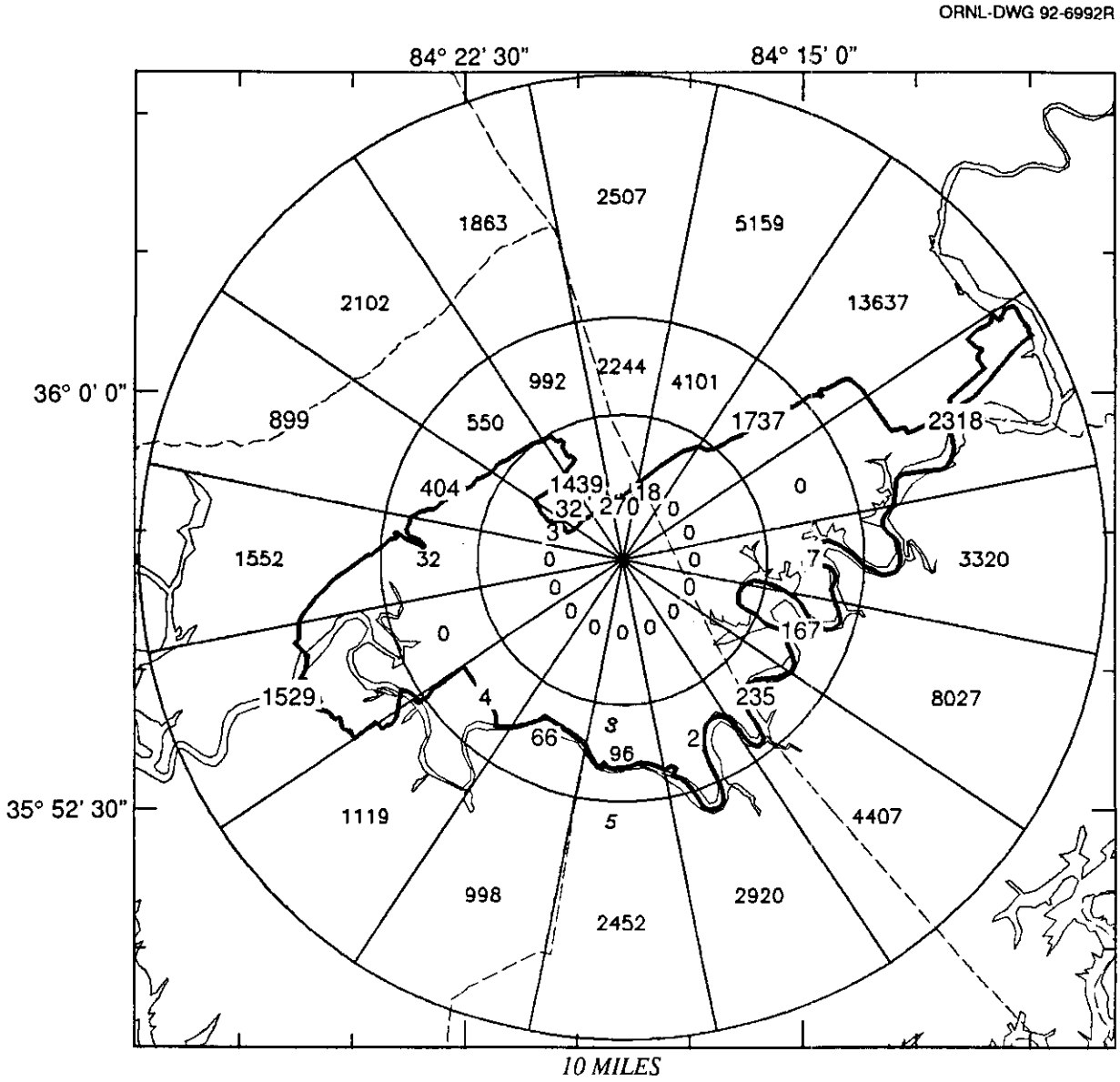

Fig. 1.1. Projected 1991 population levels within 16 km (10 miles) of the center of the Oak Ridge Reservation, by sector and based on 1990 census data (U.S. Department of Commerce 1991, Vol. 1).

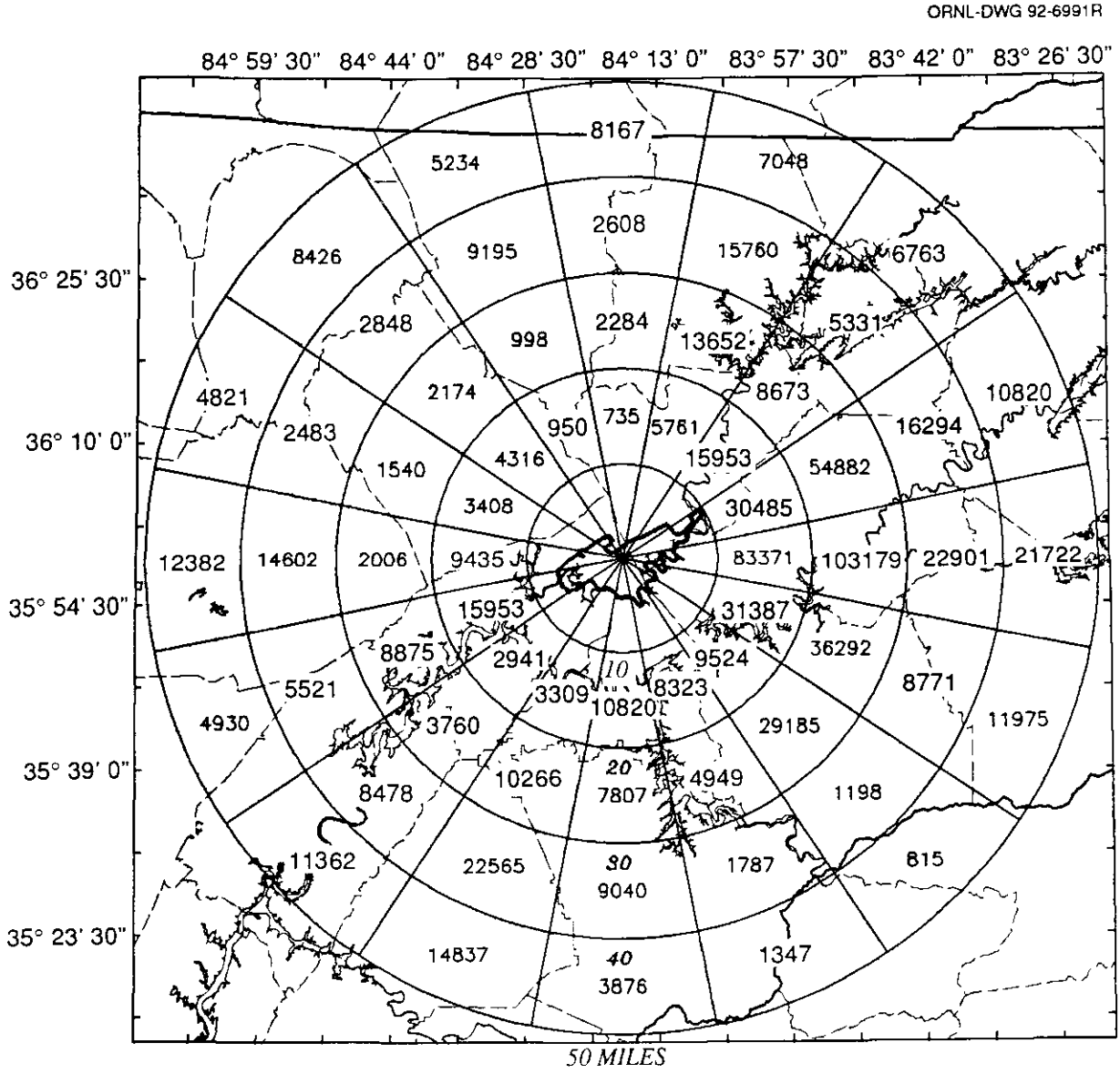

Fig. 1.2. Projected 1991 population levels within 80 km (50 miles) of the center of the Oak Ridge Reservation, by sector and based on 1990 census data (U.S. Department of Commerce 1991, Vol. 1).

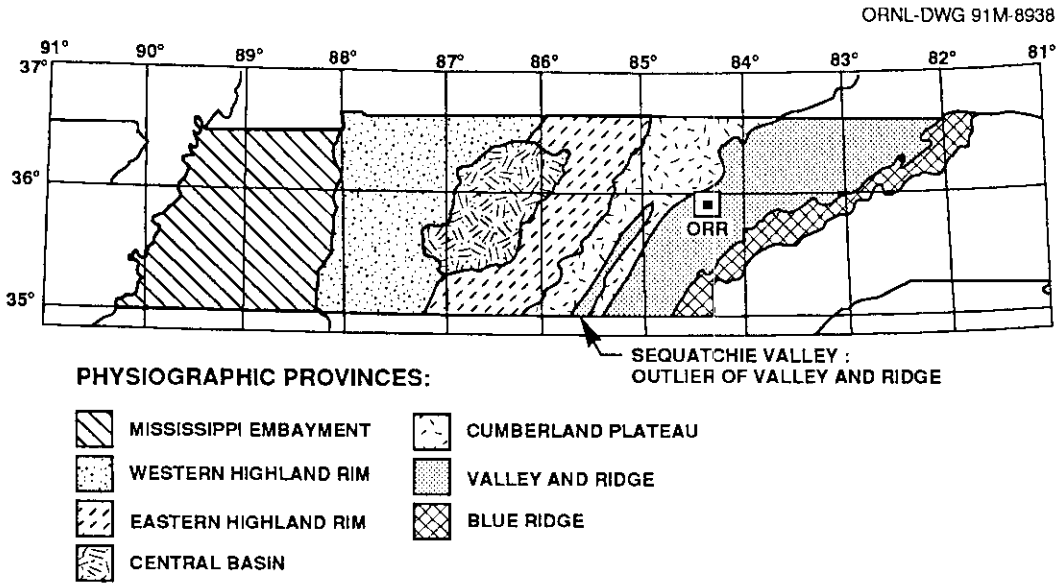

Fig. 1.3. Physiographic map of Tennessee.

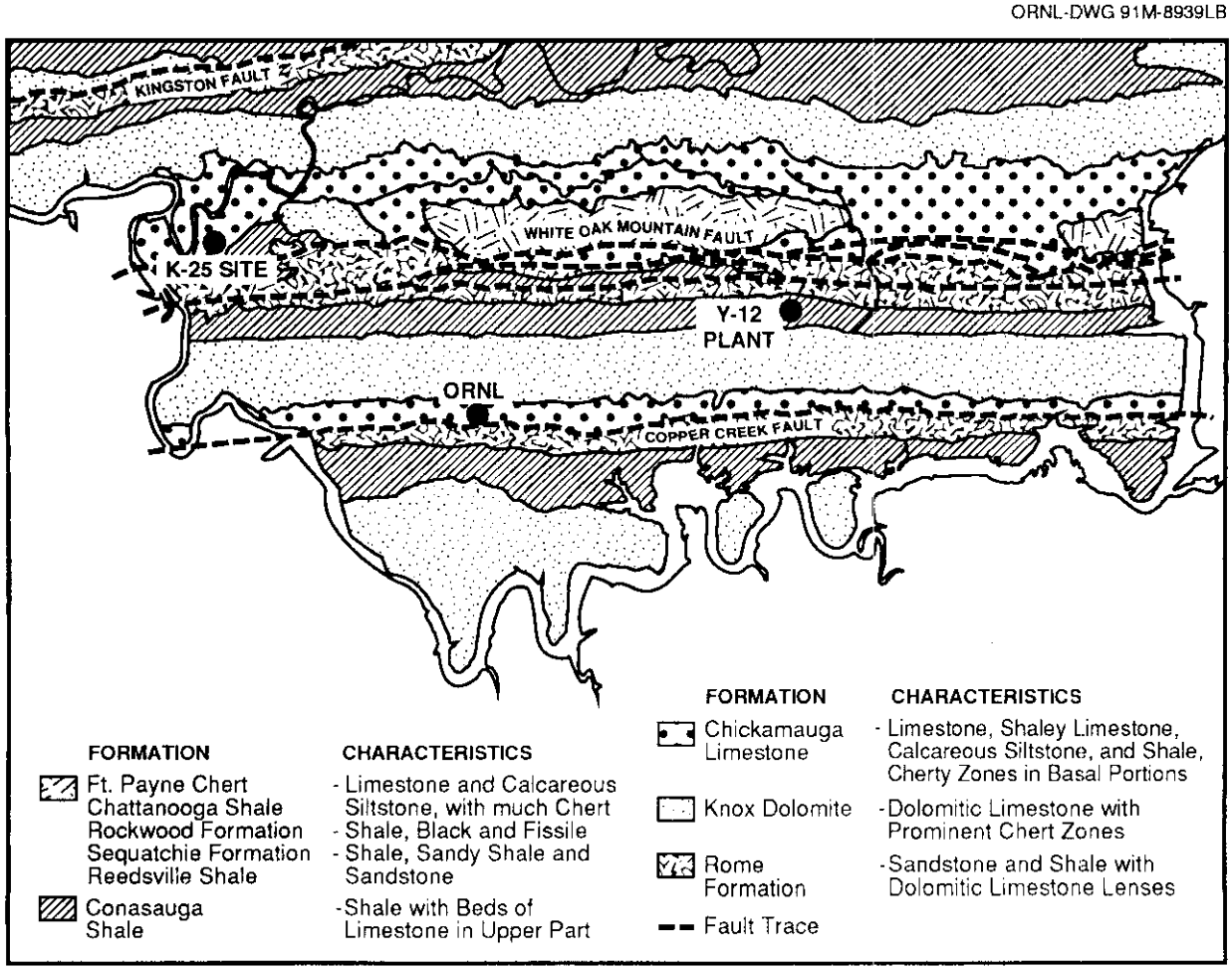

Fig. 1.4. Geologic map of the Department of Energy's Oak Ridge Reservation.

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

[a]*Source:* "Use Classifications for Surface Waters," Chapter 1200-4-4 in *State of Tennessee Water Quality Standards*, Tennessee Department of Environment and Conservation, Bureau of Environment, Division of Water Pollution Control, December 1991.

[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.

2. POTENTIAL RADIATION AND CHEMICAL DOSE TO THE PUBLIC

Table 2.1. Internal effective dose equivalent conversion factors (rem/μCi)[a]

Radionuclide (solubility)[b]		Inhalation[c]	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
^{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. See Beres (1990), Sect. 2, Vol. 1.

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

[c]For AMAD of 1.0 μm.

Table 2.2. 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. See Beres (1990), Sect. 2, Vol. 1.

[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 2.3. Activities (Ci), solubilities, and particle sizes (AMAD, μm) of radionuclides released from ORNL during 1991

Nuclide	Sol. class	AMAD	2026	3020	3039	7025	7512	7911	7830	Total
^{3}H	G	0			1.58E+4	1.50E+2		1.64E+1		1.60E+4
^{7}Be	Y	1.0			6.46E–6				2.21E–7	6.68E–6
^{60}Co	Y	1.0	6.44E–6		1.89E–4					1.95E–4
^{82}Br	D	1.0	8.84E–4							8.84E–4
^{83m}Kr	G	0						7.53E+1		7.53E+1
^{85}Kr	G	0			4.80E+3					4.80E+3
^{85m}Kr	G	0						1.78E+2		1.78E+2
^{87}Kr	G	0						3.60E+2		3.60E+2
^{88}Kr	G	0						5.09E+2		5.09E+2
^{89}Kr	G	0						6.46E+2		6.46E+2
^{90}Sr	D	1.0	1.00E–6	7.76E–7	3.12E–5			6.73E–7	1.12E–8	3.37E–5
^{129}I	D	1.0							4.20E–6	4.20E–6
^{131}I	D	1.0					2.07E–6	4.62E–2		4.62E–2
^{132}I	D	1.0						5.15E–5		5.15E–5
^{133}I	D	1.0						6.16E–2		6.16E–2
^{134}I	D	1.0						5.15E–5		5.15E–5
^{135}I	D	1.0						3.30E–2		3.30E–2
^{133}Xe	G	0						9.08E+2		9.08E+2
^{133m}Xe	G	0						2.82E+1		2.82E+1
^{135}Xe	G	0						2.92E+1		2.92E+1
^{135m}Xe	G	0						1.60E+2		1.60E+2
^{138}Xe	G	0						8.76E+2		8.76E+2
^{137}Cs	D	1.0	9.77E–6	2.70E–6	5.62E–5			2.95E–6	1.14E–7	7.17E–5
^{138}Cs	D	1.0						2.88E–4		2.88E–4
^{137m}Ba	D	1.0	9.77E–6	2.70E–6	5.62E–5			2.93E–6	1.14E–7	7.17E–5
^{191}Os	Y	1.0	1.01E–5	2.12E–6	3.98		2.97E–5	1.25E–5	1.56E–6	3.98
^{194}Au	E	0			3.36E–3					3.36E–6
^{212}Pb	D	1.0	3.80E–2	3.82E–2	1.47E–1		4.13E–4	1.65E–2	8.03E–4	2.41E–1
^{228}Th	Y	1.0	3.24E–8	4.99E–9	4.36E–9				1.31E–10	4.19E–8
^{230}Th	Y	1.0	3.41E–9	5.17E–9	3.85E–9			1.68E–9	1.18E–10	1.41E–8
^{232}Th	Y	1.0	1.70E–9	2.93E–9	4.86E–9			1.76E–9	1.06E–10	1.14E–8
$^{234}U^{a}$	Y	1.0	1.92E–8	1.19E–8	8.15E–9			2.17E–8	1.33E–8	7.43E–8
^{238}Pu	Y	1.0	4.72E–8	2.54E–8						7.26E–8
^{239}Pu	Y	1.0	1.59E–7	2.00E–7						3.59E–7

[a]All uranium emissions were assumed to be Y-class ^{234}U.

Table 2.4. Activities (Ci), solubilities, and AMADs (μm) of radionuclides emitted from the K-25 Site during 1991

Nuclide	Sol. class	AMAD (μm)	Total curies released			
			K-1435	K-1420	K-1015	Total
^{57}Co	Y	1.0	4.15E–7			4.15E–7
^{95}Nb	Y	1.0	1.46E–6			1.46E–6
^{137}Cs	D	1.0	5.52E–4		4.73E–8	5.52E–4
^{137m}Ba	D	1.0	5.52E–4		4.73E–8	5.52E–4
^{237}Np	W	1.0	8.13E–4			8.14E–4
^{234m}Pa	Y	1.0	1.73E–1			1.73E–1
^{238}Pu	Y	1.0			4.26E–8	4.26E–8
^{239}Pu	Y	1.0	5.38E–5			5.38E–5
^{99}Tc	W	1.0	3.95E–2			3.95E–2
^{228}Th	Y	0.3	2.66E–3			2.66E–3
^{230}Th	Y	0.3	8.41E–5			8.41E–5
^{232}Th	Y	0.3	1.52E–5			1.52E–5
^{234}Th	Y	0.3	4.73E–2			4.73E–2
^{234}U	Y	0.3	1.05E–2	1.78E–8	2.34E–7[a]	1.05E–2
^{235}U	Y	1.0	4.61E–4	6.49E–10		4.61E–4
^{236}U	Y	1.0		3.99E–11		3.99E–11
^{238}U	Y	0.3	1.33E–2	3.26E–9		1.33E–2

[a]All emissions of uranium from K-1015 were assumed to be Y-class ^{234}U.

Table 2.5. Activities (Ci), solubilities, and AMADs (μm) of radionuclides emitted from the Y-12 Plant during 1991[a]

Nuclide	AMAD (μm)	Solubility class			
		D	W	Y	All
^{234}U	1.0	1.15E–2	1.74E–2	2.42E–2	5.32E–2
^{235}U	1.0	3.57E–4	5.41E–4	7.58E–4	1.66E–3
^{236}U	1.0	4.80E–5	7.24E–5	9.88E–5	2.19E–4
^{238}U	1.0	6.66E–5	4.88E–6	7.28E–3	7.35E–3
Total		1.20E–2	1.80E–2	3.24E–2	6.24E–2

[a]Does not include 1.6 Ci of ^{85}Kr emitted from building 9735.

Table 2.6. Radionuclide discharges from White Oak Dam during 1991

Radionuclide	Discharge (Ci)
^{3}H	2500
^{60}Co	0.17
Total Sr[a]	3.2
^{137}Cs	1.8

[a]Taken to be ^{90}Sr.

Table 2.7. Estimated radionuclide concentrations (pCi/L) in water

Location	Upper CR[a] (Gallaher[b])	Lower CR[a] (Kingston[c])	Watts Bar (Rockwood[d])	Chickamauga (Dayton[e], Soddy-Daisy/ Falling Water[f])
		Method 1		
^{3}H	2100[g]	0[h]	0[i]	0[i]
^{60}Co	0[g]	0[h]	0[i]	0[i]
Total Sr[j]	0.78[g]	0.54[h]	0.078[i]	0.071[i]
^{137}Cs	0[g]	0[h]	0[i]	0[i]
Total U[k]	0[g]	0.19[h]	0.027[i]	0.025[i]
		Method 2		
^{3}H	420[l]	420[l]	100[i]	94[i]
^{60}Co	0.029[l]	0.029[l]	0.0070[i]	0.0064[i]
Total Sr[j]	0.54[l]	0.54[l]	0.13[i]	0.12[i]
^{137}Cs	0.30[l]	0.30[l]	0.074[i]	0.068[i]
Total U[k]	*m*	*m*	0[i]	0[i]

[a]CR = Clinch River.
[b]DOE drinking water plant serving 4000 persons.
[c]Public water supply serving 6841 persons.
[d]Public water supply serving 7387 persons.
[e]Public water supply serving 9605 persons.
[f]Public water supply serving 9742 persons.
[g]From Table 4.56 in Vol. 2.
[h]From Table 4.57 in Vol. 2.
[i]Calculated by diluting lower CR values with the Tennessee River flow.
[j]Taken to be ^{90}Sr.
[k]Taken to be ^{234}U.
[l]Calculated by dividing White Oak Dam discharge (Table 2.6 in Vol. 2) by the Clinch River flow (5.9×10^{12} L).
[m]No value reported.

Table 2.8. Estimated radionuclide concentrations (pCi/g) in fish

Location	Upper CR[a]	Lower CR[a]	Watts Bar	Chickamauga
		Method 1		
^{3}H	[b]	[b]	[b]	[b]
^{60}Co	0.0022[c]	0[c]	0[d]	0[d]
Total Sr[e]	0.026[c]	0.0051[c]	0.00074[d]	0.00067[d]
^{137}Cs	0.17[c]	0.074[c]	0.011[d]	0.0097[d]
		Method 2[f]		
^{3}H	0.42	0.42	0.10	0.094
^{60}Co	0.0086	0.0085	0.0021	0.0019
Total Sr[e]	0.032	0.032	0.0079	0.0072
^{137}Cs	0.61	0.60	0.15	0.14

[a]CR = Clinch River.
[b]No value reported.
[c]From Table 6.5 in Vol. 2.
[d]Calculated using lower CR values and Tennessee River flow.
[e]Taken to be ^{90}Sr.
[f]Calculated using LADTAP-XL methodology. See Hamby (1991), Sect. 2, Vol. 1.

Table 2.9. Radionuclide concentrations in the leopard frog and the bullfrog near Basin 3524 (Bq/kg dry weight)[a]

Frog sample number	^{241}Am	^{244}Cm	^{60}Co	^{137}Cs	^{238}Pu	^{239}Pu	^{90}Sr	^{152}Eu	^{154}Eu	^{155}Eu
1-C	8.4 ± 7.8	−4.5 ± 5.1	83.0 ± 34.0	5,400.0 ± 2,000.0	3.9 ± 6.6	−2.7 ± 3.9	30,000.0 ± 1,000.0	*b*	*b*	*b*
2-C	8.3 ± 5.1	1.9 ± 3.7	290.0 ± 80.0	21,000.0 ± 1,000.0	23.0 ± 9.0	60.0 ± 12.0	20,000.0 ± 1,000.0	430.0 ± 280.0	*b*	*b*
3-C	6.6 ± 4.0	1.5 ± 2.9	390.0 ± 160.0	8,000.0 ± 400.0	*b*	*b*	8,500.0 ± 300.0	*b*	*b*	*b*
4-C	12.0 ± 3	10.0 ± 3	73.0 ± 5	8,700.0 ± 100	4.0 ± 1	8.0 ± 1	32,000.0 ± 1,000	190.0 ± 30	67.0 ± 20	*b*
5-C	23.0 ± 4	10.0 ± 3	87.0 ± 6	5,500.0 ± 100	10.0 ± 1	33.0 ± 3	9,600.0 ± 100	450.0 ± 40	160.0 ± 20	45.0 ± 14
6-C	22.0 ± 3	8.0 ± 2 (and ^{241}Cm)	38.0 ± 4	5,100.0 ± 100	5.0 ± 1	18.0 ± 2	8,700.0 ± 100	160.0 ± 20	68.0 ± 20	16.0 ± 11

[a]Multiply by 0.027 to convert from Bq/kg to pCi/g.
[b]Not detected.

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

Table 3.1. Air permits at the Y-12 Plant

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
FUGITIVE EMISSION SOURCE	01-1020-89	029891P	Fugitive air emission at the Y-12 Plant	O
Y-9201-1-A(01)	01-0020-15	730303P	Wleding booths	O
Y-9201-1-A(02)	01-0020-15	730303P	Welding Shop	O
Y-9201-1-A(04)	01-0020-15	730303P	Metal fabrication shop	O
Y-9201-1-A(05)	01-0020-15	730303P	Welding shop	O
Y-9201-1-A(15)	01-0020-15	730303P	Metal fabrication shop	O
Y-9201-1-A(19)	01-0020-15	730303P	Welding hood exhaust	O
Y-9201-1-B(16)	01-0020-59	730310P	Tool grinding machines	O
Y-9201-1-B(18)	01-0020-59	730310P	Snadblaster exhaust	O
Y-9201-1-C(3)	01-0020-17	730304P	Graphitic carbon machining	O
Y-9201-1-C(4)	01-0020-17	730304P	Graphitic carbon machining	O
Y-9201-1-D(09)	01-0020-61	730310P	Fabrication shop	O
Y-9201-1-D(10)	01-0020-61	730310P	Fabrication shop	O
Y-9201-1-D(11)	01-0020-61	730310P	Fabrication shop	O
Y-9201-1-D(13)	01-0020-61	730310P	Metal grinders and milling machines	O
Y-9201-1-[E]-(00)	01-1020-92	031880P	Lead machining operations	O
Y-9201-2-B(02)	01-0020-43	012887P	Acid wash station	O
Y-9201-2-C(01)	01-0020-67	015146P	Weld booth	O
Y-9201-2-C(02)	01-0020-67	015146P	Weld booth	O
Y-9201-2-C(03)	01-0020-67	015146P	Weld booth	O
Y-9201-3-A(01)	01-0020-55	013002F	Diesel generator	O
Y-9201-5-B(01)	01-0020-21	730305P	Machining operations L5N hood exhaust	O
Y-9201-5-B(02)	01-0020-21	730305P	Vacuum inlets L5E machining shop	O
Y-9201-5-B(03)	01-0020-21	730305P	Rubber-gel potting hoot exhaust	O
Y-9201-5-B(04)	01-0020-21	730305P	Palarite shop—machine exhaust	O
Y-9201-5-B(05)	01-0020-21	730305P	Tool grinding machines hood exhaust	O
Y-9201-5-B(06)	01-0020-21	730305P	Cleaning hood—equipment service	O
Y-9201-5-B(07)	01-0020-21	730305P	Electrochemical machine-stainless steel	O
Y-9201-5-C(01)	01-1020-43	025949P	Grinding/sanding and welding operations	O
Y-9201-5-D(01)	01-1020-44	025902P	Hood	O
Y-9201-5-D(02)	01-1020-44	025902P	Film dryer exhaust fume hood	O
Y-9201-5-E(01)	01-1020-70	025983P	BeO hot press	O
Y-9201-5-E(02)	01-1020-70	025983P	A53 hot press house vacuum	O
Y-9201-5-E(08)	01-1020-70	025983P	Room exaust	O
Y-9201-5-F(01)	01-0020-36	025973P	Carbon foam saw room	O
Y-9201-5-F(02)	01-0020-36	025973P	Carbon foam urethane mixing vat	O
Y-9201-5-F(03)	01-0020-36	025973P	Carbon foam mixing and pour room	O
Y-9201-5-F(04)	01-0020-36	025973P	Oven	O
Y-9201-5-F(05)	01-0020-36	025973P	Oven	O
Y-9201-5-G(01)	01-0020-44	730308P	Arc melt	O
Y-9201-5-G(02)	01-0020-44	730308P	DeVilbiss hood	O
Y-9201-5-G(03)	01-0020-44	730308P	Nitric acid dip tanks	O
Y-9201-5-G(04)	01-0020-44	730308P	Acid pickling tanks	O
Y-9201-5-G(05)	01-0020-44	730308P	Abrasive saws	O
Y-9201-5-G(06)	01-0020-44	730308P	Scrap metal recycle	O
Y-9201-5-G(07)	01-0020-44	730308P	Vapor Degreaser	O
Y-9201-5-H(01)	01-0020-16	026019P	Mixing process material	O
Y-9201-5-H(02)	01-0020-16	026019P	Setup and sample area	O
Y-9201-5-H(03)	01-0020-16	026019P	Vapor blaster	O
Y-9201-5-H(04)	01-0020-16	026019P	Nickel plating tank exhaust	O
Y-9201-5-H(05)	01-0020-16	026019P	Material handling	O
Y-9201-5-H(06)	01-0020-16	026019P	Material handling	O
Y-9201-5-H(07)	01-0020-16	026019P	Glove box & blending station	O
Y-9201-5-H(08)	01-0020-16	026019P	Inspection house vacuum	O
Y-9201-5N-A(01)	01-1020-18	730314P	Machine shop exhaust	O

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9201-5N-[B]-(239)	01-0020-30	030484P	Plating tanks and hoods	O
Y-9201-5N-[B]-(240)	01-0020-30	030484P	Plating tanks and hoods	O
Y-9201-5N-[B]-(241)	01-0020-30	030484P	Plating tanks and hoods	O
Y-9201-5N-[B]-(242)	01-0020-30	030484P	Incinerator	O
Y-9201-5N-[B]-(243)	01-0020-30	030484P	Grit blaster	O
Y-9201-5N-[B]-(244)	01-0020-30	030484P	Grit blaster and area exhaust	O
Y-9202-A-(20)	01-0020-06	031696P	Laboratory beryllium	O
Y-9202-A-(21)	01-0020-06	031696P	Laboratory	O
Y-9204-2-A(01)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(02)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(03)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(04)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(05)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(06)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(07)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(08)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(09)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(10)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(11)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(12)	01-0020-46	026107P	Storage tank	O
Y-9204-2-A(13)	01-0020-46	026107P	Storage tank	O
Y-9204-2-B	01-0020-45	012889P	Storage tank	O
Y-9204-2-B(14)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(15)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(16)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(17)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(18)	01-0020-71	025954P	Caustic scrubber exhaust	O
Y-9204-2-B(19)	01-0020-71	025954P	Caustic scrubber exhaust	O
Y-9204-2-B(20)	01-0020-71	025954P	Storage area	O
Y-9204-2-B(21)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(22)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-B(23)	01-0020-71	025954P	Caustic scrubber exhaust	O
Y-9204-2-B(24)	01-0020-71	025954P	Caustic scrubber exhaust	O
Y-9204-2-B(25)	01-0020-71	025954P	Lithium metal wash station	O
Y-9204-2-B(26)	01-0020-71	025954P	Cleaning Station	O
Y-9204-2-B(27)	01-0020-71	025954P	Lithium remelt oven	O
Y-9204-2-B(28)	01-0020-71	025954P	Reduction cell	O
Y-9204-2-C(29)	01-1020-19	025900P	Classified	O
Y-9204-2-C(30)	01-1020-19	025900P	Classified	O
Y-9204-2-C(31)	01-1020-19	025900P	Classified	O
Y-9204-2-C(32)	01-1020-19	025900P	Classified	O
Y-9204-2-C(33)	01-1020-19	025900P	Classified	O
Y-9204-2-C(34)	01-1020-19	025900P	Classified	O
Y-9204-2-C(35)	01-1020-19	025900P	Classified	O
Y-9204-2-C(36)	01-1020-19	025900P	Classified	O
Y-9204-2-C(37)	01-1020-19	025900P	Classified	O
Y-9204-2-C(38)	01-1020-19	025900P	Classified	O
Y-9204-2-C(39)	01-1020-19	025900P	Classified	O
Y-9204-2-C(40)	01-1020-19	025900P	Classified	O
Y-9204-2-C(41)	01-1020-19	025900P	Classified	O
Y-9204-2-C(42)	01-1020-19	025900P	Classified	O
Y-9204-2-C(43)	01-1020-19	025900P	Classified	O
Y-9204-2-C(44)	01-1020-19	025900P	Classified	O
Y-9204-2-C(45)	01-1020-19	025900P	Classified	O
Y-9204-2-C(46)	01-1020-19	025900P	Classified	O

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9204-2-C(47)	01-1020-19	025900P	Classified	O
Y-9204-2-C(48)	01-1020-19	025900P	Classified	O
Y-9204-2-C(49)	01-1020-19	025900P	Classified	O
Y-9204-2-C(50)	01-1020-19	025900P	Classified	O
Y-9204-2-C(51)	01-1020-19	025900P	Classified	O
Y-9204-2-D(52)	01-1020-57	025967P	Storage tanks	O
Y-9204-2-D(53)	01-1020-57	025967P	Station	O
Y-9204-2-D(54)	01-1020-57	025967P	Salvage vats	O
Y-9204-2-D(55)	01-1020-57	025967P	Storage tank	O
Y-9204-2-D(56)	01-1020-57	025967P	Lithium chloride crystallizer	O
Y-9204-2-D(57)	01-1020-57	025967P	Lithium chloride crystallizer	O
Y-9204-2-D(58)	01-1020-57	025967P	Neutralizer	O
Y-9204-2-D(59)	01-1020-57	025967P	3 lab hoods	O
Y-9204-2-D(60)	01-1020-57	025967P	Process tank	O
Y-9204-2-D(61)	01-1020-57	025967P	Lithium chloride crystallizer	O
Y-9204-2-D(62)	01-1020-57	025967P	Lithium hydroxide neutralizer	O
Y-9204-2-D(63)	01-1020-57	025967P	HCL head tanks	O
Y-9204-2-D(64)	01-1020-57	025967P	Process tanks	O
Y-9204-2-D(65)	01-1020-57	025967P	Process tank	O
Y-9204-2-D(66)	01-1020-57	025967P	Neutralizer	O
Y-9204-2-D(67)	01-1020-57	025967P	Neutralizer	O
Y-9204-2-E(68)	01-1020-55	730328P	Oven	O
Y-9204-2-E(69)	01-1020-55	730328P	Oven	O
Y-9204-2-E(70)	01-1020-55	730328P	Tungsten screener	O
Y-9204-2-E(71)	01-1020-55	730328P	Dry box vent	O
Y-9204-2-E(72)	01-1020-55	730328P	Glove boxes	O
Y-9204-2-E(73)	01-1020-55	730328P	Material handling	O
Y-9204-2-E(74)	01-1020-55	730328P	Glove boxes	O
Y-9204-2-E(75)	01-1020-55	730328P	Outgassing/annealing ovens	O
Y-9204-2-E(76)	01-1020-55	730328P	Material handling	O
Y-9204-2-E(77)	01-1020-55	730328P	Glove boxes	O
Y-9204-2-E(78)	01-1020-55	730328P	Reactor unloading station	O
Y-9204-2-E(79)	01-1020-55	730328P	Reactor unloading station	O
Y-9204-2-E(80)	01-1020-55	730328P	Glove boxes	O
Y-9204-2-E(81)	01-1020-55	730328P	Vacuum pump	O
Y-9204-2-F	01-0020-32	012874P	Storage tank	O
Y-9204-2-F(082)	01-0020-51	025897P	Classified	O
Y-9204-2-F(083)	01-0020-51	025897P	Classified	O
Y-9204-2-F(084)	01-0020-51	025897P	Classified	O
Y-9204-2-F(085)	01-0020-51	025897P	Classified	O
Y-9204-2-F(086)	01-0020-51	025897P	Classified	O
Y-9204-2-F(087)	01-0020-51	025897P	Classified	O
Y-9204-2-G(088)	01-1020-79	028350P	Inspection operation	O
Y-9204-2-G(089)	01-1020-79	028350P	Metal working machine shop hood—B-2	O
Y-9204-2-G(090)	01-1020-79	028350P	Metal working machine shop hood—B-2	O
Y-9204-2-H(492)	01-1020-42	025952P	Etching vats	O
Y-9204-2-H(493)	01-1020-42	025952P	Glue mixing	O
Y-9204-2E-A(436)	01-0020-68	730312P	Oven	O
Y-9204-2E-A(439)	01-0020-68	730312P	Hood exhaust	O
Y-9204-2E-A(441)	01-0020-68	730312P	Hood	O

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9204-2E-A(442)	01-0020-68	730312P	Hood	O
Y-9204-2E-A(443)	01-0020-68	730312P	Degreaser	O
Y-9204-2E-A(444)	01-0020-68	730312P	Electropolishers	O
Y-9204-2E-A(445)	01-0020-68	730312P	Surface coating	O
Y-9204-2E-A(448)	01-0020-68	730312P	Glovebox	O
Y-9204-2E-A(449)	01-0020-68	730312P	Storage tank	O
Y-9204-2E-B(12)	01-1020-41	025953P	X-ray testing	O
Y-9204-2E-B(14)	01-1020-41	025953P	Hoods	O
Y-9204-2E-B(15)	01-1020-41	025953P	Hoods	O
Y-9204-2E-C(12)	01-1020-68	730328P	Machine shop hood exhaust—B2E	O
Y-9204-2E-C(13)	01-1020-68	730328P	Machine shop hood exhaust—spec. shop	O
Y-9204-2E-[A]-(202)	01-1020-91	730938P	Positive ion accelerator	O
Y-9204-3-AJ-106	01-0020-89	018208P	Roof exhaust stack	O
Y-9204-4-A(02)	01-1020-56	032416P	Wash tank	O
Y-9204-4-A(03)	01-1020-56	032416P	Quench tanks	O
Y-9204-4-A(04)	01-1020-56	032416P	1000 ton press	O
Y-9204-4-A(05)	01-1020-56	032416P	7500 ton press	O
Y-9204-4-A(06)	01-1020-56	032416P	Exhaust from press pit area	O
Y-9204-4-A(07)	01-1020-56	032416P	Plasma torch cutting machine	O
Y-9204-4-A(08)	01-1020-56	032416P	Vacuum quench furnace	O
Y-9204-4-A(09)	01-1020-56	032416P	Ingot cooler	O
Y-9204-4-A(10)	01-1020-56	032416P	Exhaust from lathe	O
Y-9204-4-A(11)	01-1020-56	032416P	Grinding facility	O
Y-9204-4-A(12)	01-1020-56	032416P	Dye penetrant	O
Y-9204-4-A(13)	01-1020-56	032416P	Salt baths	O
Y-9204-4-A(14)	01-1020-56	032416P	Quench tanks	O
Y-9204-4-A(15)	01-1020-56	032416P	Preheat furnace exhaust	O
Y-9204-4-A(17)	01-1020-56	032416P	Oven exhaust	O
Y-9204-4-A(18)	01-1020-56	032416P	Vacuum furnace quench chamber	O
Y-9204-4-A(19)	01-1020-56	032416P	7500 ton press & 1500 ton press	O
Y-9204-4-B(481)	01-0020-72	730313P	Exhaust from machining operation	O
Y-9204-4-B(482)	01-0020-72	730313P	Exhaust from hood—reclamation area	O
Y-9204-4-B(484)	01-0020-72	730313P	Rooling mill—1st floor assembly	O
Y-9204-4-B(485)	01-0020-72	730313P	Exhaust from paint hood	O
Y-9204-4-B(486)	01-0020-72	730313P	Filtering exhaust from paing booths	O
Y-9204-4-B(488)	01-0020-72	730313P	Laboratory hoods—1st floor	O
Y-9204-4-B(489)	01-0020-72	730313P	Laboratory hoods—reclamation area	O
Y-9204-4-B(490)	01-0020-72	730313P	Assembly process—first floor	O
Y-9204-4-B(491)	01-0020-72	730313P	Assembly process—1st floor	O
Y-9204-4-C(01)	01-1020-36	025968P	Degreaser and welding booth	O
Y-9204-4-D(01)	01-1020-35	730317P	Exhaust hood	O
Y-9204-4-E(01)	01-0020-33	030819P	Plating equipment	O
Y-9204-4-E(02)	01-0020-33	025002P	Plating equipment	O
Y-9204-4-E(03)	01-0020-33	025002P	Plating equipment	O
Y-9204-4-E(04)	01-0020-33	025002P	Plating equipment	O
Y-9204-4-[A]-(88)	01-1020-56	032416P	Grit blast system	O
Y-9206-A(01)	01-0020-48	012892P	Storage tank—tank farm—8500 gal	O
Y-9206-A(02)	01-0020-48	012892P	Storage tank—tank farm—12,800 gal	O
Y-9206-A(03)	01-0020-48	012892P	Storage tank—tank farm—10,000 gal	O
Y-9206-C(01)	01-1020-24	730316P	Classified	O
Y-9206-C(02)	01-1020-24	730316P	Classified	O
Y-9206-D(13)	01-1020-38	025901P	Maintenance shop weld booth	O
Y-9206-E (NEW)	01-1020-24	730316P	Classified	O
Y-9206-[B]-(013)	01-0020-03	731689P	South stack, incinerator	O
Y-9206-[B]-(015)	01-0020-03	731689P	West stack	O

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9206-[B]-(016)	01-0020-03	731689P	Dissolving hood	O
Y-9206-[B]-(017)	01-0020-03	731689P	Steam cleaning hoods	O
Y-9206-[B]-(115)	01-0020-03	731689P	Reduction fluid bed	O
Y-9206-[B]-(135)	01-0020-03	731689P	AEC scrubber stack	O
Y-9206-[B]-(136)	01-0020-03	731689P	AED consolidated stack	O
Y-9206-[B]-(208)	01-0020-03	731689P	Conversion fluid bed	O
Y-9206-[B]-(209)	01-0020-03	731689P	HF purge vent	O
Y-9206-[B]-(210)	01-0020-03	731689P	Chemical make-up area	O
Y-9206-[B]-(211)	01-0020-03	731689P	Hood 29 and 30	O
Y-9206-[B]-(212)	01-0020-03	731689P	Dry vacuum system	O
Y-9212-B(01)	01-0020-02	730301P	U metal drying and briquetting process	O
Y-9212-B(02)	01-0020-02	730301P	Exhaust from chip wasing and drying	O
Y-9212-B(03)	01-0020-02	730301P	E-wing machine shop	O
Y-9212-B(04)	01-0020-02	730301P	U metal and U metal alloy casting	O
Y-9212-C(01)	01-0020-05	025984P	Drum receiving/sampling hood and glovebox	O
Y-9212-C(02)	01-0020-05	025984P	Tube furnace/gas purge vents	O
Y-9212-C(03)	01-0020-05	025984P	Sampling hoods and safe bottles/rm 1022	O
Y-9212-C(04)	01-0020-05	025984P	Dry hood/rm1021	O
Y-9212-C(05)	01-0020-05	025984P	Dissolver tray hoods/rm 1021	O
Y-9212-C(06)	01-0020-05	025984P	Dissolver hood	O
Y-9212-C(07)	01-0020-05	025984P	Dissolver trays/scrubber	O
Y-9212-C(08)	01-0020-05	025984P	Shear and saw hood/rm 1021	O
Y-9212-C(09)	01-0020-05	025984P	Precipitation process	O
Y-9212-D(01)	01-1020-46	025904P	Weld booths	O
Y-9212-F(01)	01-1020-49	730321P	Two deburr benches—hood exh.—A-wing	O
Y-9212-F(02)	01-1020-49	730321P	Two deburr benches—hood exh.—A-wing	O
Y-9212-F(03)	01-1020-49	730321P	Machining—hood exhaust—A-wing	O
Y-9212-F(04)	01-1020-49	730321P	Machining—hood exhaust—A-wing	O
Y-9212-F(05)	01-1020-49	730321P	Machining—hood exhaust—A-wing	O
Y-9212-G(01)	01-1020-47	028435P	Seal-peel pot	O
Y-9212-[A](027)	01-1020-72	997756P	D-wing, room 1010 hoods, rms 26 & 29	O
Y-9212-[A](028)	01-1020-72	997756P	Reduction, shear, and room 1010, EUCF	O
Y-9212-[A](033)	01-1020-72	997756P	Headhous equipment & incinerator	O
Y-9212-[A](040)	01-1020-72	997756P	B-1 sampling lab hoods	O
Y-9212-[A](042)	01-1020-72	997756P	Chloride removal sys./C-1 wing process ex.	O
Y-9212-[A](050)	01-1020-72	997756P	C-1 chip burner, enclosures, load hoods	O
Y-9212-[A](111)	01-1020-72	997756P	Reduction fluid beds	O
Y-9212-[A](112)	01-1020-72	997756P	Conversion fluids beds	O
Y-9212-[A](132)	01-1020-72	997756P	Decontamination facility	O
Y-9212-[A](430)	01-1020-72	997756P	HF dock cylinder/vaporizer purge vent	O
Y-9212-[A](431)	01-1020-72	997756P	N204 cylinder purge vent	O
Y-9215-A(01)	01-0020-37	731839P	Machine shop hood exhaust—M-wing	O
Y-9215-B(02)	01-0020-38	012880P	Turco pretreat spray hood	O
Y-9215-C(02)	01-1020-52	025948P	Hydroform exhaust	O
Y-9215-C(03)	01-1020-52	730323P	Vapor blaster/metal cleaner	O
Y-9215-C(10)	01-1020-52	730323P	Nickel plating—metal working exhaust	O
Y-9215-C(11)	01-1020-52	730323P	Exhaust	O
Y-9215-C(17)	01-1020-52	730323P	Rolling mill	O
Y-9215-C(19)	01-1020-52	730323P	Electric annealing oven	O
Y-9215-D(12)	01-1020-53	025966P	Rolling mill exhaust	O
Y-9215-D(13)	01-1020-53	025966P	Hood exhaust	O
Y-9215-D(14)	01-1020-53	025966P	Exhaust from rolling mill	O
Y-9215-D(15)	01-1020-53	025966P	Turret lathe & shear exhaust	O
Y-9215-E(6)	01-1020-54	025972P	Lab hood	O
Y-9215-E(7)	01-1020-54	025972P	Lab hoods	O

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9215-E(8)	01-1020-54	025972P	Lab hoods	O
Y-9215-[B]-(1)	01-1020-51	732125P	O-wing metal working operations	O
Y-9215-[B]-(2)	01-1020-51	732125P	O-wing metal working operations	O
Y-9215-[B]-(4)	01-1020-51	732125P	O-wing metal working operations	O
Y-9215-[B]-(6)	01-1020-51	732125P	O-wing metal working operations	O
Y-9401-2-[A]-(205)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(220)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(221)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(222)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(223)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(224)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(225)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(226)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(227)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(228)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(229)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(230)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(231)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(232)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(233)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(234)	01-0020-88	730286P	Plating equipment	O
Y-9401-2-[A]-(235)	01-0020-88	730286P	Plating equipment	O
Y-9401-3-A	01-1020-31	029322F	Coal fired boiler	O
Y-9401-3-B(1)	01-1020-32	029322F	Coal fired boiler	O
Y-9401-3-C	01-1020-33	029322F	Coal fired boiler	O
Y-9401-3-D(2)	01-1020-34	029322F	Coal fired boiler	O
Y-9401-3-G(01)	01-1020-61	026472P	Oil storage tank	O
Y-9401-3-G(02)	01-1020-61	026472P	Vent from lime silo	O
Y-9401-3-H(01) [9616-10]	01-1020-62	029280P	Sulfuric acid storage tank/20,000 gal	O
Y-9401-5-A(01)	01-0020-92	026108P	Uranium chip oxidizer	O
Y-9404-11-A(1)	01-1020-81	028426P	Purification plant	O
Y-9404-11-A(2)	01-1020-81	028426P	Purification plant	O
Y-9404-11-A(3)	01-1020-81	028426P	Purification plant	O
Y-9404-11-A(4)	01-1020-81	028426P	Purification plant	O
Y-9404-5-B(02)	01-0020-25	012866P	Spray room exhaust	O
Y-9404-5-B(03)	01-0020-25	012866P	Spray booth	O
Y-9404-7-FUG-A-(00)			PCB storage shed	
Y-9404-9-C(03)	01-0020-40	012882P	PVC curing ovens	O
Y-9404-9-D(04)	01-0020-40	012882P	PVC curing ovens	O
Y-9404-9-E(05)	01-0020-40	012882P	PVC curing ovens	O
Y-9616-6-FUG-A-(00)			Chemical storage	
Y-9616-7-A(01)	01-1020-74	026502P	West end treatment storage tank	O
Y-9616-7-A(02)	01-1020-74	026502P	West end treatment storage tank	O
Y-9616-7-A(03)	01-1020-74	026502P	West end treatment storage tank	O
Y-9616-7-A(04)	01-1020-74	026502P	West end treatment storage tank	O
Y-9616-7-A(05)	01-1020-74	026502P	West end treatment vent, reactor vessel	O
Y-9616-7-A(06)	01-1020-74	026502P	West end treatment storage tank	O
Y-9616-7-A(07)	01-1020-74	026502P	West end treatment vent, degassifer unit	O
Y-9616-7-A(08)	01-1020-74	026502P	West end treatment storage tank	O
Y-9616-7-A(09)	01-1020-74	026502P	West end treatment storage tank	O
Y-9616-7-A(10)	01-1020-74	026502P	West end treatment storage tank	O
Y-9616-7-A(11)	01-1020-74	026502P	West end treatment vent, lime silo	O
Y-9616-7-A(12)	01-1020-74	026502P	West end treatment storage tank	O
Y-9616-7-WST-[A]-(1)	01-1020-80	031254P	Vent from air stripper	O
Y-9620-2A	01-0020-50	012894P	Storage tank	O
Y-9623-A(01)	01-1020-25	025970P	Vent from reactor vessel	O
Y-9623-A(02)	01-1020-25	025970P	Vent from eight tanks	O

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9623-A(03)	01-1020-25	025970P	Lab hood	O
Y-9623-A(04)	01-1020-25	025970P	Lime silo	O
Y-9623-A(05)	01-1020-25	025970P	Storage tank	O
Y-9623-A(06)	01-1020-25	025970P	Storage tank	O
Y-9720-19-A(01)	01-0020-41	012885P	Curing oven	O
Y-9720-19-C(01)	01-0020-23	012864P	Teflon sintering oven	O
Y-9720-19-D(03)	01-0020-27	012869P	Plastics spray booth	O
Y-9720-20-A(01)	01-1020-39	025971P	Small maintenance shop—fabric filter	O
Y-9720-31-FUG-A-(00)	01-1020-89	029891P	Storage area	
Y-9720-32-SAS-[A]-201	01-0020-42	032547P	Classified waste shredder	O
Y-9720-5-ASM-[A]-(130)	01-1020-75	031958P	Hood @ 9720-5 east end	O
Y-9720-5-FAB-[B]-247	01-1020-85	031741P	Cleaning and packaging of uranium parts	O
Y-9720-58-FUG-A-(00)	01-1020-89	029891P	PCB storage shed	
Y-9720-6-A(1)	01-0020-26	012867P	Paint spray booth	O
Y-9720-6-A(2)	01-0020-26	012867P	Paint spray booth	O
Y-9720-6-B(01)	01-0020-75	015154P	Woodworking operation	O
Y-9720-6-B(03)	01-0020-26	012867P	Drying oven	O
Y-9720-6-C(01)	01-0020-76	015155P	2 welding booths	O
Y-9720-6-C(02)	01-0020-76	015155P	Welding booth	O
Y-9720-6-E(01)	01-0020-83	016548P	Clean room laboratory	O
Y-9720-9-FUG-A-(00)	01-1020-89	029891P	PCB & RCRA storage	
Y-9737-A(01)	01-0020-22	012863P	Oven	O
Y-9737-B(02)	01-0020-78	015157P	Plating tank catalog cat	O
Y-9737-C(02)	01-0020-78	015157P	PC board etcher	O
Y-9737-D(02)	01-0020-78	015157P	Solder centrifuge	O
Y-9737-E(02)	01-0020-78	015157P	Wave solder machine	O
Y-9737-F(02)	01-0020-78	015157P	Oil bath	O
Y-9737-G(03)	01-0020-79	015160P	Fume hood	O
Y-9737-H(04)	01-0020-79	015160P	Varnish room exhaust	O
Y-9737-I(05)	01-0020-79	015160P	Cleaning hood	O
Y-9738-A(01)	01-0020-14	025975P	Sandblaster untitled cat	O
Y-9738-A(02)	01-0020-14	025975P	Hood with fan	O
Y-9738-A(03)	01-0020-14	025975P	Sand blaster	O
Y-9738-A(04)	01-0020-14	025975P	Hood with fan	O
Y-9738-A(05)	01-0020-14	025975P	Hood with fan	O
Y-9739-A(01)	01-1020-78	028105P	Printfold Diazo blueprint copier/rm 160	O
Y-9739-B(02)	01-1020-78	028105P	Printfold Diazo blueprint copier/rm 174	O
Y-9754-3-[A]-(00)			Fuel service station	
Y-9767-4-A(01)	01-0020-35	012877P	Chilled water circulating system	O
Y-9808-A	01-0020-80	015156P	Carpenter shop	O
Y-9808-A(01)	01-1020-22	026109P	Spray booth	O
Y-9809-A(01)	01-0020-93	025899P	Oxide storge vaults	O
Y-9811-1-[A]-(1)	01-1020-95	731997P	Waste oil/storage bulk storage facility	O
Y-9811-1-[A]-(2)	01-1020-95	731997P	Waste oil/storage bulk storage facility	O
Y-9811-1-[A]-(3)	01-1020-95	731997P	Waste oil/storage bulk storage facility	O
Y-9811-1-[A]-(4)	01-1020-95	731997P	Waste oil/storage bulk storage facility	O
Y-9811-1-[A]-(5)	01-1020-95	731997P	Waste oil/storage bulk storage facility	O
Y-9811-1-[A]-(6)	01-1020-95	731997P	Waste oil/storage bulk storage facility	O
Y-9811-1-[A]-(7)	01-1020-95	731997P	Waste oil/storage bulk storage facility	O
Y-9811-6-PMU-A(1)	01-1020-82	029415P	Dry ash handling system	O
Y-9811-8-[A]-(01)	01-1020-63	032988P	Waste oil solvent tanks	O
Y-9811-8-[A]-(02)	01-1020-63	032988P	Waste oil solvent tanks	O
Y-9811-8-[A]-(03)	01-1020-63	032988P	Waste oil solvent tanks	O
Y-9811-8-[A]-(04)	01-1020-63	032988P	Waste oil solvent tanks	O
Y-9811-8-[A]-(05)	01-1020-63	032988P	Waste oil solvent tanks	O
Y-9811-B(02)	01-1020-45	025903P	Incinerator	O
Y-9812-[A]-(287)	01-1020-29	022474P	Storage tank/12,115 gal	O
Y-9812-[A]-(288)	01-1020-29	022474P	Storage tank/12,133 gal	O

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9812-[A]-(289)	01-1020-29	022474P	Storage tank/4,876 gal	O
Y-9815-A(03)	01-0020-11	025895P	Vent from reactors	O
Y-9815-A(04)	01-0020-11	025895P	Storage tank/12,000 gal	O
Y-9815-A(05)	01-0020-11	025895P	Storage tank/4,500 gal	O
Y-9815-A(06)	01-0020-11	025895P	Storage tank/4,400 gal	O
Y-9815-A(07)	01-0020-11	025895P	Storage tank/1,800 gal	O
Y-9815-A(08)	01-0020-11	025895P	2 storage tank/2,200 gal each	O
Y-9818-A(01)	01-0020-12	025965P	Hot well seal tank	O
Y-9818-A(02)	01-0020-12	025965P	11 storage tanks—nitric acid recovery	O
Y-9818-A(03)	01-0020-12	025965P	Bioreactor tanks/ozonation tanks (2)	O
Y-9818-A(04)	01-0020-12	025965P	Basement exhaust	O
Y-9818-A(05)	01-0020-12	025965P	Nitric acid supply line vent	O
Y-9818-A(06)	01-0020-12	025965P	Ozone generator/area exhaust	O
Y-9818-A(07)	01-0020-12	025965P	Storage tank/10,000 gal	O
Y-9818-A(08)	01-0020-12	025965P	Denitrification feed tank/10,000 gal	O
Y-9818-A(09)	01-0020-12	025965P	Nitrate receiving tank/4,000 gal	O
Y-9818-A(10)	01-0020-12	025965P	Nitric acid waste tank/10,000 gal	O
Y-9818-A(11)	01-0020-12	025965P	Nitric acid waste tank/10,000 gal	O
Y-9818-A(12)	01-0020-12	025965P	Nitric acid waste tank/10,000 gal	O
Y-9828-6-FUG-A-(00)	01-1020-89	029891P	Trash monitoring station	
Y-9929-F(01)	01-0020-39	012881P	Open yard coal storage	O
Y-9983-74-FUG-A-(00	01-1020-89	029891P	Old salvage	
Y-9998-A(01)	01-0020-13	025957P	Swagging machines	O
Y-9998-A(02)	01-0020-13	025957P	Swagging machines	O
Y-9998-A(03)	01-0020-13	025957P	Furnaces	O
Y-9998-A(04)	01-0020-13	025957P	Nitric acid pickling tanks	O
Y-9998-A(05)	01-0020-13	025957P	Hood	O
Y-9998-A(06)	01-0020-13	025957P	Foundry operations	O
Y-9998-B(1)	01-1020-40	026110P	Machine shop	O
Y-BCB-FUG-A-(00)	01-1020-89	029891P	Bear Creek Burial Grounds	
Y-BCBG-NAK	01-00020-00	0100020	Open burn for NaK (send letter to Knox)	O
Y-IDY-FUG-A-(00)	01-1020-89	029891P	Interim drum area	
Y-IWF-FUG-A-(00)	01-1020-89	029891P	Industrial waste facility	
Y-SLF-FUG-A-(00)	01-1020-89	029891P	Sanitary landfill	
Y-9201-1-A(01)	01-0020-15	730303P	Welding booths	C
Y-9201-1-A(02)	01-0020-15	730303P	Welding shop	C
Y-9201-1-A(04)	01-0020-15	730303P	Metal fabrication shop	C
Y-9201-1-A(05)	01-0020-15	730303P	Welding shop	C
Y-9201-1-A(15)	01-0020-15	730303P	Metal fabrication shop	C
Y-9201-1-A(19)	01-0020-15	730303P	Welding hood exhaust	C
Y-9201-1-B(16)	01-0020-59	730310P	Tool grinding machines	C
Y-9201-1-B(18)	01-0020-59	730310P	Sandblaster exhaust	C
Y-9201-1-C(3)	01-0020-17	730304P	Graphic carbon machining	C
Y-9201-1-C(4)	01-0020-17	730304P	Graphic carbon machining	C
Y-9201-1-D(09)	01-0020-61	730310P	Fabrication shop	C
Y-9201-1-D(10)	01-0020-61	730310P	Fabrication shop	C
Y-9201-1-D(11)	01-0020-61	730310P	Fabrication shop	C
Y-9201-1-D(13)	01-0020-61	730310P	Metal grinders and milling machines	C
Y-9201-5-B(01)	01-0020-21	730305P	Machining operations L5N hood exhaust	C
Y-9201-5-B(02)	01-0020-21	730305P	Vacuum inlets L5E machining shop	C
Y-9201-5-B(03)	01-0020-21	730305P	Rubber-gel potting hood exhaust	C
Y-9201-5-B(04)	01-0020-21	730305P	Palarite shop—machine exhaust	C
Y-9201-5-B(05)	01-0020-21	730305P	Tool grinding machines hood exhaust	C
Y-9201-5-B(06)	01-0020-21	730305P	Cleaning hood—equipment service	C
Y-9201-5-B(07)	01-0020-21	730305P	Electrochemical machine-stainless steel	C
Y-9201-5-G(01)	01-0020-44	921689P	Arc melt	C
Y-9201-5-G(02)	01-0020-44	921689P	DeVilbiss hood	C
Y-9201-5-G(03)	01-0020-44	921689P	Nitric acid dip tanks	C
Y-9201-5-G(04)	01-0020-44	921689P	Acid pickling tanks	C
Y-9201-5-G(05)	01-0020-44	921689P	Scrap metal recycle	C

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9201-5-G(06)	01-0020-44	921689P	Scrap metal recycle	C
Y-9201-5-G(07)	01-0020-44	921689P	Vapor degreaser	C
Y-9201-5N-A(01)	01-1020-18	730314P	Machine shop exhaust	C
Y-9204-2-E(68)	01-1020-55	730328P	Oven	C
Y-9204-2-E(69)	01-1020-55	730328P	Oven	C
Y-9204-2-E(70)	01-1020-55	730328P	Tungsten screener	C
Y-9204-2-E(71)	01-1020-55	730328P	Dry box vent	C
Y-9204-2-E(72)	01-1020-55	730328P	Glove boxes	C
Y-9204-2-E(73)	01-1020-55	730328P	Material handling	C
Y-9204-2-E(74)	01-1020-55	730328P	Glove boxes	C
Y-9204-2-E(75)	01-1020-55	730328P	Outgassing/annealing ovens	C
Y-9204-2-E(76)	01-1020-55	730328P	Material handling	C
Y-9204-2-E(77)	01-1020-55	730328P	Glove boxes	C
Y-9204-2-E(78)	01-1020-55	730328P	Reactor unloading station	C
Y-9204-2-E(79)	01-1020-55	730328P	Reactor unloading station	C
Y-9204-2-E(80)	01-1020-55	730328P	Glove boxes	C
Y-9204-2-E(81)	01-1020-55	730328P	Vacuum pump	C
Y-9204-2E-A(436)	01-0020-68	730312P	Oven	C
Y-9204-2E-A(439)	01-0020-68	730312P	Hood exhaust	C
Y-9204-2E-A(441)	01-0020-68	730312P	Hood	C
Y-9204-2E-A(442)	01-0020-68	730312P	Hood	C
Y-9204-2E-A(443)	01-0020-68	730312P	Degreaser	C
Y-9204-2E-A(444)	01-0020-68	730312P	Electropolishers	C
Y-9204-2E-A(445)	01-0020-68	730312P	Surface coating	C
Y-9204-2E-A(448)	01-0020-68	730312P	Glovebox	C
Y-9204-2E-A(449)	01-0020-68	730312P	Storage tank	C
Y-9204-2E-C(12)	01-1020-68	730328P	Machine shop hood exhaust—B2E	C
Y-9204-2E-C(13)	01-1020-68	730328P	Machine shop hood exhaust—spec. shop	C
Y-9204-2E-[A]-(202)	01-1020-91	730938P	Positive ion accelerator	C
Y-9204-4-A(02)	01-1020-56	931629P	Wash tank	C
Y-9204-4-A(03)	01-1020-56	931629P	Quench tanks	C
Y-9204-4-A(04)	01-1020-56	931629P	1000 ton press	C
Y-9204-4-A(05)	01-1020-56	931629P	7500 ton press	C
Y-9204-4-A(06)	01-1020-56	931629P	Exhaust from press pit area	C
Y-9204-4-A(07)	01-1020-56	931629P	Plasma torch cutting machine	C
Y-9204-4-A(08)	01-1020-56	931629P	Vacuum quench furnace	C
Y-9204-4-A(09)	01-1020-56	931629P	Ingot cooler	C
Y-9204-4-A(10)	01-1020-56	931629P	Exhaust from lathe	C
Y-9204-4-A(11)	01-1020-56	931629P	Grinding facility	C
Y-9204-4-A(12)	01-1020-56	931629P	Dye penetrant	C
Y-9204-4-A(13)	01-1020-56	931629P	Salt baths	C
Y-9204-4-A(14)	01-1020-56	931629P	Quench tanks	C
Y-9204-4-A(15)	01-1020-56	931629P	Preheat furnace exhaust	C
Y-9204-4-A(17)	01-1020-56	931629P	Oven exhaust	C
Y-9204-4-A(18)	01-1020-56	931629P	Vacuum furnace quench chamber	C
Y-9204-4-A(19)	01-1020-56	931629P	7500 ton press & 1500 ton press	C
Y-9204-4-B(481)	01-0020-72	730313P	Exhaust from machining operation	C
Y-9204-4-B(482)	01-0020-72	730313P	Exhaust from hood—reclamation area	C
Y-9204-4-B(484)	01-0020-72	730313P	Rolling mill—1st floor assembly	C
Y-9204-4-B(485)	01-0020-72	730313P	Exhaust from paint hood	C
Y-9204-4-B(486)	01-0020-72	730313P	Filtering exhaust from paint booths	C
Y-9204-4-B(488)	01-0020-72	730313P	Laboratory hoods—1st floor	C
Y-9204-4-B(489)	01-0020-72	730313P	Laboratory hoods—reclamation area	C
Y-9204-4-B(490)	01-0020-72	730313P	Assembly process—first floor	C
Y-9204-4-B(491)	01-0020-72	730313P	Assembly process—1st floor	C

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9204-4-D(01)	01-1020-35	730317P	Exhaust hood	C
Y-9204-4-[A]-(88)	01-1020-56	931629P	Grit blast system	C
Y-9206-C(01)	01-1020-24	730316P	Classified	C
Y-9206-C(02)	01-1020-24	730316P	Classified	C
Y-9206-E (NEW)	01-1020-24	730316P	Classified	C
Y-9206-[B]-(013)	01-0020-03	731689P	South stack, incinerator	C
Y-9206-[B]-(015)	01-0020-03	731689P	West stack	C
Y-9206-[B]-(016)	01-0020-03	731689P	Dissolving hood	C
Y-9206-[B]-(017)	01-0020-03	731689P	Steam cleaning hoods	C
Y-9206-[B]-(115)	01-0020-03	731689P	Reduction fluid bed	C
Y-9206-[B]-(135)	01-0020-03	731689P	AEC scrubber stack	C
Y-9206-[B]-(136)	01-0020-03	731689P	AEC consolidated stack	C
Y-9206-[B]-(208)	01-0020-03	731689P	Conversion fluid bed	C
Y-9206-[B]-(209)	01-0020-03	731689P	HF purge vent	C
Y-9206-[B]-(210)	01-0020-03	731689P	Chemical make-up area	C
Y-9206-[B]-(211)	01-0020-03	731689P	Hood 29 and 30	C
Y-9206-[B]-(212)	01-0020-03	731689P	Dry vacuum system	C
Y-9212-B(01)	01-0020-02	730301P	U metal drying and briquetting process	C
Y-9212-B(02)	01-0020-02	730301P	Exhaust from chip washing and drying	C
Y-9212-B(03)	01-0020-02	730301P	E-wing machine shop	C
Y-9212-B(04)	01-0020-02	730301P	U metal and U metal alloy casting	C
Y-9212-F(01)	01-1020-49	730321P	Two Deburr benches—hood exh.—A-wing	C
Y-9212-F(02)	01-1020-49	730321P	Two Deburr benches—hood exh.—A-wing	C
Y-9212-F(03)	01-1020-49	730321P	Machining—Hood exhaust—A-wing	C
Y-9212-F(04)	01-1020-49	730321P	Machining—Hood exhaust—A-wing	C
Y-9212-F(05)	01-1020-49	730321P	Machining—Hood exhaust—A-wing	C
Y-9212-[A](027)	01-1020-72	997756P	D-wing, room 1010 hoods, rms 26 & 29	C
Y-9212-[A](028)	01-1020-72	997756P	Reduction, shear, and room 1010, EUCF	C
Y-9212-[A](033)	01-1020-72	997756P	Headhous equipment & incinerator	C
Y-9212-[A](040)	01-1020-72	997756P	B-1 sampling lab hoods	C
Y-9212-[A](042)	01-1020-72	997756P	Chloride removal sys./C-1 wing process ex.	C
Y-9212-[A](050)	01-1020-72	997756P	C-1 chip burner, enclosures, load hoods	C
Y-9212-[A](111)	01-1020-72	997756P	Reduction fluids beds	C
Y-9212-[A](112)	01-1020-72	997756P	Conversion fluid beds	C
Y-9212-[A](132)	01-1020-72	997756P	Decontamination facility	C
Y-9212-[A](430)	01-1020-72	997756P	HF dock cylinder/vaporizer purge vent	C
Y-9212-[A](431)	01-1020-72	997756P	N204 cylinder purge vent	C
Y-9215-A(01)	01-0020-37	731839P	Machine shop hood exhaust—M-wing	C
Y-9215-C(03)	01-1020-52	730323P	Vapor blaster/metal cleaner	C
Y-9215-C(10)	01-1020-52	730323P	Nickel plating—metal working exhaust	C
Y-9215-C(11)	01-1020-52	730323P	Exhaust	C
Y-9215-C(17)	01-1020-52	730323P	Rolling mill	C
Y-9215-C(19)	01-1020-52	730323P	Electric annealing oven	C
Y-9215-[B]-(1)	01-1020-51	732125P	O-wing metal working operations	C
Y-9215-[B]-(2)	01-1020-51	732125P	O-wing metal working operations	C
Y-9215-[B]-(4)	01-1020-51	732125P	O-wing metal working operations	C
Y-9215-[B]-(6)	01-1020-51	732125P	O-wing metal working operations	C
Y-9401-2-[A]-(205)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(220)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(221)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(222)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(223)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(224)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(225)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(226)	01-0020-88	730286P	Plating equipment	C

Table 3.1 (continued)

Y-12 Plant source number	Emission source reference number	Permit number	Source	Permit type[a]
Y-9401-2-[A]-(227)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(228)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(229)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(230)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(231)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(232)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(233)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(234)	01-0020-88	730286P	Plating equipment	C
Y-9401-2-[A]-(235)	01-0020-88	730286P	Plating equipment	C
Y-9811-1-[A]-(1)	01-1020-95	731997P	Waste oil/storage bulk storage facility	C
Y-9811-1-[A]-(2)	01-1020-95	731997P	Waste oil/storage bulk storage facility	C
Y-9811-1-[A]-(3)	01-1020-95	731997P	Waste oil/storage bulk storage facility	C
Y-9811-1-[A]-(4)	01-1020-95	731997P	Waste oil/storage bulk storage facility	C
Y-9811-1-[A]-(5)	01-1020-95	731997P	Waste oil/storage bulk storage facility	C
Y-9811-1-[A]-(6)	01-1020-95	731997P	Waste oil/storage bulk storage facility	C
Y-9811-1-[A]-(7)	01-1020-95	731997P	Waste oil/storage bulk storage facility	C

[a]O = operating; C = construction.

Table 3.2. 1991 Air permits at ORNL

ORNL source number	Emission source reference number	Permit number	Source	Permit type[a]
X-2000-SV2	73-0112-75	024473P	Furnace, ovens, hoods, pumps	O
X-2000-SV9	73-0112-32	024135P	Laser with wet scrubber	O
X-2013-01	73-0112-65	730837P	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	730837P	Parts washer (degreaser)	O
X-2519-1/5	73-0112-03	030284P	5 boilers and ash system	O
X-2519-T1	73-0112-57	031280P	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	730837P	Parts washer (degreaser)	O
X-2525-03	73-0112-65	730837P	Parts washer (degreaser)	O
X-2525-14	73-0112-65		Degreaser, graymills	A
X-2525-6	73-0112-95	027257P	Machine shop	O
X-2525-S13	73-0112-54	027392P	Vapor blaster and buffers	O
X-2525-SV11	73-0112-49	024151P	Electroplating shop	O
X-2525-SV4	73-0112-38	031062P	6 wet and 3 dry grinders	O
X-2525-SV8	73-0112-62	024949P	Spray booth and oven	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	730837P	Parts washer (degreaser)	O
X-3003-SV6	73-0112-29	023760P	Tank, sulfur hexafluoride	O
X-3003-SV8	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-3005-02	73-0112-18	880787P/027214P	Parts washer (degreaser)	O
X-3012-SV1	73-0112-74	024449P	Furnace	O
X-3012-SV2	73-0112-50	024252P	Degreaser	O
X-3019-01	73-0112-23	023194P	Thermal denitration	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-3044-01			Special materials machine shop	A
X-3074-01	73-0112-65	730837P	Parts washer (degreaser)	O
X-3103-T1	73-0112-42	024113P	Tank, sulfuric acid	O
X-3104-03	73-0112-81	024511P	Carpenter shop	O
X-3117-T1	73-0112-42	024115P	Tank, sulfuric acid	O
X-3500-02	73-0112-65	730837P	Parts washer (degreaser)	O
X-3500-SV12	73-0112-73	024450P	Furnace	O
X-3502-01	73-0112-05	030881P	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	730489P	NRWTP air stripper column	O
X-4500N1-SV93	73-0112-65	730837P	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

Table 3.2 (continued)

ORNL source number	Emission source reference number	Permit number	Source	Permit type[a]
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	732645P	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	73-0112-29	023760P	Tank	O
X-6000-01	73-0112-65	730837P	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	730837P	Parts washer (degreaser)	O
X-7002-01	73-0112-19	024251P	Parts washer (degreaser)	O
X-7002-01	73-0112-19	024251P	Parts washer (degreaser)	A
X-7002-03	73-0112-65	730837P	Parts washer (degreaser)	O
X-7002-04	73-0112-65	730837P	Parts washer (degreaser)	O
X-7002-05	73-0112-08	030980P	Spray booth	O
X-7002-T1	73-0112-88	025659P	Tank, used oil	O
X-7003-01	73-0112-65	730837P	Parts washer (degreaser)	O
X-7003-01	73-0112-65		Degreaser, graymills	A
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 furnaces (5)	O
X-7007-1/2	73-0112-09	030824P	Spray booth and cleaning booth	O
X-7012-01	73-0112-65	730837P	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 (X-7069-T1)	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 (standby unit)	O
X-7606-01	73-0112-65	730837P	Parts washer (degreaser)	O
X-7667-0	73-00111 0067	73-00111 0067 4	Chemical detonation facility	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-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, corrosion inhibitor	O
X-7903-T1	73-0112-48	024138P	Tank, sulfuric acid	O
X-7910-01	73-0112-65	730837P	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-FE	73-0112-97	029660P	Fugitive emission sources	O

[a]O = operating permit; A = application.

Table 3.3. 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-1004-L	0106-35	012503P	Main vent of development facility	O
K-1004-L oven	0106-95	024299P	Sintering oven	O
K-1004-T hood	1106-04	024498P	Resin and hardener mixer with hoods	O
K-1004-T center b hood	1106-04	024756P	Resin and hardener mixer with hoods	O
K-1004-T hood meth	1106-15	025493P	Ultrasonic cleaner	O
K-1004-T south oven	1106-01	024304P	Matrix composites curing oven	O
K-1004-T west n oven	0106-96	024301P	Matrix composites curing oven	O
K-1004-T wind 1	1106-28	029901P	Fiber winding spools with epoxy dip	O
K-1004-T wind 2	1106-28	029901P	Fiber winding spools with epoxy dip	O
K-1004-T wind 3	1106-28	029901P	Fiber winding spools with epoxy dip	O
K-1004-T wind 4	1106-28	029901P	Fiber winding spools with epoxy dip	O
K-1024 FT1	0106-18	025655P	Filter test facility	O
K-1037 AVLIS EX LAB	0106-68	031404P	Vacuum system vents	O
K-1037 AVLIS EX LAB	0106-68	031404P	Materials Test Unit (MTU)	O
K-1037 AVLIS EX LAB	0106-68	031404P	Materials handling development	O
K-1037 AVLIS EX LAB	0106-68	031404P	Electron Beam One (EB-1)	O
K-1037 AVLIS furnace	0106-81	023119P	Huppert furnace	O
K-1037 AVLIS grieve oven	0106-80	023118P	Grieve oven TB-500 electric	O
K-1037 AVLIS LAB	1106-35	930506P	AVLIS Lab	PTC
K-1037 AVLIS LCDEV	0106-69	029897P	Expansion Lab C	O
K-1037 AVLIS LGB	0106-77	032345P	Grit blast facility with baghouse	O
K-1037 AVLIS O OVEN	0106-73	029900P	Electric oxidation oven	O
K-1037 AVLIS PRODCON	1106-36	930871P	Products conversion demonstration	PTC
K-1037 AVLIS Q OVEN	0106-79	023120P	Quincy oven	O
K-1037 AVLIS SSB	0106-85	023663P	Small sand blaster	O
K-1037 MLBH	0106-84	023662P	Mechanical lab	O
K-1095 PS123	0106-14	015830P	Paint spray operation	O
K-1098-FSB1	0106-13	015098P	Sand blast facility with baghouse	O
K-1131 MS	0106-29	015099P	Fluorine plant	O
K-1200 center bay	0106-87	732346P	Mixing epoxy resins	O
K-1200 A123	0106-56	019608P	Purge evacuation	O
K-1200 CVTF	0106-62	017339P	Centrifuge	O
K-1200 FAE1	0106-86	029192P	Isotope separating process	O
K-1200 SITF	0106-61	017338P	System interface	O
K-1200 north bay oven	0106-92	024272P	Matrix composites curing	O
K-1202 ST1	1106-20	024911P	Tanks	O
K-1220 B	0106-48	015101P	Machine repair stands	O
K-1231 AP216	0106-53	015704P	HF transfer line vent scrubber	O
K-1232 lime storage silo	1106-26	024456P	Lime storage silo	O
K-1233 1	0106-51	015702P	Classified material process	O
K-1401 121659	0106-09	016306P	1,1,1-trichloroethane degreaser	O
K-1401 275029PL	0106-38	012506P	Plastic shop curing oven	O
K-1401 composite machine	0106-88	025514P	Composite machining process	O

Table 3.3 (continued)

K-25 source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type[a]
K-1401 foam pack	1106-12	025490P	Foam packing operation	O
K-1401 JIGANDFIXT	0106-71	029898P	Parts fabrication	O
K-1401 HCLE	0106-28	024500P	Hydrochloric acid tank	O
K-1401 MB01	0106-45	017336P	Reclaiming service oven	O
K-1401 MSMC1	0106-32	017337P	Motor curing oven	O
K-1401 MSMC3	0106-66	018526P	Electric bake oven in motor shop	O
K-1401 slope	1106-29	026164P	Uranium hexaflouride converters	O
K-1401 T-104	1106-32	025658P	T-104 acid cleaning tank	O
K-1401 TRICH	1106-10	024947P	1,1,1-trichloroethane storage tank	O
K-1401 LH blove box 1,2,3	1106-03	026679P	LH glove boxes	O
K-1401 machine shop	1106-09	025585P	Machine shop exhaust system	O
K-1401 OOO oven, NE-2	0106-89	028424P	Electric oven for metal parts	O
K-1401 PLS1,4,6	0106-72	029899P	Ovens for curing plastic parts	O
K-1407 H-F-210 lime bin	1106-18	025443P	Lime storage silo	O
K-1407-A lime silo	1106-25	024455P	Lime storage silo	O
K-1413 MS	0106-52	015703P	Development facility vent	O
K-1413 propane lab	0106-28	024500P	Propane storage tank	O
K-1414 gasoline tank	0106-28	016312P	Gasoline storage tank	O
K-1414 UG methanol, unleaded gas	0106-28	024500P	Methanol, unleaded gasoline tank	O
K-1414 unleaded gasoline tank	1106-39	932727P	Unleaded gasoline storage tank	PTC
K-1419 20	0106-83	025250P	Scrubber and cylinder cleaning	O
K-1420 237306 vapor degreaser	0106-49	023797P	Detrex vapor degreaser	O
K-1420 disassembly	0106-74	032344P	Dismantling parts	O
K-1420 CPL	0106-54	017055P	Ultrasonic cleaner	O
K-1420 CPL1	0106-58	017051P	Vent for ultrasonic cleaner	O
K-1420 A	0106-55	017846P	A-area ventilation	O
K-1420 A1	0106-82	024396P	Flammable materials storage tank	O
K-1420 WODF	0106-67	018527P	Waste oil	O
K-1420 phillips vapor	0106-70	023798P	Phillips vapor degreaser	O
K-1425 WOS A	0106-11	029895P	Waste oil and solvent storage tanks	O
K-1425 WOS B	0106-11	029895P	Waste oil and solvent storage tanks	O
K-1425 WOS C	0106-11	029895P	Waste oil and solvent storage tanks	O
K-1425 WOS D	0106-11	029895P	Waste oil and solvent storage tanks	O
K-1435-C tank farm	0106-75	024105P	Storage tanks	O
K-1435 TSCAINCIN	0106-78	032449I	TSCA incinerator	O
K-1501 A1A2C3	0106-04	029902F	Steam plant with 3 stacks	O
K-1501 Boiler 8	0106-12	930870F	Natural gas/#2 oil boiler	PTC
K-1501 sulfuric acid tank	0106-28	024500P	Sulfuric acid storage tank	O
K-1515 north alum tank	0106-28	024500P	North alum tank	O
K-1515 south alum tank	0106-28	024500P	South alum tank	O
K-1600 TTFL	0106-59	017053P	Development lab	O
K-25 A-E	0106-33	012478P	Drying tracks	O
K-25 VAO	0106-15	012488P	Vacuum systems	O
K-25 B-1	0106-19	016309P	Heat exchange medium	O

Table 3.3 (continued)

K-25 source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type[a]
K291	0106-63	015097P	Wet air evacuation system	O
K-402-8 16990 cool	0106-28	024500P	Coolant tank	O
K-402-9 16989 cool	0106-28	024500P	Coolant tank	O
K-402-9 PC	0106-42	012660P	Gaseous diffusion purge cascade	O
K-502-2 327298	0106-28	024500P	Freon storage tank	O
K-502-2 327300	0106-28	024500P	Freon storage tank	O
K-602 WAP	0106-93	024297P	Evacuation of cascade cells	O
K-602-1 2543 LO	0106-23	016310P	Lube oil tank	O
K-602-2 2540 LO	0106-23	016310P	Lube oil tank	O
K-602-2 325172	0106-28	024500P	Freon storage tank	O
K-602-3 2542 LO	0106-23	016310P	Lube oil tank	O
K-602-4 2541 LO	0106-23	016310P	Lube oil tank	O
K-602-4 325285	0106-28	024500P	Freon storage tank	O
K-602-5 2545 LO	0106-23	016310P	Lube oil tank	O
K-602-6 2544 LO	0106-23	016310P	Lube oil tank	O
K-704 316MO	0106-24	016311P	Mineral oil tank	O
K-732 2135MO	0106-24	016311P	Mineral oil tank	O
K-732 2140MO	0106-24	016311P	Mineral oil tank	O
K-762 2427MO	0106-24	016311P	Mineral oil tank	O
K-762 2428MO	0106-24	016311P	Mineral oil tank	O
K-762 2423MO	0106-24	016311P	Mineral oil tank	O
K-762 2431MO	0106-24	016311P	Mineral oil tank	O
K-832 chromate tank	1106-10	024947P	Chromate storage tank	O
K-892 chromate tank	1106-10	024947P	Chromate storage tank	O
K-892 sulfuric acid tank, N	0106-28	024500P	North sulfuric acid tank	O
K-893 sulfuric acid tank, S	0106-28	024500P	South sulfuric acid tank	O
K-892 lime silo	1106-08	025120P	Lime silo	O
K-894 sulfuric acid tank	0106-28	024500P	Sulfuric acid storage tank	O
K-896 soda silo	1106-24	024758P	Soda silo	O
K-902 jet	0106-93	024298P	Exhaust jet	O
K-902 WAP	0106-93	024298P	Evacuation of cascade cells	O
K-902-1 2310 LO	0106-23	016310P	Lube oil tank	O
K-902-1 2318 LO	0106-23	016310P	Lube oil tank	O
K-902-2 2311 LO	0106-23	016310P	Lube oil tank	O
K-902-2 2319 LO	0106-23	016310P	Lube oil tank	O
K-902-2 2320 LO	0106-23	016310P	Lube oil tank	O
K-902-2 2321 LO	0106-23	016310P	Lube oil tank	O
K-902-3 2312 LO	0106-23	016310P	Lube oil tank	O
K-902-3 2322 LO	0106-23	016310P	Lube oil tank	O
K-902-3 2323 LO	0106-23	016310P	Lube oil tank	O
K-902-3 324383	0106-28	024500P	Freon storage tank	O
K-902-3 324469 Freon	0106-28	024500P	Freon R-114 storage tank	O
K-902-3 324470 Freon	0106-28	024500P	Freon R-114 storage tank	O
K-902-4 2313 LO	0106-23	016310P	Lube oil tank	O

Table 3.3 (continued)

K-25 source number	Emission source reference number (73-XXXX-XX)	Permit number	Source	Permit type[a]
K-902-4 2324 LO	0106-23	016310P	Lube oil tank	O
K-902-4 2325 LO	0106-23	016310P	Lube oil tank	O
K-902-5 2314 LO	0106-23	016310P	Lube oil tank	O
K-902-5 2378 LO	0106-23	016310P	Lube oil tank	O
K-902-5 2379 LO	0106-23	016310P	Lube oil tank	O
K-902-5 PCB 1	1106-10	024947P	PCB oil storage tank	O
K-902-5 PCB 2	1106-10	024947P	PCB oil storage tank	O
K-902-5 PCB 3	1106-10	024947P	PCB oil storage tank	O
K-902-5 PCB 4	1106-10	024947P	PCB oil storage tank	O
K-902-6 2315 LO	0106-23	016310P	Lube oil tank	O
K-902-6 2380 LO	0106-23	016310P	Lube oil tank	O
K-902-6 2381 LO	0106-23	016310P	Lube oil tank	O
K-902-6 PCB 1	1106-10	024947P	PCB oil storage tank	O
K-902-6 PCB 2	1106-10	024947P	PCB oil storage tank	O
K-902-6 PCB 3	1106-10	024947P	PCB oil storage tank	O
K-902-7 2316 LO	0106-23	016310P	Lube oil tank	O
K-902-7 2382 LO	0106-23	016310P	Lube oil tank	O
K-902-7 2383 LO	0106-23	016310P	Lube oil tank	O
K-902-8 2317 LO	0106-23	016310P	Lube oil tank	O
K-902-8 2384 LO	0106-23	016310P	Lube oil tank	O
K-902-8 2385 LO	0106-23	016310P	Lube oil tank	O
K-902-8 PCB	1106-10	024947P	PCB oil storage tank	O

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

Table 3.4. 1991 monthly fluoride averages in ambient air at the Y-12 Plant[a]

Station	Average concentrations ($\mu g/m^3$)					
	Jan	Feb	Mar	Apr	May	Jun
1	<0.0120	0.0175	<0.0115	<0.0105	<0.0081	<0.0088
2	0.0153	0.0176	<0.0112	<0.0112	<0.0091	0.0091
3	0.0146	0.0193	<0.0116	<0.0163	<0.0091	<0.0089
4	0.0128	<0.0174	*b*	*b*	<0.0105	<0.0086
5	0.0125	0.0159	<0.0106	*b*	*b*	<0.0568
6	<0.0116	0.0167	0.0127	0.0130	<0.0085	<0.0084
7	0.0115	0.0152	<0.0111	<0.0092	<0.0082	<0.0125
8	0.0141	0.0154	<0.0115	*b*	*b*	*b*
9	0.0142	0.0170	*b*	*b*	<0.0081	<0.0087
10	0.0134	0.0131	<0.0106	<0.0091	<0.0081	<0.0082
11	<0.0118	0.0179	<0.0100	<0.0095	<0.0084	<0.0087
	Jul	Aug	Sep	Oct	Nov	Dec
1	<0.0083	<0.0098	<0.0103	<0.0092	0.0093	<0.0073
2	0.0083	<0.0117	<0.0098	<0.0099	0.0335	<0.0142
3	<0.0186	<0.0101	<0.0088	<0.0100	0.0445	<0.0173
4	0.0096	<0.0117	<0.0100	<0.0102	0.0825	<0.0185
5	<0.0898	<0.0480	<0.0094	<0.0099	0.4104	<0.0385
6	0.0255	<0.0117	<0.0094	<0.0075	0.0178	<0.0101
7	<0.0093	<0.0098	<0.0082	<0.0088	0.0424	<0.0071
8	*b*	*b*	*b*	*b*	0.0153	<0.0096
9	0.0120	<0.0092	<0.0086	<0.0096	0.0137	<0.0089
10	<0.0107	<0.0091	<0.0084	<0.0096	<0.0093	<0.0091
11	<0.0082	<0.0087	<0.0100	<0.0099	<0.0085	<0.0088

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

Table 3.5. 1991 ^{234}U, ^{235}U, ^{236}U, and ^{238}U in ambient air at the Y-12 Plant[a]

Station number	Concentration (10^{-15} μCi/cm^3)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
		^{234}U		
1	0.138 ± 0.021	0.872 ± 0.057	0.133 ± 0.045	0.064 ± 0.025
2	0.284 ± 0.029	0.253 ± 0.030	0.096 ± 0.037	0.166 ± 0.046
3	0.620 ± 0.040	0.069 ± 0.015	0.333 ± 0.076	0.472 ± 0.094
4	0.722 ± 0.064	0.981 ± 0.086	0.214 ± 0.071	0.413 ± 0.097
5	0.681 ± 0.049	1.371 ± 0.070	0.853 ± 0.145	1.151 ± 0.218
6	0.342 ± 0.034	0.472 ± 0.044	0.340 ± 0.079	0.375 ± 0.085
7	0.477 ± 0.037	0.486 ± 0.060	0.235 ± 0.061	0.328 ± 0.083
8	0.272 ± 0.029	0.664 ± 0.050	0.159 ± 0.049	0.185 ± 0.053
9	0.244 ± 0.065	0.205 ± 0.036	0.103 ± 0.034	0.243 ± 0.065
10	0.144 ± 0.021	0.167 ± 0.022	0.106 ± 0.037	0.082 ± 0.033
11	0.256 ± 0.030	0.130 ± 0.019	0.120 ± 0.039	0.084 ± 0.030
12	0.243 ± 0.029	0.149 ± 0.025	0.066 ± 0.029	0.080 ± 0.029
		^{235}U		
1	0.0060 ± 0.0042	0.0113 ± 0.0100	0.0075 ± 0.0106	0.0076 ± 0.0089
2	0.0030 ± 0.0030	0.0071 ± 0.0050	*b*	0.0025 ± 0.0054
3	0.0208 ± 0.0074	*b*	0.0194 ± 0.0161	0.0081 ± 0.0095
4	0.0222 ± 0.0111	0.0300 ± 0.0150	0.0060 ± 0.0121	0.0038 ± 0.0077
5	0.0275 ± 0.0097	0.0469 ± 0.0149	0.0212 ± 0.0152	0.0397 ± 0.0238
6	0.0134 ± 0.0067	0.0041 ± 0.0041	0.0139 ± 0.0140	0.0168 ± 0.0153
7	0.0116 ± 0.0058	0.0218 ± 0.0126	0.0071 ± 0.0101	0.0070 ± 0.0109
8	0.0153 ± 0.0068	0.0264 ± 0.0100	0.0070 ± 0.0100	0.0032 ± 0.0065
9	0.0079 ± 0.0079	–0.006 ± –0.010	0.0089 ± 0.0103	0.0136 ± 0.0139
10	0.0031 ± 0.0031	0.0089 ± 0.0052	0.0098 ± 0.0114	0.0033 ± 0.0068
11	0.0068 ± 0.0048	0.0051 ± 0.0036	0.0160 ± 0.0145	–0.000 ± 0.0003
12	0.0065 ± 0.0046	0.0118 ± 0.0068	0.0136 ± 0.0138	0.0027 ± 0.0054
		^{236}U		
1	*b*	0.0151 ± 0.0076	0.0029 ± 0.0061	0.0041 ± 0.0059
2	*b*	0.0036 ± 0.0062	*b*	0.0021 ± 0.0044
3	0.0052 ± 0.0037	*b*	*b*	*b*
4	0.0056 ± 0.0056	0.0225 ± 0.0130	0.0049 ± 0.0097	0.0030 ± 0.0062
5	0.0034 ± 0.0060	0.0072 ± 0.0051	0.0107 ± 0.0097	0.0105 ± 0.0109
6	0.0067 ± 0.0047	*b*	*b*	0.0136 ± 0.0124
7	0.0087 ± 0.0050	*b*	0.0057 ± 0.0081	0.0062 ± 0.0088
8	0.0031 ± 0.0031	0.0113 ± 0.0065	–0.0001 ± 0.0002	–0.0001 ± 0.0002
9	*b*	0.0062 ± 0.0062	*b*	0.0028 ± 0.0056
10	0.0031 ± 0.0031	*b*	0.0026 ± 0.0053	0.0081 ± 0.0096
11	0.0034 ± 0.0034	0.0026 ± 0.0026	0.0051 ± 0.0074	–0.000 ± 0.0003
12	*b*	0.0039 ± 0.0039	0.0055 ± 0.0078	–0.0001± 0.0002

Table 3.5 (continued)

Station number	Concentration (10^{-15} μCi/cm^3)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
		^{238}U		
1	0.0198 ± 0.0073	0.0453 ± 0.0131	0.0120 ± 0.0122	0.0206 ± 0.0134
2	0.0299 ± 0.0095	0.0250 ± 0.0094	0.0175 ± 0.0145	0.0131 ± 0.0108
3	0.0182 ± 0.0069	0.0219 ± 0.0083	0.0157 ± 0.0130	0.0372 ± 0.0189
4	0.0223 ± 0.0136	0.0449 ± 0.0183	0.0389 ± 0.0280	0.0093 ± 0.0108
5	0.0378 ± 0.0124	0.0397 ± 0.0120	0.0214 ± 0.0139	0.0374 ± 0.0210
6	0.0168 ± 0.0075	0.0538 ± 0.0149	0.0252 ± 0.0172	0.0164 ± 0.0136
7	0.0289 ± 0.0091	0.0508 ± 0.0192	0.0172 ± 0.0142	0.0335 ± 0.0212
8	0.1375 ± 0.0209	0.0566 ± 0.0146	0.0396 ± 0.0220	0.0388 ± 0.0211
9	0.0079 ± 0.0136	0.0498 ± 0.0176	0.0311 ± 0.0178	0.0501 ± 0.0249
10	0.0947 ± 0.0170	0.0417 ± 0.0112	0.0290 ± 0.0180	0.0188 ± 0.0148
11	0.0615 ± 0.0145	0.0281 ± 0.0085	0.0129 ± 0.0118	0.0154 ± 0.0121
12	0.0032 ± 0.0056	0.0589 ± 0.0152	0.0386 ± 0.0213	0.0108 ± 0.0098

[a]Minimum detectable activity (MDA) is in the order of 1E–11 μCi/cm^3.
[b]No data available.

Table 3.6. 1991 total suspended particulates in ambient air at the Y-12 Plant[a]

Sample date	Concentration[b,c] ($\mu g/m^3$)		Sample date	Concentration[b,c] ($\mu g/m^3$)	
	East	West		East	West
1/6/91	*d*	25.6	7/5/91	40.4	38.8
1/12/91	11.7	*d*	7/11/91	36.0	11.6
1/18/91	17.9	21.6	7/17/91	50.9	45.6
1/24/91	35.6	39.8	7/23/91	43.9	53.2
1/30/91	19.6	21.3	7/29/91	74.0	65.8
2/5/91	43.5	63.9	8/4/91	61.1	50.6
2/11/91	19.3	23.0	8/10/91	31.3	31.1
2/17/91	8.1	10.7	8/16/91	7.2	23.6
2/23/91	22.3	21.8	8/22/91	53.4	41.6
3/1/91	42.5	53.8	8/28/91	41.5	39.3
3/7/91	19.5	18.9	9/3/91	42.1	45.4
3/13/91	54.3	67.5	9/9/91	35.7	46.3
3/19/91	24.0	22.9	9/15/91	80.2	*d*
3/25/91	35.6	29.0	9/21/91	45.4	34.4
3/31/91	19.1	17.1	9/27/91	*d*	*d*
4/6/91	*d*	46.2	10/3/91	45.0	22.6
4/12/91	67.3	75.0	10/9/91	37.0	24.3
4/18/91	108.7	73.2	10/15/91	24.8	28.9
4/24/91	44.1	47.1	10/21/91	56.8	*d*
4/30/91	24.7	21.0	10/27/91	15.7	32.9
5/6/91	38.9	37.7	11/2/91	*d*	*d*
5/12/91	14.8	24.4	11/8/91	17.0	11.6
5/18/91	46.0	49.7	11/14/91	71.8	43.8
5/24/91	30.3	36.4	11/20/91	19.9	21.1
5/30/91	38.0	38.1	11/26/91	36.9	*d*
6/5/91	47.9	51.3	12/2/91	11.2	10.9
6/11/91	65.2	61.7	12/8/91	24.4	22.5
6/17/91	31.1	33.8	12/14/91	9.8	10.2
6/23/91	36.5	56.7	12/20/91	38.8	31.2
6/30/91	31.6	31.7	12/26/91	37.0	30.1
			12/31/91	66.3	53.0

[a]See Fig. 3.17 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 3.7. 1991 gross alpha and beta in ambient air at the Y-12 Plant

Station number	Concentration (10^{-15} μCi/cm^3)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
		Gross alpha[a]		
1	0.683 ± 0.158	−0.02 ± −0.12	0.495 ± 0.143	0.566 ± 0.141
2	0.586 ± 0.153	0.220 ± 0.131	0.801 ± 0.155	0.664 ± 0.134
3	0.944 ± 0.171	0.385 ± 0.154	0.788 ± 0.157	0.889 ± 0.155
4	0.740 ± 0.237	0.533 ± 0.319	0.659 ± 0.275	0.760 ± 0.168
5	0.960 ± 0.171	0.857 ± 0.171	0.887 ± 0.149	0.790 ± 0.144
6	0.615 ± 0.176	0.213 ± 0.191	0.641 ± 0.150	0.515 ± 0.152
7	0.765 + 0.162	0.297 ± 0.336	0.536 ± 0.167	0.428 ± 0.144
8	0.635 ± 0.155	0.520 ± 0.161	0.691 ± 0.149	0.337 ± 0.128
9	0.458 ± 0.284	0.509 ± 0.270	0.499 ± 0.141	0.603 ± 0.145
10	0.781 ± 0.163	0.277 ± 0.147	0.707 ± 0.154	0.529 ± 0.143
11	0.602 ± 0.154	0.437 ± 0.157	0.503 ± 0.141	0.253 ± 0.121
12	0.618 ± 0.154	0.206 ± 0.142	0.692 ± 0.156	0.455 ± 0.134
		Gross beta[a]		
1	4.719 ± 0.298	1.741 ± 0.238	7.105 ± 0.315	6.799 ± 0.293
2	7.834 ± 0.347	5.326 ± 0.297	7.765 ± 0.321	6.609 ± 0.270
3	7.280 ± 0.339	5.577 ± 0.324	7.250 ± 0.318	7.914 ± 0.307
4	6.062 ± 0.456	5.874 ± 0.593	4.695 ± 0.486	5.914 ± 0.310
5	6.755 ± 0.331	5.711 ± 0.313	7.392 ± 0.296	6.654 ± 0.279
6	6.542 ± 0.368	6.032 ± 0.413	6.840 ± 0.311	5.844 ± 0.302
7	6.755 ± 0.331	6.643 ± 0.662	5.677 ± 0.332	4.804 ± 0.279
8	7.098 ± 0.336	5.180 ± 0.316	7.122 ± 0.309	6.636 ± 0.288
9	5.308 ± 0.557	7.091 ± 0.537	7.108 ± 0.311	7.818 ± 0.311
10	7.159 ± 0.337	5.164 ± 0.315	7.228 ± 0.319	7.963 ± 0.315
11	6.997 ± 0.334	5.680 ± 0.326	6.925 ± 0.310	5.942 ± 0.273
12	7.693 ± 0.345	5.669 ± 0.322	7.373 ± 0.326	6.620 ± 0.288

[a]Minimum detectable activity (MDA) is approximately 1.0E–09 μCi/cm^3.

Table 3.8. Long-lived gross alpha activity in ambient air on the ORR during 1991

Station	Number of samples	Concentration (10^{-15} μCi/mL)			
		Max	Min	Mean[a]	Standard error of mean
		ORNL PAM stations[b]			
3	22	8.7	0.53	2.3*	0.50
7	26	9.0	0.54	2.7*	0.54
9	25	10	0.57	2.5*	0.49
20	26	9.5	0.45	2.8*	0.50
21	18	8.2	0.99	2.9*	0.55
22	19	3.4	0.46	1.4*	0.21
Summary	136	10	0.45	2.4*	0.20
		ORR PAM stations[b]			
23	23	10	0.52	3.0*	0.58
33	24	18	0.48	2.9*	0.75
34	21	7.3	0.94	2.3*	0.43
40	24	9.4	0.68	2.5*	0.45
41	23	8.0	0.36	2.5*	0.47
42	25	9.2	0.51	2.4*	0.45
43	24	7.2	0.77	2.0*	0.30
44	23	13	0.76	2.3*	0.53
45	25	8.7	0.55	2.2*	0.39
46	21	9.8	0.62	2.3*	0.55
Summary	233	18	0.36	2.5*	0.16
		RAM stations[c]			
52	24	5.3	0.41	1.9*	0.31
58	16	5.9	0.71	1.6*	0.33
Summary	40	5.9	0.41	1.8*	0.23
Overall summary	409	18	0.36	2.4*	0.11

[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. 3.19, Vol. 1.
[c]Locations of remote stations are shown in Fig. 3.20, Vol. 1.

Table 3.9. Long-lived gross beta activity in ambient air on the ORR during 1991

Station	Number of samples	Concentration (10^{-15} μCi/mL)			
		Max	Min	Mean[a]	Standard error of mean
		ORNL PAM stations[b]			
3	22	31	7.9	19*	1.2
7	26	31	13	21*	0.95
9	25	31	10	19*	1.1
20	26	38	12	20*	1.2
21	18	29	9.8	20*	1.1
22	19	28	10	19*	1.1
Summary	136	38	7.9	20*	0.45
		ORR PAM stations[b]			
23	23	32	16	23*	0.95
33	24	40	11	21*	1.4
34	21	33	12	20*	1.1
40	24	28	4.8	19*	0.99
41	23	32	11	20*	1.0
42	25	30	12	21*	0.95
43	24	31	7.8	21*	1.2
44	23	37	13	22*	1.3
45	25	37	12	21*	1.2
46	21	31	1.8	19*	1.3
Summary	233	40	1.8	21*	0.37
		RAM stations[c]			
52	24	31	12	18*	1.0
58	16	35	11	20*	1.7
Summary	40	35	11	19*	0.90
Overall summary	409	40	1.8	20*	0.27

[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. 3.19, Vol. 1.
[c]Locations of remote stations are shown in Fig. 3.20, Vol. 1.

Table 3.10. ^{131}I concentration in ambient air on the ORR during 1991

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	22	5.0	–6.1	0.060	0.53	<0.01
7	26	6.9	–9.9	–0.68	0.86	<0.01
9	25	15	–9.4	0.70	0.84	<0.01
20	26	7.8	–12	–0.13	0.69	<0.01
21	18	4.6	–5.3	0.13	0.56	<0.01
22	19	7.2	–3.9	0.021	0.67	<0.01
Summary	136	15	–12	0.0025	0.30	<0.01
			ORR PAM stations[c]			
23	23	11	–7.1	0.65	0.77	<0.01
34	21	23	–4.3	2.9*	1.4	<0.01
40	24	6.6	–7.0	–0.53	0.78	<0.01
41	23	7.9	–9.7	0.98	0.85	<0.01
44	23	4.2	–6.1	0.97*	0.50	<0.01
45	25	3.8	–14	–0.73	0.74	<0.01
46	21	8.4	–4.8	0.39	0.64	<0.01
Summary	160	23	–14	0.62*	0.32	<0.01
Overall summary	296	23	–14	0.33	0.22	<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 × 10^{-15} μCi/mL.

[c]Locations of ORNL and ORR perimeter stations are shown in Fig. 3.19, Vol. 1.

Table 3.11. Tritium concentration in ambient air on the ORR during 1991

Station[a]	Number of samples	Concentration (10^{-6} pCi/mL)				
		Max	Min	Mean[b]	Standard error of mean	Percent of DCG[c]
3	13	1400	14	170	110	*d*
8	13	920	27	200*	76	0.02
Overall summary	26	1400	14	190*	64	0.19

[a]Station locations are shown in Fig. 3.19, 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.

[d]Not applicable.

Table 3.12. 1991 continuous ambient 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	0.018	<0.01	–0.006	<0.01	0.057	<0.01
^{137}Cs	0.023	<0.01	0.022	<0.01	0.052	<0.01
^{238}Pu	0.001	<0.01	0.0014	<0.01	–0.0008	<0.01
^{239}Pu	–0.00022	<0.01	–0.0009	<0.01	–0.0027	<0.01
^{228}Th	0.0023*	<0.01	0.002*	<0.01	0.0018	<0.01
^{230}Th	0.0019*	<0.01	0.0062*	0.016	0.0042*	0.011
^{232}Th	0.0021*	0.03	0.004*	0.057	0.0031*	0.044
Total-Sr	0.12*	<0.01	0.071*	<0.01	0.11*	<0.01
^{234}U	–0.0095*	0.011	0.15*	0.17	0.08*	0.089
^{235}U	0.0028*	<0.01	0.01*	0.01	0.0055*	<0.01
^{238}U	0.0042*	<0.01	0.018*	0.018	0.022*	0.022

Analysis	Station 45	Percentage DCG[b]	Station 46	Percentage DCG[b]	ORNL network	Percentage DCG[b]
^{60}Co	–0.019	<0.01	0.02	<0.01	0.014	<0.01
^{137}Cs	0.019	<0.01	0.068*	<0.01	0.007	<0.01
^{238}Pu	0.001	<0.01	–0.0014	<0.01	0.00021	<0.01
^{239}Pu	–0.0023	<0.01	–0.0005	<0.01	0.00012	<0.01
^{228}Th	0.0038*	<0.01	0.0029*	<0.01	0.0019*	<0.01
^{230}Th	0.0035*	<0.01	0.004*	0.01	0.0016*	<0.01
^{232}Th	0.0027*	0.039	0.0035*	0.05	0.0021*	0.03
Total-Sr	0.0094	<0.01	0.02	<0.01	0.019*	<0.01
^{234}U	0.16*	0.18	0.16*	0.18	0.024*	0.027
^{235}U	0.0039*	<0.01	0.01*	0.01	0.003*	<0.01
^{238}U	0.033*	0.033	0.029*	0.029	0.014*	0.014

Analysis	ORR network	Percentage DCG[b]	Remote network	Percentage DCG[b]
^{60}Co	–0.002	<0.01	0.031	<0.01
^{137}Cs	0.0082	<0.01	0.0034	<0.01
^{238}Pu	–0.0002	<0.01	0.0018	<0.01
^{239}Pu	–0.00057	<0.01	–0.0011	<0.01
^{228}Th	0.0033*	<0.01	0.0037*	<0.01
^{230}Th	0.0024*	<0.01	0.003*	<0.01
^{232}Th	0.0031*	0.044	0.0037*	0.053
Total-Sr	0.0084	<0.01	0.037*	<0.01
^{234}U	0.039*	0.043	0.0079*	<0.01
^{235}U	0.0061*	<0.01	0.00028	<0.01
^{238}U	0.02*	0.02	0.0053*	<0.01

[a]See Figs. 3.19 and 3.20 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; 137Cs is 4 × 10–10 μCi/mL; ^{238}Pu is 3×10^{-14} μCi/mL; 239Pu 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.

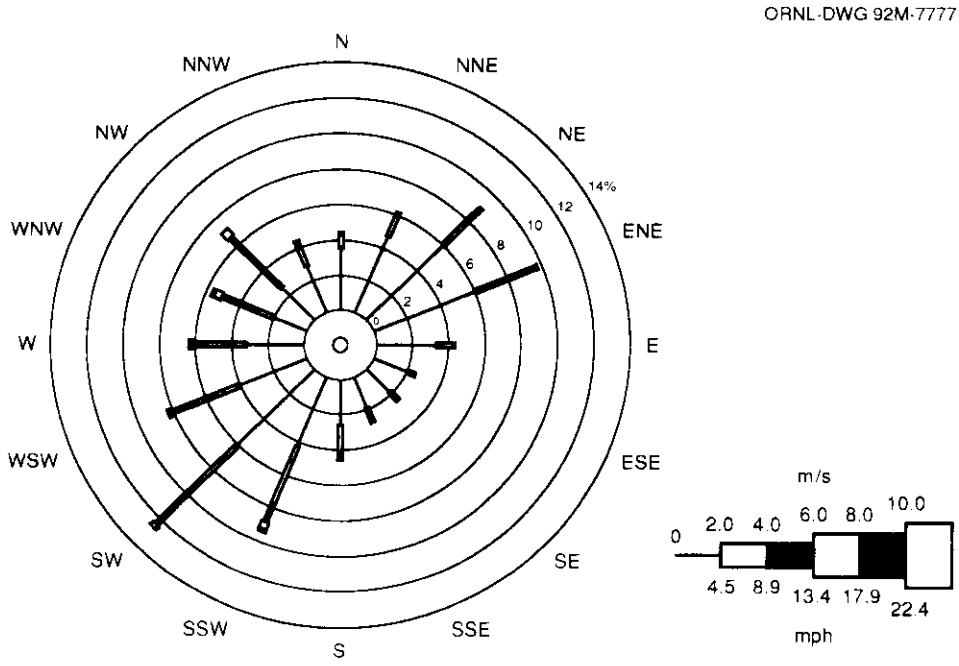

Fig. 3.1. 1991 wind rose for K-25 tower MT1 (10-m level), with 91.4% of possible data.

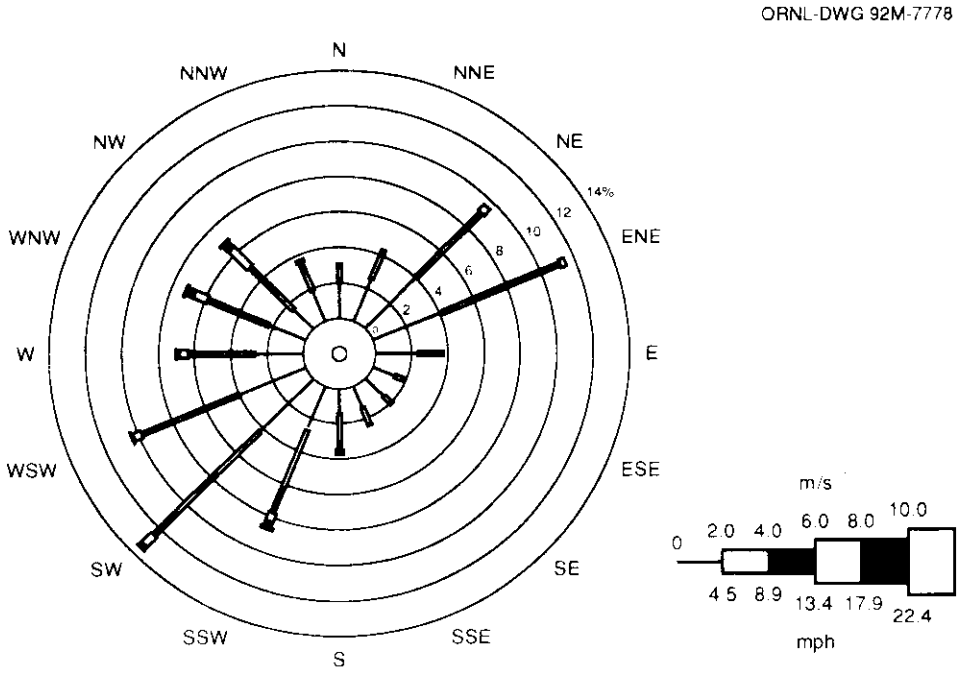

Fig. 3.2. 1991 wind rose for K-25 tower MT1 (60-m level), with 87.5% of possible data.

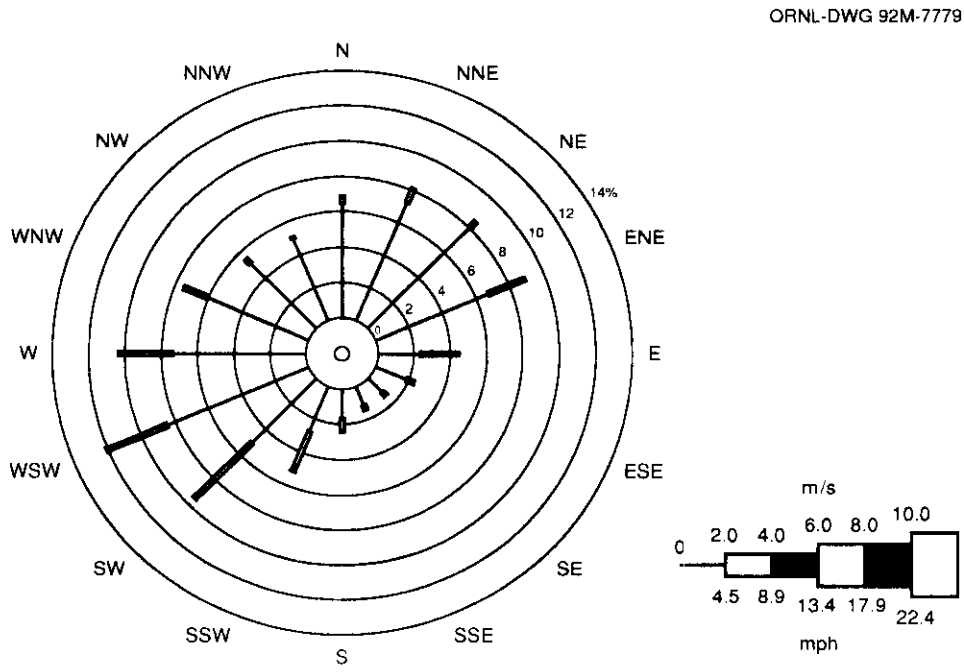

Fig. 3.3. 1991 wind rose for ORNL tower MT2 (10-m level), with 81.8% of possible data.

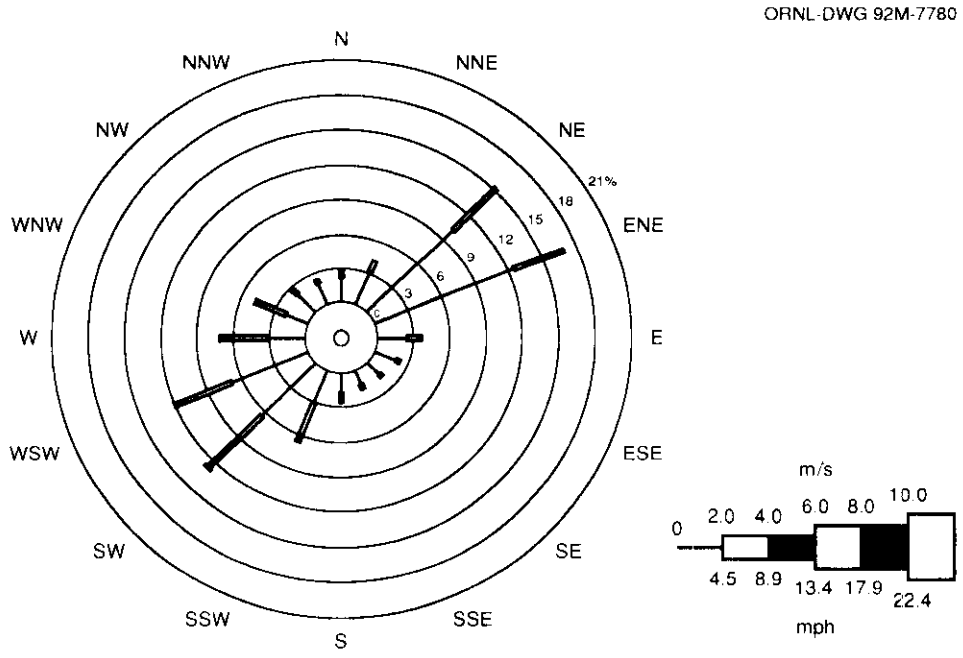

Fig. 3.4. 1991 wind rose for ORNL tower MT2 (30-m level), with 82.2% of possible data.

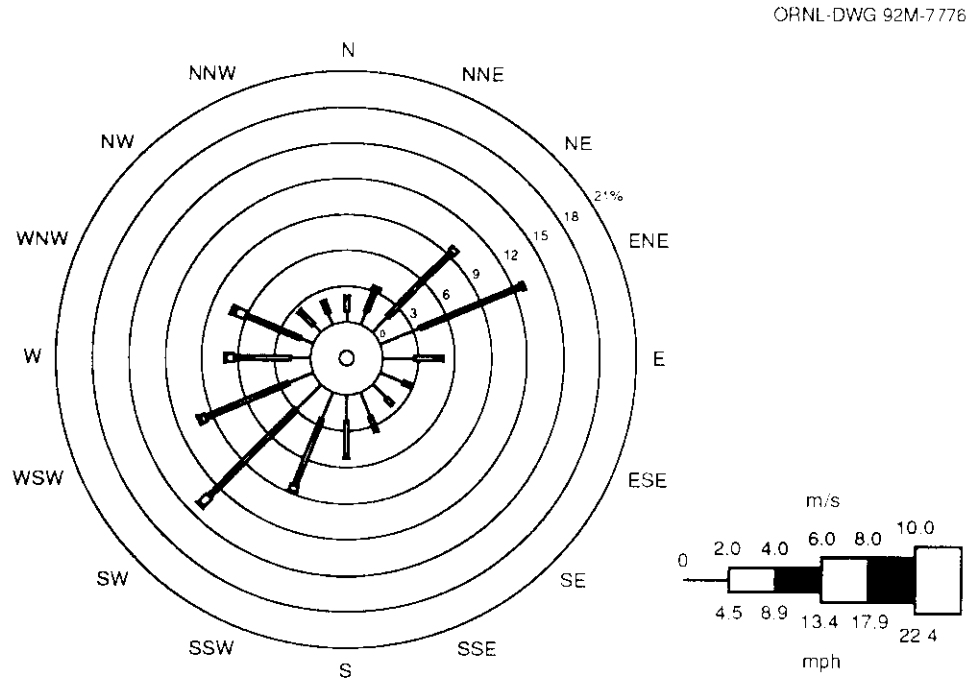

Fig. 3.5. 1991 wind rose for ORNL tower MT2 (100-m level), with 80.4% of possible data.

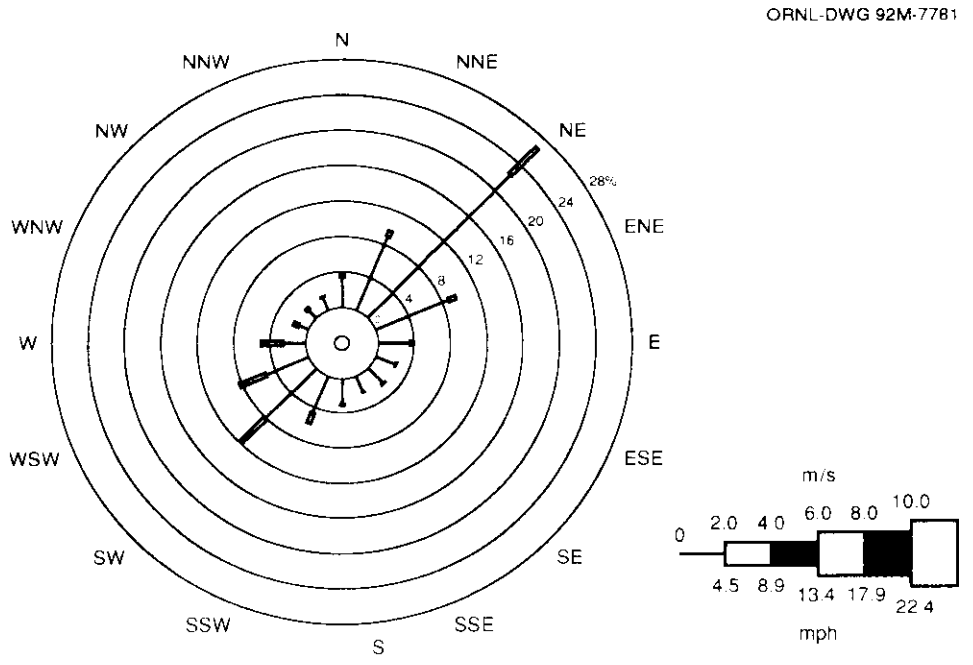

Fig. 3.6. 1991 wind rose for ORNL tower MT3 (10-m level), with 84.0% of possible data.

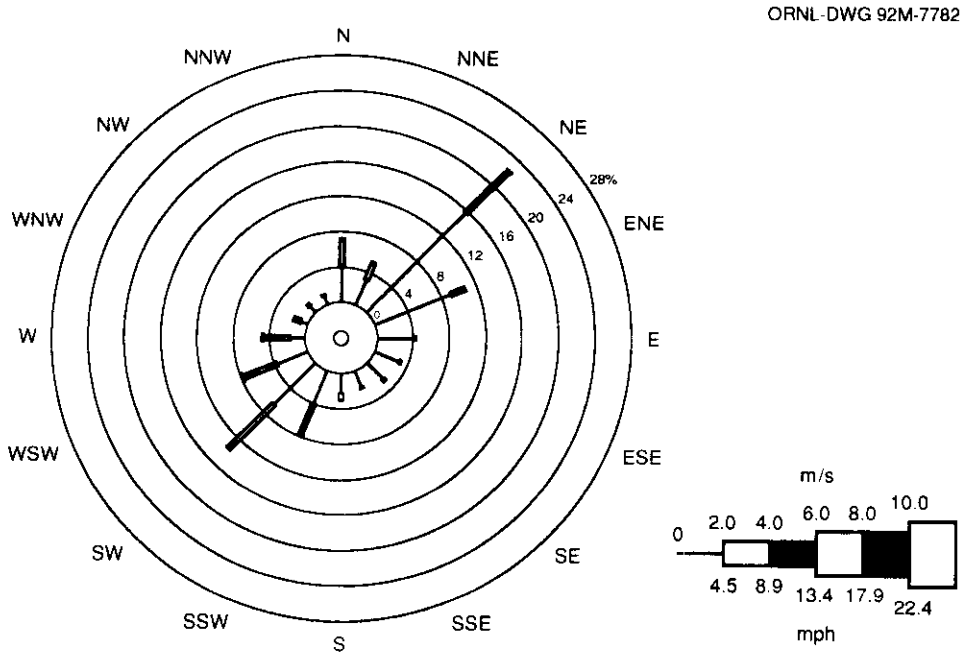

Fig. 3.7. 1991 wind rose for ORNL tower MT3 (30-m level), with 83.0% of possible data.

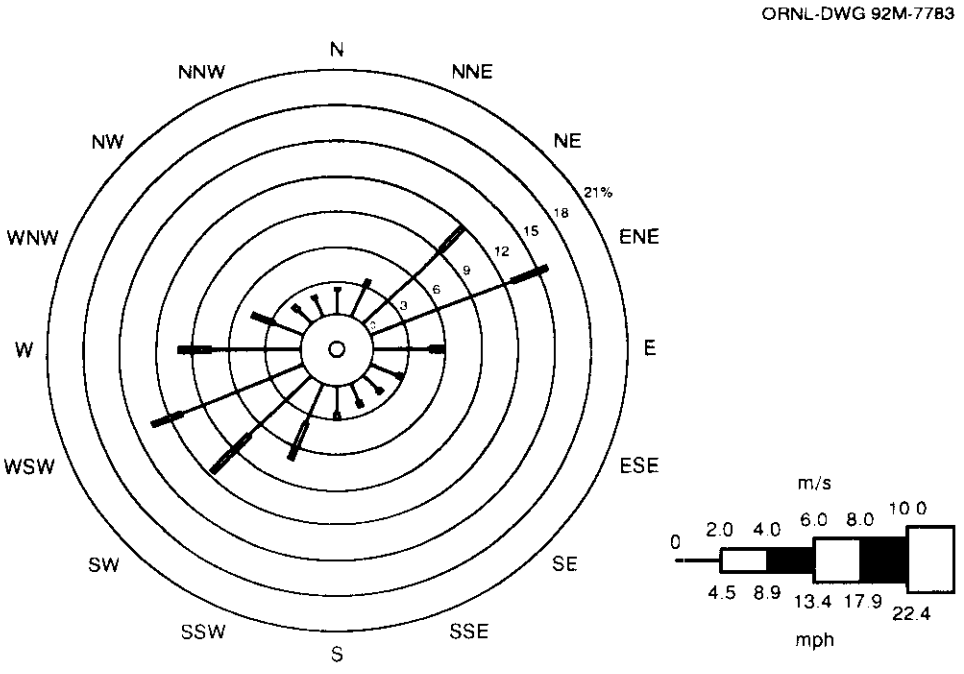

Fig. 3.8. 1991 wind rose for ORNL tower MT4 (10-m level), with 82.3% of possible data.

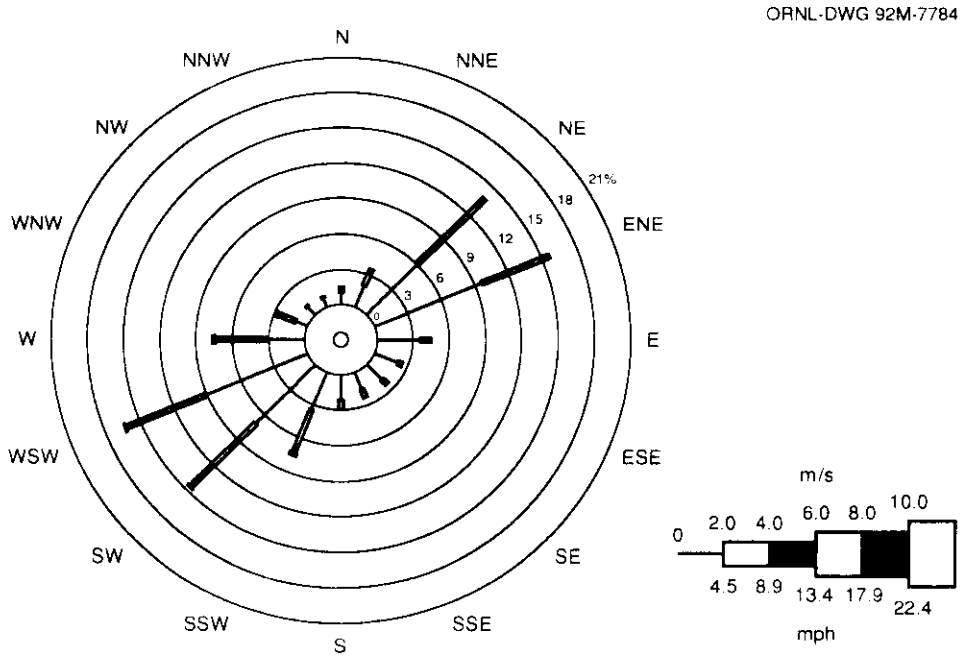

Fig. 3.9. 1991 wind rose for ORNL tower MT4 (30-m level), with 82.5% of possible data.

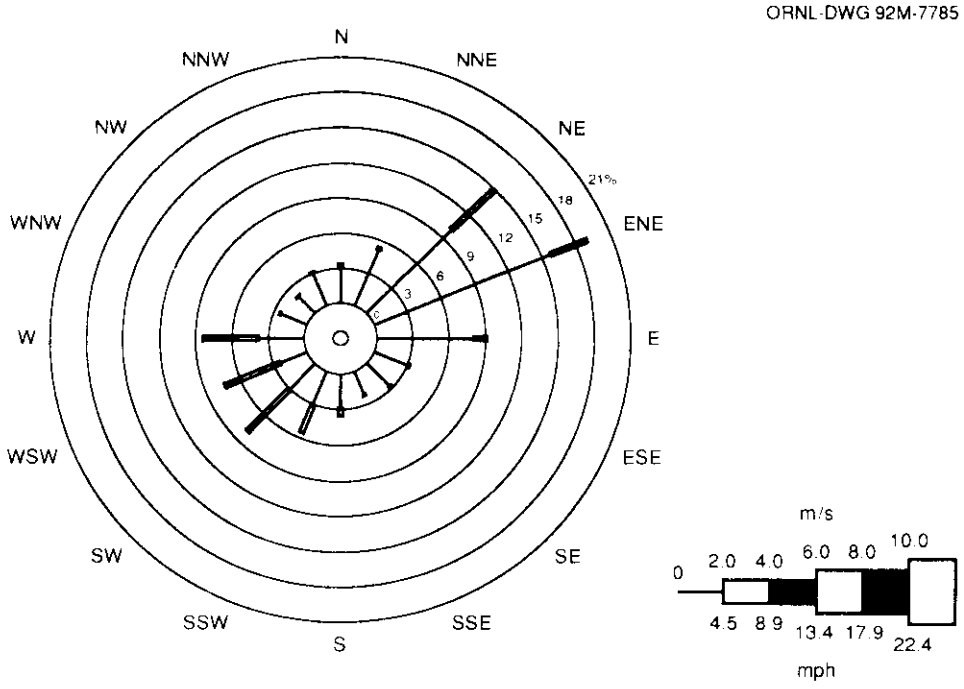

Fig. 3.10. 1991 wind rose for Y-12 Plant tower MTE (east) (10-m level), with 99.3% of possible data.

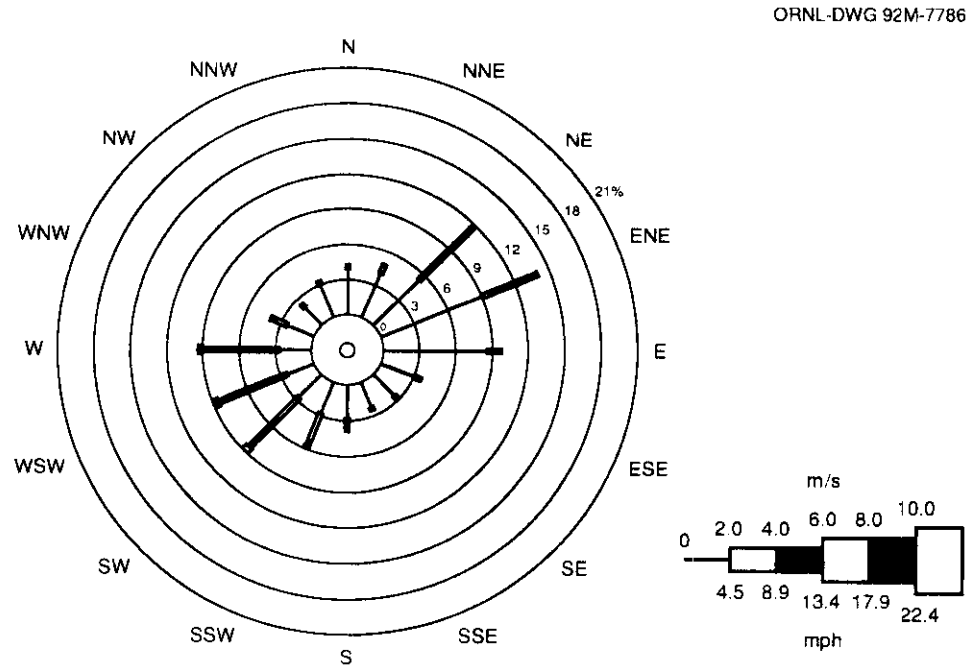

Fig. 3.11. 1991 wind rose for Y-12 Plant tower MTE (east) (30-m level), with 97.2% of possible data.

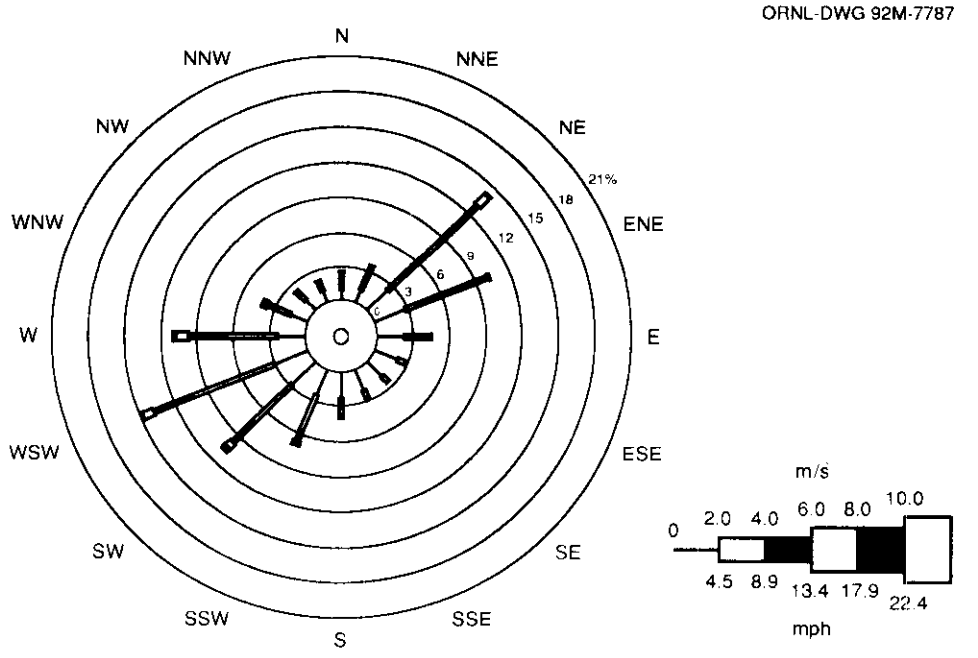

Fig. 3.12. 1991 wind rose for Y-12 Plant tower MTE (east) (100-m level), with 98.7% of possible data.

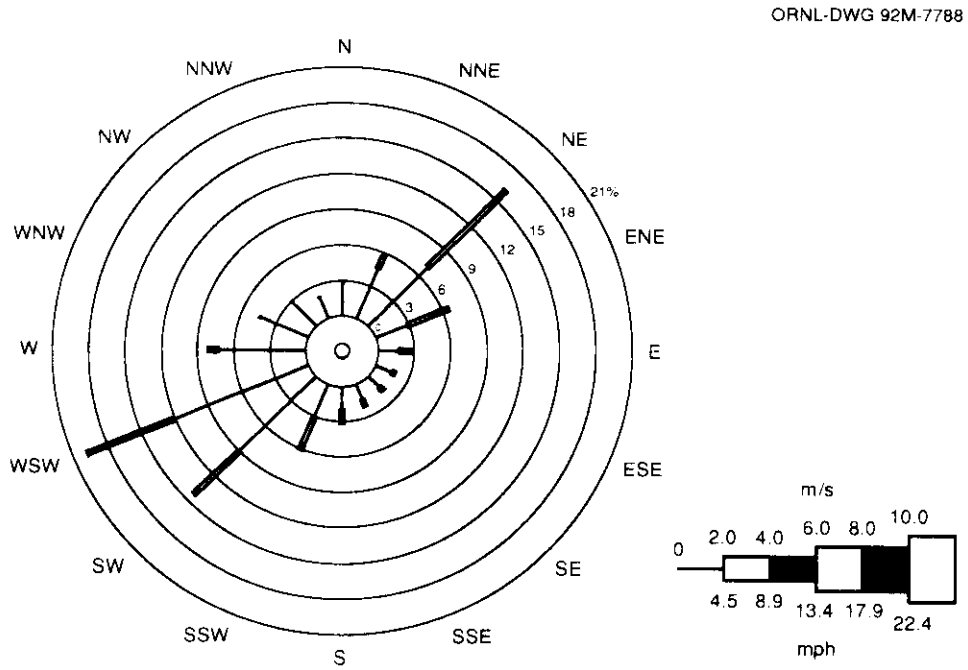

Fig. 3.13. 1991 wind rose for Y-12 Plant tower MTW (west) (10-m level), with 99.3% of possible data.

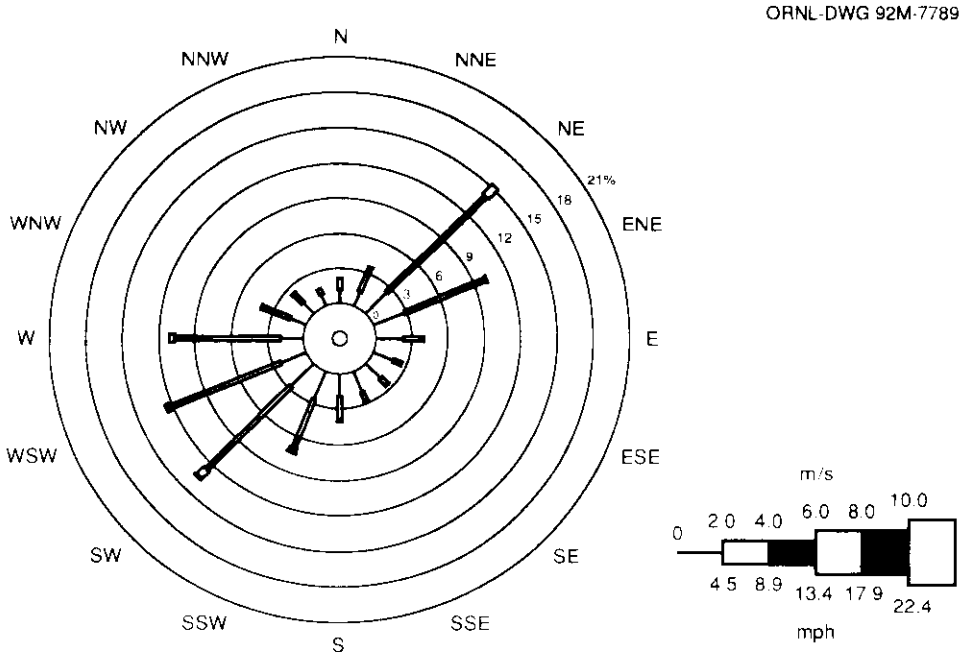

Fig. 3.14. 1991 wind rose for Y-12 Plant tower MTW (west) (60-m level), with 98.0% of possible data.

Table 3.13 1991 external gamma radiation measurements

Location	Number of samples[a]	Exposure rate (μ R/h)			
		Max	Min	Av[b]	Standard error[c]
		ORNL PAM stations[d]			
03	592	9.1	7.3	7.6*	0.0074
07	4,560	260	0.00067	3.3*	0.074
20	6,729	71	6.2	8.9*	0.011
Network summary	11,881	260	0.00067	6.7*	0.038
		Oak Ridge Reservation PAM stations[d]			
08	5,449	16,000	5.9	10*	3.0
31	58	8.2	7.9	8.0*	0.011
33	5,211	190	0.19	5.8*	0.065
34	4,238	89	1.2	8.2*	0.022
40	4,697	490	7.4	34*	1.1
41	5,102	6.3	3.1	5.1*	0.0031
42	6,896	38	4.4	7.1*	0.0084
43	4,918	56	0.00033	3.1*	0.046
44	6,827	300	0.13	7.3*	0.063
45	5,128	28	0.0080	3.4*	0.048
46	5,852	120	7.2	9.2*	0.034
Network summary	54,376	16,000	0.00033	9.1*	0.32

[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]Averages marked with an asterisk (*) are statistically greater than zero at the 95% level of confidence.

[c]Standard deviation of the mean.

[d]See Fig. 3.19.

4. SURFACE WATER

Table 4.1. 1991 Y-12 Plant annual summary for upper Bear Creek radiological and nonradiological data km 11.97[a]

Parameter	Number of samples	Concentration (mg/L)				Percentage of DCG
		Max	Min	Av	Standard error	
Cadmium	48	0.062	0.0005	0.0083	0.0014	*b*
Chromium	48	0.005	0.001	0.002	0.000	*b*
Cyanide	48	0.003	<0.002	<0.002	0.000	*b*
Lead	48	<0.005	<0.001	<0.001	0.000	*b*
Mercury	48	0.0056	<0.0002	<0.0004	0.0001	*b*
Nitrate (as N)	48	600	38	159	18	*b*
Dissolved oxygen	48	12.2	6.8	9.1	0.2	*b*
Phenols	48	0.006	<0.001	<0.002	0.000	*b*
Total dissolved solids	48	2,300	270	1,305	78	*b*
Total suspended solids	48	36	<5	<6	1	*b*
Selenium	48	<0.002	<0.002	<0.002	0.000	*b*
Thallium	48	<0.005	<0.001	<0.001	0.000	*b*
pH, standard units	48	8.8	6.7	*b*	0.05358	*b*
Aluminum	48	0.89	<0.04	<0.22	0.02	*b*
Barium	48	1.16	0.17	0.49	0.03	*b*
Beryllium	48	<0.002	<0.0004	<0.0004	0.0000	*b*
Boron	48	0.289	0.036	0.094	0.008	*b*
Calcium	48	420	96.6	238.9	12.3	*b*
Cerium	48	<0.08	<0.02	<0.02	0.00	*b*
Cobalt	48	0.01	<0.002	<0.003	0.000	*b*
Copper	48	0.03	0.006	0.007	0.000	*b*
Gallium	48	<0.09	<0.02	<0.02	0.00	*b*
Iron	48	0.66	<0.06	<0.13	0.02	*b*
Lithium	48	<0.08	<0.02	<0.02	0.00	*b*
Magnesium	48	59.8	13.0	32.6	1.8	*b*
Manganese	48	3.78	0.101	1.453	0.119	*b*
Molybdenum	48	<0.03	<0.006	<0.006	0.000	*b*
Nickel	48	0.10	0.009	0.038	0.003	*b*
Niobium	48	<0.05	<0.01	<0.01	0.00	*b*
Phosphorus	48	0.2	<0.05	<0.06	0.00	*b*
Potassium	48	7.4	2.9	4.9	0.2	*b*
Scandium	48	<0.002	<0.000	<0.000	0.000	*b*
Silver	48	<0.03	<0.006	<0.006	0.000	*b*
Sodium	48	67.8	20.5	41.4	1.9	*b*
Strontium	48	1.26	0.29	0.70	0.04	*b*
Thorium	48	0.05	<0.01	<0.01	0.00	*b*
Titanium	48	<0.06	<0.01	<0.01	0.00	*b*
Vanadium	48	<0.02	<0.004	<0.004	0.000	*b*
Zinc	48	0.05	0.007	0.011	0.001	*b*
Zirconium	48	<0.02	<0.004	<0.005	0.000	*b*
PCB, total	48	<0.0005	<0.0005	<0.0005	0.0000	*b*
Volatile organics, total	48	<0.01	<0.01	<0.01	0.00	*b*
^{241}Am[c]	48	9.1	–0.56	0.46	0.26	1.53
^{237}Np[c]	48	6.3	–0.48	1.47	0.16	4.91
^{238}Pu[c]	46	0.42	–0.58	0.00	0.03	0.0
^{99}Tc[c]	48	3.27	0.003	0.562	0.071	0.001
Uranium, total	48	0.848	0.098	0.224	0.017	*b*
^{235}U[c]	48	0.73	0.20	0.36	0.01	*b*
Alpha activity[c]	48	520	28	143	17	*b*

[a]See Fig. 4.2 in Vol. 1.
[b]Not applicable.
[c]pCi/L.

Table 4.2. 1991 Y-12 Plant annual summary for upper Bear Creek radiological and nonradiological data for km 12.4[a]

Parameter	Number of samples	Concentration (mg/L)			Standard error	Percentage of DCG
		Max	Min	Av		
Arsenic	47	<0.005	<0.001	<0.005	0.000	*b*
Cadmium	48	0.022	<0.0005	<0.0015	0.0006	*b*
Chromium	48	0.021	<0.001	<0.002	0.000	*b*
Cyanide	47	0.003	<0.002	<0.002	0.000	*b*
Lead	47	0.058	<0.001	<0.003	0.001	*b*
Nitrate, as N	48	530	6.8	45.6	10.8	*b*
Dissolved oxygen	48	11.2	5.3	7.5	0.2	*b*
Phenols	48	0.007	0.0001	0.0021	0.0002	*b*
Total dissolved solids	48	1100	260	860	25	*b*
Total suspended solids	48	380	0.5	15.9	7.8	*b*
Selium	47	<0.002	<0.002	<0.002	0.000	*b*
Thallium	47	<0.005	<0.001	<0.001	0.000	*b*
pH, standard units	48	7.8	7.3	*b*	0.0	*b*
Aluminum	48	21.8	<0.04	<0.69	0.45	*b*
Barium	48	0.928	0.0499	0.109	0.01761	*b*
Beryllium	48	<0.002	<0.0004	<0.0005	0.0000	*b*
Boron	48	0.291	0.05	0.092	0.006	*b*
Calcium	48	230	57.2	172.9	4.9	*b*
Cerium	48	<0.08	<0.02	<0.02	0.00	*b*
Cobalt	48	0.014	<0.002	<0.003	0.000	*b*
Copper	48	0.052	<0.006	<0.009	0.001	*b*
Gallium	47	<0.09	<0.02	<0.02	0.00	*b*
Iron	48	42.6	<0.06	<1.08	0.88	*b*
Lithium	48	<0.08	<0.02	<0.02	0.00	*b*
Magnesium	48	37.4	8.12	24.63	0.84	*b*
Manganese	48	0.571	0.009	0.058	0.012	*b*
Molybdenum	47	<0.03	<0.006	<0.007	0.001	*b*
Nickel	48	0.04	<0.008	<0.010	0.001	*b*
Niobium	47	<0.05	<0.01	<0.01	0.00	*b*
Phosphorus	48	0.4	<0.05	<0.08	0.01	*b*
Potassium	48	7.5	3.8	5.4	0.1	*b*
Scandium	48	0.0115	<0.0004	<0.0007	0.0002	*b*
Silver	47	<0.03	<0.006	<0.007	0.001	*b*
Sodium	48	179	18.6	61.0	3.5	*b*
Strontium	48	0.578	0.155	0.440	0.0012	*b*
Thorium	48	0.05	<0.01	<0.01	0.00	*b*
Titanium	48	0.19	<0.01	<0.02	0.00	*b*
Vanadium	48	0.09	<0.004	<0.006	0.002	*b*
Zinc	48	0.2	0.007	0.018	0.004	*b*
Zirconium	48	0.05	<0.004	<0.006	0.001	*b*
PCB, total	47	<0.0005	<0.0005	<0.0005	0.0000	*b*
Volatile organics, total	47	<0.01	<0.01	<0.01	0.00	*b*
^{241}Am[c]	48	0.93	–0.34	0.12	0.04	0.40
^{237}Np[c]	48	5.7	–0.37	0.86	0.12	2.86
^{238}Pu[c]	45	0.41	–0.44	–0.01	0.02	–0.03
^{239}Pu[c]	45	0.2	–0.13	0.01	0.01	0.03
^{240}Pu[c]	45	0.2	–0.13	0.01	0.01	0.03
^{99}Tc[c]	48	0.67	0.01	0.14	0.02	0.00
U, total (mg/L)	48	1.04	0.129	0.64	0.03	*b*
^{235}U (%)	48	0.42	0.14	0.30	0.01	*b*

[a]See Fig. 4.2 in Vol. 1.
[b]Not applicable.
[c]pCi/L.

Table 4.3. 1991 annual radiological summary Y-12 Plant diversion ditch[a]

Parameter	Number of samples	Concentration[b]				Percentage of DCG
		Max	Min	Av	Standard error	
U, total	52	0.074	<0.001	<0.038	0.002	*c*
^{235}U (%)	51	0.630	0.180	0.422	0.013	*c*
Th, total	52	<0.011	<0.003	<0.003	0.000	*c*

[a]See Fig. 4.2 in Vol. 1.
[b]Units are in mg/L unless otherwise noted.
[c]Not applicable.

Table 4.4. 1991 Y-12 Plant annual radiological and nonradiological data summary for Station 17[a]

Parameter	Number of samples	Concentration (mg/L)[b]			Standard error	Percentage of DCG
		Max	Min	Av		
Mercury	729	0.0076	0.0004	0.0014	0.0000	*c*
Nitrate	249	130.00	0.55	5.61	0.54	*c*
Total phosphorus	249	0.47	0.12	0.27	0.00	*c*
Copper	250	0.030	<0.006	<0.007	0.000	*c*
Zinc	249	0.170	0.017	0.044	0.001	*c*
Chromium	250	0.030	<0.006	<0.006	0.000	*c*
Molybdenum	249	0.110	<0.006	<0.007	0.000	*c*
Lithium	248	0.41	<0.02	<0.03	0.00	*c*
Selenium	225	<0.007	<0.002	<0.002	0.000	*c*
Cadmium	244	<0.004	<0.004	<0.004	0	*c*
Lead	246	0.020	<0.001	<0.002	0.000	*c*
Nickel	246	<0.050	<0.001	<0.037	0.001	*c*
Calcium	249	73.60	26.80	54.37	0.46	*c*
Magnesium	249	14.40	4.99	10.86	0.10	*c*
Sodium	249	43.0	2.8	17.6	0.5	*c*
Potassium	249	3.3	1.5	2.3	0.0	*c*
Sulfate	249	220	20	68	2	*c*
Chloride	249	150	1	19	1	*c*
Fluoride	249	5.8	0.1	1.0	0.0	*c*
Total suspended solids	243	62	<5	<11	1	*c*
Total dissolved solids	249	520	94	278	4	*c*
Alkalinity	249	140	68	108	1	*c*
Total organic carbons	249	27.0	1.7	14.9	0.4	*c*
Residual chlorine, total	232	<0.1	<0.1	<0.1	0	*c*
Cadmium (AA)	243	0.0041	<0.0001	<0.0006	0.0000	*c*
Temperature, °F	330	82	52	68	0	*c*
pH, standard units	323	8.8	5.5	*b*	0.0	*c*
Dissolved oxygen	318	10.2	2.7	7.6	0.1	*c*
Conductivity, mhos/cm	330	334	3	80	5	*c*
Alpha activity (pCi/L)	42	40.0	6.4	17.6	1.2	*c*
Beta activity (pCi/L)	43	27	8	17	1	*c*
^{237}Np (pCi/L)	43	0.75	–0.63	0.04	0.04	0.13
^{226}Ra (pCi/L)	27	4.30	0.27	2.02	0.23	2.02
^{228}Ra (pCi/L)	28	570	–240	108	34	108
^{90}Sr, (pCi/L)	43	7.1	–2.3	0.6	0.3	0.6
Th, total	43	0.015	–0.003	0.003	0.000	*c*
U, total	43	0.068	0.010	0.031	0.002	*c*
^{235}U (%)	43	0.95	0.22	0.46	0.03	*c*
^{238}Pu (pCi/L)	33	0.36	–0.53	0.00	0.03	0.01
$^{239/240}$Pu (pCi/L)	33	0.23	–0.14	0.03	0.01	0.10
^{99}Tc (pCi/mL)	44	0.140	–0.022	0.013	0.005	0.013
^{234}Th (pCi/L)	42	23.0	–2.7	2.0	0.8	0.02
^{228}Th (pCi/L)	43	3.8	0.01	0.83	0.11	0.21
^{230}Th (pCi/L)	43	2.1	0	0.37	0.05	0.12
^{232}Th (pCi/L)	43	0.46	–0.95	0.06	0.03	0.12
^{234}U (pCi/L)	43	150	3.4	9.7	3.3	*c*
^{235}U (pCi/L)	43	8.8	0.02	0.56	0.20	0.092
^{238}U (pCi/L)	43	35	3	11	1	2

[a]Flow during operations and/or discharging.
[b]Units are in mg/L unless otherwise noted.
[c]Not applicable.

Table 4.5. 1991 annual radiological and nonradiological data summary for West End Sewer, Y-12 Plant

Parameter	Number of samples	Concentration[a]			Standard error	Percentage of DCG
		Max	Min	Av		
Mercury	12	0.012	0.000	0.003	0.001	*b*
Oil and grease	12	10.0	<2.0	<4.3	0.7	*b*
Total suspended solids	12	73	<5	<42	1	*b*
Cyanide	12	0.020	<0.002	<0.005	0.002	*b*
Ammonia	12	14.00	0.25	9.04	1.37	*b*
Kjeldahl nitrogen	12	21.0	0.7	13.5	1.9	*b*
Selenium	12	<0.002	<0.002	<0.002	0.000	*b*
Biochemical oxygen demand	11	86.00	9.98	48.38	7.91	*b*
Chemical oxygen demand	12	160	23	104	13	*b*
Chromium +6	12	<0.01	<0.01	<0.01	0.00	*b*
pH, standard units	12	7.8	7.0	*b*	0.1	*b*
Aluminum	12	0.53	0.11	0.22	0.03	*b*
Arsenic	12	<0.04	<0.04	<0.04	0.00	*b*
Barium	12	0.0975	0.0264	0.0525	0.0060	*b*
Beryllium	12	<0.0004	<0.0004	<0.0004	0.0000	*b*
Boron	12	0.04	0.02	0.03	0.00	*b*
Cadmium	12	<0.004	<0.004	<0.004	0.000	*b*
Calcium	12	52.6	32.2	41.8	2.0	*b*
Cerium	12	<0.02	<0.02	<0.02	0.00	*b*
Chromium	12	<0.006	<0.006	<0.006	0.000	*b*
Cobalt	12	<0.002	<0.002	<0.002	0.000	*b*
Copper	12	0.039	0.007	0.014	0.002	*b*
Gallium	12	<0.02	<0.02	<0.02	0.00	*b*
Iron	12	1.27	<0.06	<0.44	0.09	*b*
Lanthanum	*b*	*b*	*b*	*b*	*b*	*b*
Lead	12	<0.02	<0.02	<0.02	0.00	*b*
Lithium	12	<0.02	<0.02	<0.02	0.00	*b*
Magnesium	12	12.20	8.73	10.11	0.26	*b*
Mangenese	12	0.223	0.009	0.112	0.021	*b*
Molybdenum	12	<0.006	<0.006	<0.006	0.000	*b*
Nickel	12	<0.009	<0.008	<0.008	0.000	*b*
Niobium	12	<0.01	<0.01	<0.01	0.00	*b*
Phosphorus	12	4.25	1.30	2.64	0.21	*b*
Potassium	12	8.8	1.7	6.4	0.7	*b*
Scandium	12	<0.0004	<0.0004	<0.0004	0.0000	*b*
Silver	12	0.012	<0.006	<0.007	0.001	*b*
Sodium	12	19.6	8.6	14.5	0.8	*b*
Strontium	12	0.138	0.074	0.105	0.006	*b*
Thorium	12	<0.01	<0.01	<0.01	0.00	*b*
Titanium	12	<0.01	<0.01	<0.01	0.00	*b*
Vanadium	12	<0.004	<0.004	<0.004	0.000	*b*
Zinc	12	0.36	0.11	0.18	0.02	*b*
Zirconium	12	<0.004	<0.004	<0.004	0.000	*b*
Alpha activity (pCi/L)	12	29.0	−1.4	14.7	2.3	*b*
Beta activity (pCi/L)	12	41.0	7.9	26.4	3.0	*b*
^{235}U (%)	10	2.67	0.97	1.70	0.17	*b*
U, total	12	0.0180	0.0008	0.0067	0.0016	*b*
Gamma, total (pCi/L)	12	200.0	1.2	51.3	16.2	*b*

[a]All units are in mg/L unless noted otherwise.

[b]Not applicable.

Table 4.6. 1991 annual radiological and nonradiological data summary for East End Sewer, Y-12 Plant

Parameter	Number of samples	Concentration[a]			Standard error	Percentage of DCG
		Max	Min	Av		
Mercury	10	0.0045	<0.0002	<0.0026	0.106	*b*
Oil and grease	12	24.0	<2.0	<6.1	1.7	*b*
Total suspended solids	12	44.0	16.0	27.3	2.8	*b*
Cyanide	12	0.0070	<0.0020	<0.0020	0.0004	*b*
Ammonia	12	9.0	2.1	6.9	0.6	*b*
Kjeldahl nitrogen	12	16.0	7.8	11.7	0.6	*b*
Selenium	12	0.0030	<0.0020	<0.0021	0.0001	*b*
Biochemical oxygen demand	11	10	16	29	4	*b*
Chemical oxygen demand	12	150	23	68	9	*b*
Chromium +6	12	<0.01	<0.01	<0.01	0.00	*b*
pH, standard units	10	7.9	6.9	*b*	1.7	*b*
Aluminum	12	0.41	0.11	0.19	0.03	*b*
Arsenic	12	<0.04	<0.04	<0.04	0.00	*b*
Barium	12	0.06	0.03	0.04	0.00	*b*
Beryllium	12	<0.0004	<0.0004	<0.0004	0.0000	*b*
Boron	12	0.047	0.021	0.030	0.002	*b*
Cadmium	12	<0.004	<0.004	<0.004	0.000	*b*
Calcium	12	39.6	34.4	36.8	0.5	*b*
Cerium	12	<0.02	<0.02	<0.02	0.00	*b*
Chromium	12	<0.006	<0.006	<0.006	0.000	*b*
Cobalt	12	<0.002	<0.002	<0.002	0.000	*b*
Copper	12	0.037	0.008	0.015	0.002	*b*
Gallium	12	<0.02	<0.02	<0.02	0.00	*b*
Iron	12	0.51	0.11	0.25	0.03	*b*
Lanthanum	0	0.0000	0.0000	0.0000	0.0000	*b*
Lead	12	<0.02	<0.02	<0.02	0.00	*b*
Lithium	12	<0.02	<0.02	<0.02	0.00	*b*
Magnesium	12	10.50	8.15	9.19	0.20	*b*
Mangenese	12	0.047	0.027	0.037	0.002	*b*
Molybdenum	12	<0.006	<0.006	<0.006	0.000	*b*
Nickel	12	<0.008	<0.008	<0.008	0.106	*b*
Niobium	12	<0.01	<0.01	<0.01	0.11	*b*
Phosphorus	12	3.66	1.45	2.37	0.11	*b*
Potassium	12	6.9	4.5	5.7	0.2	*b*
Scandium	12	<0.0004	<0.0004	<0.0004	0.0000	*b*
Silver	12	0.017	<0.006	<0.008	0.001	*b*
Sodium	12	16.7	8.9	12.5	0.6	*b*
Strontium	12	0.128	0.086	0.098	0.003	*b*
Thorium	12	<0.01	<0.01	<0.01	0.00	*b*
Titanium	12	<0.01	<0.01	<0.01	0.00	*b*
Vanadium	12	<0.004	<0.004	<0.004	0.000	*b*
Zinc	12	0.27	0.07	0.14	0.01	*b*
Zirconium	12	<0.004	<0.004	<0.004	0.000	*b*
Alpha activity (pCi/L)	12	5.8	−2.4	1.6	0.8	*b*
Beta activity (pCi/L)	12	13.0	7.0	9.7	0.5	*b*
^{235}U (%)	9	0.83	0.40	0.61	0.04	*b*
U, total	12	0.003	<0.001	<0.001	0.000	*b*
Gamma, total (pCi/L)	12	190.0	3.5	62.0	15.2	*b*

[a]All units are in mg/L unless noted otherwise.
[b]Not applicable.

Table 4.7. 1991 annual radiological and nonradiological data summary for the Biology Sewer, Y-12 Plant

Parameter	Number of samples	Concentration[a]				
		Max	Min	Av	Standard error	Percentage of DCG
Mercury	12	0.0009	<0.0002	<0.0003	0.0001	*b*
Oil and grease	12	9	<2	<3.0000	0.6155	*b*
Total suspended solids	12	23	<5	<7.1667	1.5267	*b*
Cyanide	12	3	<0.002	<0.2764	0.2482	*b*
Ammonia	12	1.7	<0.2	<0.7525	0.1298	*b*
Kjeldahl nitrogen	12	4.3	0.7	1.6617	0.2937	*b*
Selenium	12	<0.002	<0.002	<0.0020	0.0000	*b*
Biochemical oxygen demand	12	29	6.66	15.3742	2.2759	*b*
Chemical oxygen demand	12	86	15	35.1667	5.1696	*b*
Chromium +6	12	0.01	<0.01	<0.0100	0.0000	*b*
pH, standard units	12	9	7.2	*b*	0.1474	*b*
Aluminum	12	0.64	0.05	0.1858	0.0472	*b*
Arsenic	12	<0.04	<0.04	<0.0400	0.0000	*b*
Barium	12	0.0517	0.0246	0.0302	0.0022	*b*
Beryllium	12	<0.0004	<0.0004	<0.0004	0.0000	*b*
Boron	12	0.311	0.009	0.0629	0.0234	*b*
Cadmium	12	<0.004	<0.004	<0.0040	0.0000	*b*
Calcium	12	40.5	28.3	31.4917	0.9551	*b*
Cerium	12	<0.02	<0.02	<0.0200	0.0000	*b*
Chromium	12	0.01	<0.006	<0.0063	0.0003	*b*
Cobalt	12	0.003	<0.002	<0.0021	0.0001	*b*
Copper	12	0.024	<0.006	<0.0108	0.0014	*b*
Gallium	12	<0.02	<0.02	<0.0200	0.0000	*b*
Iron	12	0.57	<0.06	<0.1033	0.0424	*b*
Lead	12	0.02	<0.02	<0.0200	0.0000	*b*
Lithium	12	0.12	<0.02	<0.0283	0.0083	*b*
Magnesium	12	14	7.56	9.1408	0.5344	*b*
Manganese	12	0.066	0.003	0.0178	0.0049	*b*
Molybdenum	12	<0.007	<0.006	<0.0061	0.0001	*b*
Nickel	12	<0.008	<0.008	<0.0080	0.0000	*b*
Niobium	12	<0.01	<0.01	<0.0100	0.0000	*b*
Phosphorus	12	7.34	<0.05	<3.1790	0.5212	*b*
Potassium	12	3.2	1.2	1.9417	0.1681	*b*
Scandium	12	<0.0004	<0.0004	<0.0004	0.0000	*b*
Silver	12	0.259	<0.006	<0.0448	0.0256	*b*
Sodium	12	22.6	0.66	13.0142	1.5874	*b*
Strontium	12	0.109	0.038	0.0764	0.0052	*b*
Thorium	12	<0.01	<0.01	<0.0100	0.0000	*b*
Titanium	12	<0.01	<0.01	<0.0100	0.0000	*b*
Vanadium	12	<12	<0.004	<0.0040	0.0000	*b*
Zinc	12	0.22	0.01	0.1200	0.0134	*b*
Zirconium	12	<0.004	<0.004	<0.0040	0.0000	*b*
Alpha activity (pCi/L)	12	6.6	–4	0.5358	1.0635	*b*
Beta activity (pCi/L)	12	98	2.3	28.9250	9.1971	*b*
^{235}U (%)	2	0.42	0.35	0.3850	0.0350	*b*
U, total	12	<0.001	<0.001	<0.0010	0.0000	*b*
Gamma, total (pCi/L)	12	120	9.7	60.8920	12.1498	*b*

[a]All units are in mg/L unless noted otherwise.
[b]Not applicable.

Table 4.8. Y-12 Plant release of uranium to the off-site environment as a liquid effluent

Year	Uranium (Ci)	Uranium (kg)
	Station 17	
1988	0.164	220
1989	0.20	316
1990	0.135	197
1991	0.162	235
	Outfall 304	
1988	0.052	94
1989	0.138	244
1990	0.131	204
1991	0.082	159
	Total off-site release	
1988	0.22	314
1989	0.34	560
1990	0.27	401
1991	0.24	394

Table 4.9. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point 304, Bear Creek

Parameter	Number of samples	Concentration (mg/L)			Standard error	Percentage of DCG
		Max	Min	Av		
Oil and grease	51	14	<2	<3	0.3	*a*
Biochemical oxygen demand	51	31	4.94	<6.14	0.53	*a*
Chemical oxygen demand	52	46	<5	<9	1	*a*
Total dissolved solids	52	300	6	176	9	*a*
Total suspended solids	52	180	<5	<12	4	*a*
Nitrate as N	52	500	0.4	25.2	13	*a*
Conductivity, μmhos/cm	52	350	104	256	9	*a*
Dissolved oxygen	52	12.4	7.3	9.2	0.2	*a*
Turbidity, NTU	51	25	0.69	5.6	0.75	*a*
pH, standard units	51	8.4	7.1	*b*	0.04	*a*
Flow, Mgd[b]	365	31.45	0.38	4.44	0.29	*a*
Alpha activity (pCi/L)	47	26	2.2	12.7	0.9	*a*
Beta activity (pCi/L)	47	84	1.7	21.5	2.3	*a*
^{90}Sr (pCi/L)	46	5.9	–3.9	0.3	0.3	0.0
^{237}Np (pCi/L)	46	1.1	–0.13	0.11	0.03	0.38
^{226}Ra (pCi/L)	25	9.19	0.59	2.63	0.45	2.63
^{228}Ra (pCi/L)	29	380	–135	93	23	93

[a]Not applicable.
[b]Flow during operations and/or discharging.

Table 4.10. Surface water analytical results of polychlorinated biphenyls monitoring plan for the Oak Ridge Y-12 Plant, CY 1991

Site number	Location	Date sampled	PCB concentration (mg/L)
PCB-1	Outfall 301, Kerr Hollow Quarry	1/10/91	<0.0005
		6/10/91	<0.0005
		9/12/91	<0.0005
		12/12/91	<0.0005
PCB-2	Outfall 302, Rogers Quarry	1/10/91	<0.0005
		6/10/91	<0.0005
		9/12/91	<0.0005
		12/12/91	<0.0005
PCB-3	Outfall 303, New Hope Pond	*a*	
PCB-5	New Hope Pond Inlet	*b*	
PCB-6	Upstream of Outfall 135	1/10/91	<0.0005
		6/10/91	<0.0005
		9/12/91	<0.0005
		12/12/91	<0.0005
PCB-7	Outfall 304, Bear Creek	1/10/91	<0.0005
		6/10/91	<0.0005
		9/12/91	<0.0005
		12/12/91	<0.0005

[a]This outlet was closed in April 1989.
[b]This inlet was closed in November 1988.

Table 4.11. Y-12 Plant NPDES-permitted outfalls, 1991

Quarry—outfall 301
Rogers Quarry—outfall 302
Bear Creek—outfall 304
Category I outfalls—Uncontaminated precipitation runoff and/or groundwater
Category II outfalls—Cooling water, condensate, building area, and foundation drains
Category III outfalls—Outfalls which consisted of Category I or II type wastewaters along with untreated process wastewaters. The untreated process wastewater portion has been removed from these outfalls and has either been eliminated or undergoes treatment prior to discharge
Category IV outfalls—402 – Steam Condensate from the Lithium Process
405 – Sanitary Landfill #2 Sediment Pond
408 – 9202 Catch Basin
Steam Plant fly ash sluice water—outfall 623
Central Pollution Control Facility—outfall 501
West End Treatment Facility—outfall 502
Steam Plant Wastewater Treatment Facility—outfall 503
Plating Rinsewater Treatment Facility—outfall 504
Building 9204-3 Sump Pump Oil Separator—outfall 506
Groundwater Treatment Facility—outfall 512
Miscellaneous discharges (cooling towers, undergo treatment at 503, vapor blasters)

Table 4.12. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point 301, Kerr Hollow Quarry

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Flow[a], GPM	15	300	2	147	32
pH, standard units	16	8.2	6.6	*b*	0.1
Temperature, °C	16	15.4	9.6	11.9	0.5
Mercury	15	0.0035	<0.0002	<0.0005	0.0002
Total suspended solids	15	5	<5	<5	0
Sellenium	15	0.002	<0.002	<0.002	0
Arsenic	15	<0.2	<0.04	<0.05	0.01
Cadmium	15	<0.004	<0.004	<0.004	0
Chromium	15	<0.006	<0.006	<0.006	0
Copper	15	<0.006	<0.006	<0.006	0
Iron	15	0.2	<0.06	<0.10	0.01
Lead	15	0.09	<0.02	<0.03	0.01
Lithium	15	1.2	<0.02	<0.26	0.10
Nickel	15	0.6	<0.008	<0.087	0.054
Potassium	15	1.5	<0.008	<1.081	0.118
Sodium	15	1.13	<0.02	<0.66	0.08
Zinc	15	0.03	<0.005	<0.015	0.002
Zirconium	15	<0.01	<0.004	<0.005	0.001

[a]Flow during operations and/or discharging.
[b]Not applicable.

Table 4.13. CY 1991 NPDES Permit Number TN 002968

Discharge Point 302, Y-12 Plant, Roger's Quarry

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Total suspended solids	52	10	5	5	0
Chemical oxygen demand (COD)	53	11	2.3	5.7	0.2
Sulfate	53	38	15	22	1
Oil and grease	53	12	<2	<3	0
Settleable solids, ml/L	53	0.5	<0.1	<0.1	0.0
Selenium	53	0.005	<0.0002	<0.002	0.000
Mercury	53	0.0006	<0.0002	<0.000	0.000
Arsenic	53	<0.2	<0.04	<0.04	0.00
Cadmium	53	0.005	<0.004	0.004	0.000
Chromium	53	<0.006	<0.006	<0.006	0.000
Copper	53	<0.006	<0.006	<0.006	0.000
Iron	53	0.32	<0.06	<0.08	0.01
Nickel	53	<0.008	<0.008	<0.008	0.000
Zinc	53	<0.01	0.004	<0.009	0.000
Lead	53	<0.02	<0.02	<0.02	0.00
pH, standard units	53	9.2	7.0	*a*	0.1
Temperature, °C	53	31.2	9.5	19.4	1.0
Turbidity, NTU	53	7.6	0.34	1.60	0.21
Flow, Mgd[b]	365	12.76	0.07	0.89	0.08

[a]Not applicable.
[b]Flow during operations and/or discharging.

Table 4.14. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point 307, West Borrow Area

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Flow,[a] GPD	4	152,381	15,235	62,688	30,542
pH, standard units	4	8.5	7.6	*b*	0.2
Temperature, °C	4	22.5	6.8	14.8	4.1
Conductivity, umho	1	60	60	60	*b*
Ammonia	4	0.4	<0.2	<0.3	0.1
Biochemical oxygen demand	4	<5	<5	<5	0
Chemical oxygen demand	4	14	<5	<9	2
Color, ACU	4	250	10	109	53
Oil and grease	4	2	<2	<2	0
Total organic carbon	4	10.0	1.9	6.5	1.7
Total suspended solids	4	200	<5	<78	46

[a]Flow during operations and/or discharging.
[b]Not applicable.

Table 4.15. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point 308, East Borrow Area

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Flow,[a] GPD	4	152,381	763	39,620	37,592
pH, standard units	4	8.0	7.8	*b*	0.0
Temperature, °C	4	26.8	7.2	14.8	4.5
Ammonia	4	0.4	<0.2	<0.2	0.0
Biochemical oxygen demand	4	5.5	<5.0	<5.1	0.1
Chemical oxygen demand	4	24	6	15	4
Color, ACU	4	143	50	97	22
Oil and grease	4	16	<2	<6	4
Total organic carbon	4	9.3	3.4	5.9	1.2
Total suspended solids	4	38	16	25	5

[a]Flow during operations and/or discharging.
[b]Not applicable.

Table 4.16. CY 1991 NPDES Permit Number TN 002968

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

Parameter	Number of samples	Concentration (mg/L)			
		Max	Min	Av	Standard error
Flow,[a] GPD	3	7987	1143	4057	2040
pH, standard units	3	8.8	7.3	*b*	0.4
Ammonia	1	<0.2	<0.2	<0.2	*b*
Total suspended solids	3	29	<5	<15	7
Total organic carbon	1	8.5	8.5	8.5	*b*
Chemical oxygen demand	2	<5	<5	<5	0
Biochemical oxygen demand	2	<5	<5	<5	0
Oil and grease	1	<2	<2	<2	*b*
Temperature, °C	3	26	7	15	6
Conductivity, umho	1	110	110	110	*b*

[a]Flow during operations and/or discharging.

[b]Not applicable.

Table 4.17. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point 501, Central Pollution Control Facility

Parameter	Number of samples	Concentration (mg/L)				Percentage of DCG
		Max	Min	Av	Standard error	
Flow,[a] GPD	28	15,616	8,040	12,927	391	*b*
pH, standard units	28	8.7	6.4	*b*	0.1	*b*
Temperature, °C	28	30.5	13.5	23.1	0.8	*b*
Cyanide	28	0.015	<0.002	<0.003	0.0005	*b*
Oil and grease	28	10	<2	<3	0.4	*b*
Phenols	28	0.008	<0.001	<0.003	0.0004	*b*
Total toxic organics	28	0.083	<0.010	<0.021	0.004	*b*
Chloride	28	620	33	314	31	*b*
Color, ACU	28	83	<5	<10	3	*b*
Fluoride	28	5.5	<0.4	<1.6	0.3	*b*
Mercury	28	0.0005	<0.0002	<0.0002	0.00001	*b*
Nitrate	28	540.0	<0.1	<42.0	25.3	*b*
Total suspended solids	28	14.0	<5.0	<6.6	0.5	*b*
Sulfate	28	2,200	1,200	1,700	42	*b*
Sufactants, (MBAS)	28	0.13	<0.05	<0.06	0.00	*b*
Uranium	28	0.098	<0.001	<0.018	0.005	*b*
^{235}U, %	24	1.20	0.04	0.48	0.07	*b*
Aluminum	28	0.90	<0.20	<0.29	0.03	*b*
Beryllium	28	<0.002	<0.002	<0.002	0.000	*b*
Cadmium	28	0.020	<0.001	<0.018	0.001	*b*
Chromium	28	<0.030	<0.030	<0.030	0.000	*b*
Copper	28	0.030	<0.030	<0.030	0.000	*b*
Iron	28	8.5	<0.3	<1.4	0.3	*b*
Lead	28	<0.10	<0.10	<0.10	0.00	*b*
Nickel	28	1.53	0.04	0.61	0.07	*b*
Phosphorus	28	1.40	0.30	0.83	0.05	*b*
Silver	28	0.300	<0.030	<0.040	0.010	*b*
Sodium	28	474.0	68.6	249.3	20.0	*b*
Zinc	28	0.490	<0.020	<0.132	0.024	*b*
Alpha activity, pCi/L	27	190	–170	22	15	*b*
^{241}Am, pCi/L	27	1.5	–0.32	0.19	0.09	0.63
Beta activity, pCi/L	27	1,080	–34	189	42	*b*
^{237}Np, pCi/L	27	0.43	–13	–0.48	0.48	–1.59
^{226}Ra, pCi/L	21	3.5	–12.97	0.66	0.78	0.66
^{228}Ra, pCi/L	24	300	–0.81	89.38	18.18	89.38
^{90}Sr, pCi/L	27	2,500	–290	89	93	9
^{99}Tc, pCi/ml	27	0.45	0	0.11	0.02	0.11
^{234}Th, pCi/L	25	0.52	–0.25	0.14	0.03	0.001
Total thorium, mg/L	27	0.007	<0.003	<0.003	0.000	*b*
^{228}Th, pCi/L	27	4.6	–0.36	0.96	0.24	0.24
^{230}Th, pCi/L	27	0.8	–0.86	0.18	0.06	0.06
^{232}Th, pCi/L	27	3.2	–3	0.02	0.17	0.044
Tritium, pCi/L	27	490	–160	128	31	0.01
^{234}U, pCi/L	27	75	0.23	7.14	3.49	1.43
^{235}U, pCi/L	27	2.7	–0.06	0.34	0.13	0.06
^{238}U, pCi/L	27	41	–0.03	6.58	1.96	1.10
Total gamma, pCi/L	27	460	2.3	91.4	17.5	*b*

[a]Flow during operations and/or discharging.

[b]Not applicable.

Table 4.18. CY 1991 NPDES Permit Number TN 002968

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

Parameter	Number of samples	Concentration (mg/L)				Percentage of DCG
		Max	Min	Av	Standard error	
Flow,[a] GPD	73	39,100	2,660	21,121	1,244	*b*
pH, standard units	64	8.8	6.4	*b*	0.1	*b*
Temperature, °C	64	28.4	11.9	20.2	0.6	*b*
Residual chlorine	64	0.07	0.02	0.03	0.001	*b*
Cyanide	64	0.009	<0.002	<0.003	0.0003	*b*
Oil and grease	64	38	<2	<4	1	*b*
Total toxic organics	24	0.167	<0.01	<0.026	0.009	*b*
Chloride	63	1,200	650	973	14	*b*
Fluoride	63	38	0.7	19.8	1.1	*b*
Mercury	63	0.002	<0.0002	<0.0002	0.0000	*b*
Nitrate	63	560	<0.02	<28.26	12.03	*b*
Total suspended solids	63	54	<5	<20	2	*b*
Sulfate	63	14,000	3,100	9,562	317	*b*
Uranium	63	0.086	0.002	0.015	0.002	*b*
^{235}Uranium, %	62	1.0	0.16	0.36	0.02	*b*
Aluminum	63	1.1	<0.2	<0.4	0.03	*b*
Arsenic	63	<0.2	<0.2	<0.2	0.0	*b*
Barium	63	0.07	<0.002	<0.017	0.002	*b*
Beryllium	63	0.06	<0.002	<0.015	0.002	*b*
Calcium	63	37.4	6.4	14.6	0.8	*b*
Cadmium	63	0.02	<0.0005	<0.0160	0.0009	*b*
Chromium	63	<0.03	<0.03	<0.03	0.00	*b*
Cobalt	63	0.13	<0.01	<0.05	0.003	*b*
Copper	63	0.08	<0.03	<0.03	0.002	*b*
Iron	63	0.8	<0.3	<0.3	0.01	*b*
Lead	63	<0.1	<0.1	<0.1	0.0	*b*
Magnesium	63	39.3	24.4	30.5	0.4	*b*
Manganese	63	0.153	<0.009	<0.051	0.005	*b*
Molybdenum	63	0.71	<0.03	<0.22	0.02	*b*
Nickel	63	3.02	0.07	0.73	0.08	*b*
Phosphorus	63	78.1	2.2	8.7	1.5	*b*
Potassium	63	296	152	220	4	*b*
Silver	63	<0.03	<0.03	<0.03	0.00	*b*
Sodium	63	7,100	3,440	5,225	106	*b*
Zinc	63	0.84	<0.05	<0.13	0.02	*b*
Alpha activity, pCi/L	24	690	–330	72	43	*b*
^{241}Am, pCi/L	24	0.73	–0.34	0.12	0.05	0.40
Beta activity, pCi/L	24	990	–34	442	50	*b*
^{237}Np, pCi/L	24	0.36	–0.12	0.10	0.02	0.34
^{226}Ra, pCi/L	19	4.3	0.51	2.13	0.24	2.13
^{228}Ra, pCi/L	18	324	–190	110	30	110
^{90}Sr, pCi/L	24	320	–73	18	15	2
^{99}Tc, pCi/ml	24	2.32	0.02	0.24	0.09	0.24
^{234}Th, pCi/L	22	1.7	–0.11	0.26	0.08	0.00
Total thorium, mg/L	24	0.007	<0.003	<0.003	0.0002	*b*
^{228}Th, pCi/L	24	3.8	–0.08	0.80	0.17	0.20
^{230}Th, pCi/L	24	2.1	0.01	0.41	0.09	0.14
^{232}Th, pCi/L	24	0.78	–2.2	–0.01	0.10	–0.03
Tritium, pCi/L	24	5,960	290	1,881	320	0
^{234}U, pCi/L	24	8.6	0.04	3.62	0.54	0.72
^{235}U, pCi/L	24	1.7	–0.08	0.27	0.07	0.05
^{238}U, pCi/L	24	22	–0.25	7.37	1.23	1.23
Total gamma, pCi/L	24	320	34	151	17	*b*

[a]Flow during operations and/or discharging.

[b]Not applicable.

Table 4.19. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point 503, Steam Plant Wastewater Treatment Facility

Parameter	Number of samples	Concentration (mg/L)				Percentage of DCG
		Max	Min	Av	Standard error	
Flow,[a] GPD	359	378,700	700	98,965	2,916	*b*
pH, standard units	159	10.5	5.8	*b*	0.0	*b*
Temperature, °C	159	31.7	12.6	22.6	0.4	*b*
Oil and grease	158	281	<2	<5	2	*b*
Phenols	158	0.016	<0.001	<0.003	0.0002	*b*
Chloride	157	1,100	2.5	344.3	17.9	*b*
Fluoride	158	25	<0.9	<3.2	0.2	*b*
Mercury	158	0.0014	<0.0002	<0.0002	0.00001	*b*
Total suspended solids	157	14	<5	<6	0	*b*
Selenium	158	0.017	<0.002	<0.002	0.0001	*b*
Sulfate	158	3,800	380	1,391	42	*b*
Sulfide	157	<1	<1	<1	0	*b*
Uranium	158	0.023	<0.001	<0.001	0.0001	*b*
^{235}U, %	33	26.7	0.09	<2.21	0.80	*b*
Aluminum	158	4.1	<0.2	<0.3	0.0	*b*
Arsenic	158	<0.2	<0.2	<0.2	0.0	*b*
Barium	158	0.202	0.017	0.103	0.003	*b*
Beryllium	158	<0.002	<0.002	<0.002	0	*b*
Boron	158	0.11	<0.03	<0.04	0.001	*b*
Cadmium	158	<0.02	<0.005	<0.020	0.0002	*b*
Calcium	158	1,050	107	506	13	*b*
Cerium	158	<0.08	<0.08	<0.08	0	*b*
Chromium	158	<0.03	<0.03	<0.03	0	*b*
Cobalt	158	<0.01	<0.01	<0.01	0	*b*
Copper	158	<0.03	<0.03	<0.03	0	*b*
Gallium	158	<0.09	<0.09	<0.09	0	*b*
Iron	158	0.8	<0.3	<0.3	0.01	*b*
Lead	158	0.3	<0.1	<0.1	0.001	*b*
Lithium	158	0.69	<0.08	<0.09	0.004	*b*
Magnesium	158	32.8	0.3	7.0	0.6	*b*
Manganese	158	0.032	<0.009	<0.010	0.0003	*b*
Molybdenum	158	<0.03	<0.03	<0.03	0	*b*
Nickel	158	<0.04	<0.04	<0.04	0	*b*
Niobium	158	0.05	<0.05	<0.05	0	*b*
Phosphorus	158	1.5	<0.2	<0.7	0.02	*b*
Potassium	158	14	<2.5	<7.8	0.2	*b*
Scandium	158	<0.002	<0.002	<0.002	0	*b*
Silver	158	<0.03	<0.03	<0.03	0	*b*
Sodium	158	666	58.3	280.5	9.0	*b*
Strontium	158	1.01	0.104	0.537	0.014	*b*
Thorium	158	<0.05	<0.05	<0.05	0	*b*
Titanium	158	<0.06	<0.06	<0.06	0	*b*
Vanadium	158	<0.02	<0.02	<0.02	0	*b*
Zinc	158	0.16	<0.032	<0.051	0.0008	*b*
Zirconium	158	<0.05	<0.02	<0.02	0.0005	*b*
Alpha activity, pCi/L	49	230	–201	9	10	*b*
^{241}Am, pCi/L	49	0.69	–0.76	0.07	0.04	0.24
Beta activity, pCi/L	49	260	–190	39	11	*b*
^{237}Np, pCi/L	49	2.3	–0.29	0.12	0.05	0.39
^{226}Ra, pCi/L	27	7	0.03	2.00	0.32	2.00
^{228}Ra, pCi/L	27	430	–135	80	23	80
^{90}Sr, pCi/L	49	360	–47	9	8	1
^{99}Tc, pCi/mL	49	0.123	–0.044	0.016	0.005	0.016
^{234}Th, pCi/L	47	0.53	–0.02	0.20	0.02	0.00

Table 4.19 (continued)

Parameter	Number of samples	Concentration (mg/L)				Percentage of DCG
		Max	Min	Av	Standard error	
Total thorium, mg/L	49	0.009	<0.003	<0.003	0.0001	*b*
^{228}Th, pCi/L	49	2.9	–0.08	0.84	0.09	0.21
^{230}Th, pCi/L	49	0.87	–0.04	0.28	0.03	0.09
^{232}Th, pCi/L	49	1.2	–0.25	0.10	0.03	0.19
Tritium, pCi/L	48	940	–94	252	36	0.01
^{234}U, pCi/L	49	11	–0.17	0.61	0.28	0.12
^{235}U, pCi/L	49	0.49	–0.17	0.02	0.01	0.00
^{238}U, pCi/L	48	23	–0.08	1.22	0.62	0.20
Total gamma, pCi/L	49	620	–14	80	15	*b*

[a]Flow during operations and/or discharging.
[b]Not applicable.

Table 4.20. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point 504, Plating Rinsewater Treatment Facilities

Parameter	Number of samples	Concentration (mg/L)				Percentage of DCG
		Max	Min	Av	Standard error	
Flow,[a] GPD	7	20,286	16,196	18,305	542	[b]
pH, standard units	7	8.3	6.9	[b]	0.2	[b]
Temperature, °C	7	27.6	17.3	25.1	1.3	[b]
Cyanide	7	0.008	<0.002	<0.003	0.0008	[b]
Oil and grease	7	6	<2	<3	1	[b]
Total toxic organics	7	0.092	<0.01	<0.022	0.012	[b]
Chloride	7	1,900	8.2	320.7	263.7	[b]
Fluoride	7	2	0.61	1.26	0.18	[b]
Mercury	7	0.0013	<0.0002	<0.0004	0.0002	[b]
Nitrate	7	38	<0.1	<10.0	6	[b]
Total suspended solids	7	18	<5	<7	2	[b]
Sulfate	7	800	42	256	95	[b]
Uranium	7	0.05	<0.001	<0.014	0.007	[b]
^{235}U, %	6	1.81	0.23	0.772	0.252	[b]
Aluminum	7	1.2	<0.2	<0.6	0.2	[b]
Beryllium	7	<0.002	<0.0004	<0.0017	0.0002	[b]
Cadmium	7	0.02	<0.014	<0.019	0.0009	[b]
Chromium	7	<0.03	<0.006	<0.027	0.003	[b]
Copper	7	0.03	<0.027	<0.030	0.0004	[b]
Iron	7	4.7	<0.3	<1.6	0.6	[b]
Lead	7	<0.1	<0.02	<0.09	0.01	[b]
Nickel	7	1.27	0.19	0.65	0.15	[b]
Phosphorus	7	0.92	<0.2	<0.3	0.1	[b]
Potassium	7	26	<2.5	<13.8	3.1	[b]
Silver	7	<0.03	<0.006	<0.027	0.003	[b]
Sodium	7	259	12.1	88.5	34.7	[b]
Zinc	7	0.28	<0.05	<0.09	0.03	[b]
Alpha activity, pCi/L	7	26	–5.8	5.4	4.1	[b]
^{241}Am, pCi/L	7	0.18	0.001	0.109	0.023	0.362
Beta activity, pCi/L	7	44	–50	15	12	[b]
^{237}Np, pCi/L	7	0.2	–0.06	0.07	0.03	0.22
^{226}Ra, pCi/L	3	4.9	3.5	4.3	0.4	4.3
^{228}Ra, pCi/L	4	97	1.7	38.9	22.9	38.9
^{90}Sr, pCi/L	7	14	–3	3	2	0
^{99}Tc, pCi/mL	7	0.086	–0.018	0.025	0.013	0.025
^{234}Th, pCi/L	6	0.27	0.1	0.20	0.03	0.002
Total thorium, mg/L	7	<0.003	<0.003	<0.003	0.000	[b]
^{228}Th, pCi/L	7	1.3	0.36	0.66	0.13	0.16
^{230}Th, pCi/L	7	0.7	0	0.2	0.1	0.1
^{232}Th, pCi/L	7	0.14	–0.02	0.06	0.02	0.13
Tritium, pCi/L	7	500	–280	57	93	0.003
^{235}U, pCi/L	7	3.1	–0.02	0.56	0.43	0.09
^{238}U, pCi/L	7	9.6	0.36	2.35	1.25	0.39
Total gamma, pCi/L	7	250	33	104	28	[b]

[a]Flow during operations and/or discharging.

[b]Not applicable.

Table 4.21. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point 501/504, Central Pollution Control Facility/Plating Rinsewater Treatment Facility[a]

Parameter	Number of samples	Concentration[a]				
		Max	Min	Av	Standard error	Percentage of DCG
Flow[b], GPD	5	35,760	25,416	31,590	2,155	*c*
pH, standard units	5	8.2	7.1	*c*	0.2	*c*
Temperature, °C	5	28.1	19.1	23.9	1.9	*c*
Cyanide	5	<0.002	<0.002	<0.002	0	*c*
Oil and grease	5	4	<2	<3	0.4	*c*
Phenols	5	0.003	<0.001	<0.002	0.0004	*c*
Total toxic organics	5	0.097	<0.01	<0.030	0.017	*c*
Chloride	5	220	24	92	37	*c*
Color, ACU	5	17	<5	<7	2	*c*
Fluoride	5	4	0.9	2.8	0.7	*c*
Mercury	5	0.0005	<0.0002	<0.0003	0.0001	*c*
Nitrate	5	0.49	<0.1	<0.25	0.09	*c*
Total suspended solids	5	<5	<5	<5	0	*c*
Sulfates	5	1,000	620	832	70	*c*
Surfactants as MBAS	5	<0.05	<0.05	<0.05	0	*c*
Uranium	5	0.009	<0.001	<0.003	0.002	*c*
^{235}U, %	4	1.3	0.23	0.67	0.25	*c*
Aluminum	5	0.3	<0.2	<0.3	0.0	*c*
Beryllium	5	<0.002	<0.002	<0.002	0	*c*
Cadmium	5	<0.02	<0.02	<0.02	0	*c*
Chromium	5	<0.03	<0.03	<0.03	0	*c*
Coppper	5	<0.03	<0.03	<0.03	0	*c*
Iron	5	0.7	<0.3	<0.4	0.1	*c*
Lead	5	<0.1	<0.1	<0.1	0	*c*
Nickel	5	1.08	0.16	0.64	0.18	*c*
Phosphorus	5	0.8	0.3	0.6	0.1	*c*
Potassium	5	247	19	146	48	*c*
Silver	5	<0.03	<0.03	<0.03	0	*c*
Sodium	5	95.2	27.6	62.1	13.8	*c*
Zinc	5	<0.05	<0.05	<0.05	0	*c*
Alpha activity, pCi/L	4	37	–13	11	12	*c*
^{241}Am, pCi/L	4	0.2	–0.22	0.05	0.09	0.15
Beta activity, pCi/L	4	360	13	183	94	*c*
^{237}Np, pCi/L	4	0.11	0.04	0.09	0.02	0.28
^{226}Ra, pCi/L	1	7.03	7.03	7.03	*c*	7.03
^{228}Ra, pCi/L	1	5.14	5.14	5.14	*c*	5.14
^{90}Sr, pCi/L	4	0.84	–60	–30.54	12.51	–3.05
^{99}Tc, pci/mL	4	0.98	0.007	0.299	0.231	0.299
^{234}Th, pCi/L	4	2.7	0.08	0.79	0.64	0.01
Total thorium	4	<0.003	<0.003	<0.003	0	*c*
^{228}Th, pCi/L	4	1.7	0.33	0.85	0.30	0.21
^{230}Th, pCi/L	4	0.34	0.13	0.22	0.05	0.07
^{232}Th, pCi/L	4	0.17	–0.01	0.07	0.04	0.13
Tritium, pCi/L	4	240	–46	53	64	0.003
^{234}U, pCi/L	3	1.9	0.29	1.13	0.47	0.23
^{235}U, pCi/L	3	0.11	0.03	0.07	0.02	0.01
^{238}U, pCi/L	3	2.7	0.23	1.15	0.78	0.19
Total gamma, pCi/L	4	190	5.7	80.7	40.7	*c*

[a]Combined discharge.

[b]Flow during operations and/or discharging.

[c]Not applicable.

Table 4.22. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point 506, Building 9204-3 Sump Pump Oil Separator

Parameter	Number of samples	Concentration (mg/L)				Percentage of DCG
		Max	Min	Av	Standard error	
Flow,[a] GPM	52	50	50	50	0	*b*
pH, standard units	52	8.8	6.9	*b*	0.1	*b*
Temperature, °C	52	35	20	26	0	*b*
Oil and grease	52	7	<2	<2.4	0.1	*b*

[a]Flow during operations and/or discharging.
[b]Not applicable.

Table 4.23. CY 1991 NPDES Permit Number TN 002968

Discharge Point 512, Y-12 Plant, Groundwater Treatment Facility

Parameter	Number of samples	Concentration (mg/L)				Percentage of DCG
		Max	Min	Av	Standard error	
Flow,[a] GPD	29	18170	2550	9524	669	[b]
pH, standard units	25	9	6.56	[b]	0.09	[b]
Temperature, °C	21	88	15.3	37.3	5.6	[b]
Oil and grease	21	3	<2	<2	0.1	[b]
Aluminium	21	0.29	<0.04	<0.08	0.01	[b]
Arsenic	21	0.2	<0.04	<0.06	0.01	[b]
Barium	21	0.271	<0.081	<0.184	0.010	[b]
Beryllium	21	<0.004	<0.0004	<0.0006	0.0002	[b]
Boron	21	10.6	1.28	5.58	0.49	[b]
Cadmium	21	<0.02	<0.004	<0.005	0.001	[b]
Calcium	21	98	34.6	76.3	3.5	[b]
Cerium	21	<0.08	<0.02	<0.02	0.003	[b]
Chromium	21	<0.03	<0.006	<0.007	0.001	[b]
Cobalt	21	0.01	<0.002	<0.003	0.0004	[b]
Copper	21	0.033	<0.006	<0.010	0.002	[b]
Gallium	21	<0.09	<0.02	<0.02	0.003	[b]
Iron	21	0.43	<0.06	<0.14	0.02	[b]
Lead	21	0.13	<0.02	<0.03	0.01	[b]
Lithium	21	0.44	0.023	0.284	0.021	[b]
Magnesium	21	18.1	8.76	12.78	0.71	[b]
Manganese	21	16	0.106	2.945	0.934	[b]
Molybdenum	21	<0.03	<0.006	<0.007	0.001	[b]
Nickel	21	0.054	<0.009	<0.021	0.003	[b]
Niobium	21	<0.05	<0.01	<0.01	0.002	[b]
Phosphorus	21	0.2	<0.05	<0.06	0.01	[b]
Potassium	21	14	8.3	10.7	0.4	[b]
Scandium	21	0.002	<0.0004	<0.0005	0.0001	[b]
Silver	21	<0.03	<0.006	<0.007	0.001	[b]
Sodium	21	46.4	18.8	30.7	2.0	[b]
Strontium	21	0.37	0.147	0.218	0.014	[b]
Thorium	21	<0.05	<0.01	<0.01	0.002	[b]
Titanium	21	<0.06	<0.01	<0.01	0.002	[b]
Vanadium	21	0.02	<0.004	<0.005	0.001	[b]
Zinc	21	0.05	<0.01	<0.01	0.002	[b]
Zirconium	21	<0.02	<0.004	<0.005	0.001	[b]
PCB	21	<0.0005	<0.0005	<0.0005	0	[b]
Methylene chloride	21	<0.010	<0.010	<0.010	0	[b]
Tetrachloroethylene	21	<0.010	<0.010	<0.010	0	[b]
Trichloroethylene	21	<0.010	<0.010	<0.010	0	[b]

[a]Flow during operations and/or discharging.

[b]Not applicable.

Table 4.24. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant cooling towers

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		602				
Temperature, °C	4		26.7	21.3	24.7	1.3
pH, standard units	4		8.5	7.7	*a*	0.2
Free chlorine	4		0.02	0.01	0.015	0.003
Chromium	4		<0.01	<0.01	<0.01	0
Copper	4		0.019	0.012	0.015	0.001
Zinc	4		0.06	0.03	0.04	0.01
Flow, gal/d[b]	4		9,936	3,512	6,873	1,322
		604				
Temperature, °C	4		27.2	15.5	21.4	2.4
pH, standard units	4		8.4	8.1	*a*	0.1
Free chlorine	4		0.02	<0.01	0.015	0.003
Chromium	4		0.01	<0.01	<0.001	0
Copper	4		0.016	0.006	<0.011	0.002
Zinc	4		0.37	0.18	0.29	0.04
Flow, gal/d[b]	4		17,986	9,803	14,146	2,184
		606				
Temperature, °C	0					
pH, standard units	0					
Free chlorine	0					
Chromium	0					
Copper	0					
Zinc	0					
Flow, gal/d[b]	0					
		610				
Temperature, °C	4		31.5	24.8	28.3	1.4
pH, standard units	4		8.5	8.2	*a*	0.1
Free chlorine	4		0.006	0.01	0.036	0.014
Chromium	4		<0.07	<0.01	<0.01	0.01
Copper	4		0.04	0.011	0.021	0.007
Zinc	4		0.19	0.04	0.09	0.04
Flow, gal/d[b]	4		13,416	7,762	10,310.	1,367
		612				
Temperature, °C	3		24.9	23.5	24	0.5
pH, standard units	3		8.3	7.9	*a*	0.1
Free chlorine	3		0.15	0.02	0.067	0.042
Chromium	3		0.01	<0.01	<0.01	0
Copper	3		<0.022	0.013	0.019	0.003
Zinc	3		0.16	0.1	0.13	0.02
Flow, gal/d[b]	3		30,272	8,072	18,014	6,512

Table 4.24 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		613				
Temperature, °C	4		29.3	25.6	27.3	0.8
pH, standard units	4		8.5	8.2	*a*	0.1
Free chlorine	4		0.05	0.02	0.035	0.006
Chromium	4		<0.05	<0.02	<0.04	0.01
Copper	4		0.014	0.012	0.013	0
Zinc	4		0.07	0.02	0.05	0.01
Flow, gal/d[b]	4		41,835	14,275	29,001	6,055
		615				
Temperature, °C	4		24.2	12.8	20.6	2.6
pH, standard units	4		8.5	7.8	*a*	0.2
Free chlorine	4		0.02	0.01	0.015	0.003
Chromium	4		<0.01	<0.01	<0.01	0
Copper	4		0.315	0.058	0.142	0.06
Zinc	4		2.52	0.1	0.9	0.55
Flow, gal/d[b]	4		3,696	1,031	1,949	602
		616				
Temperature, °C	0					
pH, standard units	0					
Free chlorine	0					
Chromium	0					
Copper	0					
Zinc	0					
Flow, gal/d[b]	0					
		617				
Temperature, °C	4		28.8	18.9	23.7	2
pH, standard units	4		8.5	8.1	*a*	0.1
Free chlorine	4		0.05	0.01	0.03	0.009
Chromium	4		0.01	<0.01	<0.01	0
Copper	4		0.038	0.017	0.025	0.005
Zinc	4		0.08	0.04	0.06	0.01
Flow, gal/d[b]	4		7,762	3,213	5,395	1,081
		618				
Temperature, °C	4		24.7	24.7	24.7	0.3
pH, standard units	4		8.2	8.2	*a*	0.1
Free chlorine	4		0.02	<0.01	<0.018	0.003
Chromium	4		<0.01	<0.01	<0.01	0
Copper	4		0.032	0.032	0.032	0.01
Zinc	4		0.05	0.05	0.05	0
Flow, gal/d[b]	4		10,030	10,031	10,031	2,849

Table 4.24 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		619				
Temperature, °C	4		29.2	24	25.9	1.2
pH, standard units	4		8.4	7.4	*a*	0.2
Free chlorine	4		0.04	0.01	0.028	0.008
Chromium	4		<0.03	<0.01	<0.01	0.01
Copper	4		0.118	0.008	0.05	0.024
Zinc	4		0.59	0.02	0.19	0.13
Flow, gal/d[b]	4		11,798	6,900	8,274	1,178
		620				
Temperature, °C	4		27.3	17.6	24.5	2.3
pH, standard units	4		8.3	7.8	*a*	0.1
Free chlorine	4		0.07	0.01	0.03	0.014
Chromium	4		<0.01	<0.01	<0.01	0
Copper	4		0.135	0.038	0.087	0.022
Zinc	4		0.88	0.37	0.59	0.11
Flow, gal/d[b]	4		6,323	790	3,375	1,142
		622				
Temperature, °C	4		31.8	26.8	29	1.1
pH, standard units	4		8.5	8.2	*a*	0.1
Free chlorine	4		0.2	<0.01	<0.08	0.043
Chromium	4		<0.01	<0.01	<0.01	0
Copper	4		0.01	0.006	0.008	0.001
Zinc	4		0.04	0.02	0.03	0
Flow, gal/d[b]	4		14,950	9,810	12,803	1,287
		624				
Temperature, °C	0					
pH, standard units	0					
Free chlorine	0					
Chromium	0					
Copper	0					
Zinc	0					
Flow, gal/d[b]	0					
		626				
Temperature, °C	5		21.4	9.9	13.9	2.1
pH, standard units	5		8.4	7.8	*a*	0.1
Free chlorine	5		0.98	<0.01	<0.214	0.192
Chromium	5		<0.08	<0.01	<0.02	0.01
Copper	5		0.059	0.009	0.035	0.009
Zinc	5		0.13	0.02	0.08	0.02
Flow, gal/d[b]	5		26,000	923	7,449	4,696

Table 4.24 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		628				
Temperature, °C	4		30.3	24.8	27.6	1.3
pH, standard units	4		8.5	7.8	*a*	0.2
Free chlorine	4		0.1	0.02	0.04	0.02
Chromium	3		0.07	0.01	0.03	0.02
Copper	3		0.054	0.012	0.027	0.013
Zinc	3		0.31	0.08	0.16	0.08
Flow, gal/d[b]	4		24,150	10,278	16,308	3,142
		630				
Temperature, °C	4		28.3	20.7	24.8	1.6
pH, standard units	4		8.5	8.1	*a*	0.1
Free chlorine	4		0.1	0.02	0	0.019
Chromium	4		0.01	<0.01	<0.01	0
Copper	4		0.072	0.014	0.034	0.013
Zinc	4		0.1	0.02	0.07	0.02
Flow, gal/d[b]	4		4,761	3,450	3,815	317
		632				
Temperature, °C	3		28.1	18.9	23	2.7
pH, standard units	3		8.3	8.3	*a*	0
Free chlorine	3		0.05	0.015	0.028	0.011
Chromium	3		<0.01	<0.01	<0.01	0
Copper	3		0.066	0.041	0.057	0.008
Zinc	3		0.1	0.07	0.09	0.01
Flow, gal/d[b]	3		6,037	3,080	4,066	986
		633				
Temperature, °C	0					
pH, standard units	0					
Free chlorine	0					
Chromium	0					
Copper	0					
Zinc	0					
Flow, gal/d[b]	0					
		634				
Temperature, °C	4		27.4	19.9	22.8	1.6
pH, standard units	4		8.5	8.2	*a*	0.1
Free chlorine	4		0.06	0.01	0.035	0.01
Chromium	4		<0.01	<0.01	<0.01	0
Copper	4		0.021	0.01	0.017	0.003
Zinc	4		0.11	0.09	0.1	0
Flow, gal/d[b]	4		71,760	9,711	31,965	13,833

[a]Not applicable.

[b]Flow during operation and/or discharging.

Table 4.25. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Discharge Point = 623, Flyash Sluice

Parameter	Number of samples	Concentration (mg/L)				Percentage of DCG
		Max	Min	Av	Standard error	
pH, standard units	50	9.5	7.3	*a*	0.1	*a*
Flow[b], gpd	132	1,587,000	23,000	240,716	24,258	*a*

[a]Not applicable.

[b]Flow during operations and/or discharging.

Table 4.26. CY 1991 Permit Number TN 0002968

Y-12 Plant Category I Outfalls[a]

Outfall	Number of samples	pH (standard units)				Number of Samples	Flow[a] (GPD)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error
001	2	7.8	7.7	*b*	0.05	2	79,070	7,600	43,335	35,735
003	2	7.8	7.6	*b*	0.1	2	116,110	2,282	59,196	56,194
006	2	8.0	7.4	*b*	0.3	2	62,300	17,120	39,710	22,590
007	2	7.9	7.4	*b*	0.3	2	32,100	13,316	22,708	9,392
009	1	6.9	6.9	*b*	*b*	1	45,654	45,654	45,654	*b*
011	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
012	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
015	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
017	1	7.5	7.5	*b*	*b*	1	7,609	7,609	7,609	*b*
018	1	7.5	7.5	*b*	*b*	1	2,282	2,282	2,282	*b*
019	1	7.6	7.6	*b*	*b*	1	32,338	32,338	32,338	*b*
031	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
032	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
041	1	7.3	7.3	*b*	*b*	1	4,504	4504	4,504	*b*
044	2	7.8	7.8	*b*	0	2	11,413	380	5,986	5,516
045	2	8.1	7.8	*b*	0.15	2	22,827	761	11,794	11,033
057	2	7.9	7.9	*b*	0	2	11,413	5,407	8,410	3,003
062	1	7.7	7.7	*b*	*b*	1	1,522	1,522	1,522	*b*
086	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
101	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
102	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
108	1	7.6	7.6	*b*	*b*	0	*e*	*e*	*e*	*b*
127	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
134	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
136	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
138	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
140	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
145	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
146	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
149	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
151	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
152	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
153	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
155	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
156	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
159	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
161	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
164	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
170	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
177	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
178	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
179	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
180	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
182	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
183	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
184	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
186	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
193	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
194	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
195	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
196	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
197	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
198	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
199	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*

Table 4.26 (continued)

Outfall	Number of samples	pH (standard units)				Number of samples	Flow[a] (GPD)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error
200	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
202	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
205	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
206	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
207	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
208	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
209	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
215	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
221	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
223	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
224	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
228	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
229	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
230	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
231	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
232	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
233	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
234	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
235	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
236	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
237	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
247	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
248	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*

[a]Flow during operations and/or discharging.
[b]Not applicable.
[c]No flow.

Table 4.27. CY 1991 NPDES Permit Number TN 0002968

Y-12 Plant Category II Outfalls

Outfall	Number of samples	pH (standard units)				Number of samples	Temperature (°C)				Number of samples	Flow[a] (gal/d)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error		Max	Min	Av	Standard error
013	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
016	3	8.2	7.4	*b*	0.2	3	23.5	10.7	16.9	3.7	3	72,280	570	25,805	23,666
020	4	7.9	7.1	*b*	0.2	4	22.6	16.3	19.2	1.6	4	45,600	24	14,259	10,561
023	2	7.4	7.0	*b*	0.2	2	32.6	30.0	31.3	1.3	2	761	95	428	333
024	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
025	2	8.3	7.2	*b*	0.6	2	30.0	14.4	22.2	7.8	2	95	95	95	0
026	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
027	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
028	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
029	1	7.9	7.9	*b*	*b*	1	15.8	15.8	15.8	*b*	1	127	127	127	*b*
030	1	7.9	7.9	*b*	*b*	1	16.0	16.0	16.0	*b*	1	761	761	761	*b*
035	2	7.9	7.8	*b*	0.1	2	22.5	18.0	20.2	*b*	2	7,609	3,044	5,326	2,283
040	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
043	2	7.8	7.6	*b*	0.1	2	34.6	16.4	25.5	9.1	2	1,902	190	1,046	856
046	2	7.8	7.4	*b*	0.2	2	31.3	30.0	30.6	1.0	2	761	761	761	0
053	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
054	3	8.4	7.4	*b*	0.3	3	20.1	13.2	16.8	2.0	3	1,141	570	760	190
058	3	7.6	7.3	7.4	0.1	3	18.0	11.1	15.0	2.0	3	11,413	570	4,248	3,583
059	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
060	1	7.9	7.9	*b*	*b*	1	14.5	14.5	14.5	*b*	1	380	380	380	*b*
066	2	8.0	7.8	*b*	0.1	2	28.3	21.1	24.7	3.6	2	150	127	138	12
068	3	7.9	7.0	*b*	0.3	3	32.2	24.9	28.4	2.1	3	761	190	380	190
069	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
073	4	7.9	7.6	*b*	0.1	4	26.3	21.2	22.8	1.2	4	11,413	127	4,026	2,533
074	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
075	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
076	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
077	1	7.4	7.4	*c*	*c*	1	20.5	20.5	20.5	*b*	1	34,110	34,110	34,110	*b*

Table 4.27 (continued)

Outfall	Number of samples	pH (standard units)				Number of samples	Temperature (°C)				Number of samples	Flow[a] (gal/d)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error		Max	Min	Av	Standard error
078	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
079	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
080	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
081	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
084	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
087	2	7.8	7.4	*b*	0.2	2	17.2	11.3	14.2	3.0	2	11,413	1,141	6,277	5,136
092	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
093	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
094	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
095	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
096	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
098	1	7.9	7.9	*b*	*b*	1	18.0	18.0	18.0	*b*	1	761	761	761	*b*
100	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
111	1	7.9	7.9	*b*	*b*	1	15.1	15.1	15.1	*b*	1	1,902	1,902	1,902	*b*
111	1	7.7	7.7	*b*	*b*	1	17.6	17.6	17.6	*b*	1	190	190	190	*b*
115	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
117	3	8.3	7.1	*b*	0.4	3	30.4	28.7	29.3	0.6	3	761	380	507	127
118	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
119	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
120	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
123	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
124	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
131	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
133	3	8.2	7.1	*b*	0.3	3	23.4	11.8	18.0	3.4	3	1,522	761	1,141	220
137	0	*c*	*c*	*b*	b	0	c	c	*c*	*b*	0	*c*	*c*	*c*	*b*
144	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
171	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
172	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
173	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*

Table 4.27 (continued)

Outfall	Number of samples	pH (standard units)				Number of samples	Temperature (°C)				Number of samples	Flow[a] (gal/d)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error		Max	Min	Av	Standard error
174	0	c	c	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
175	0	c	c	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
185	1	7.5	7.5	*b*	*b*	1	25.5	25.5	25.5	*b*	1	190	190	190	*b*
188	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
201	2	7.8	7.2	*b*	0.3	2	20.8	17.1	19.0	2.0	2	5,707	761	3,234	2,473
203	1	7.4	7.4	*b*	*b*	1	12.4	12.4	12.4	*b*	1	761	761	761	*b*
204	1	7.5	7.5	*b*	*b*	1	11.4	11.4	11.4	*b*	1	380	380	380	*b*
210	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
212	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
213	2	7.9	7.3	*b*	0.3	2	21.2	15.0	18.1	3.1	2	1,141	380	760	381
214	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
216	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
217	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
218	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
219	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
220	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
226	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
238	3	8.4	8.1	*b*	0.1	3	24.8	9.4	16.6	4.5	3	2,663	380	1,395	671
239	3	8.4	8.1	*b*	0.1	3	24.8	9.4	16.6	4.5	3	2,663	380	1,395	671
240	3	8.4	8.1	*b*	0.1	3	24.8	9.4	16.6	4.5	3	2,663	380	1,395	671
241	3	8.4	8.1	*b*	0.1	3	24.8	9.4	16.6	4.5	3	2,663	380	1,395	671
243	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
244	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
245	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
246	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*

[a]Flow during operations and/or discharging.
[b]Not applicable.
[c]No flow.

Table 4.28. CY 1990 NPDES Permit Number TN 0002968

Y-12 Plant Category III Outfalls

Outfall	Number of samples	pH (standard units)				Number of samples	Temperature (°C)				Number of samples	Flow[a] (gal/d)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error		Max	Min	Av	Standard error
002	4	7.8	7.2	*b*	0.1	4	24.2	14.1	17.5	2.3	4	138,600	11,413	66,037	29,937
071	4	8.0	7.3	*b*	0.2	4	20.5	17.1	18.8	0.7	4	76,099	22,827	46,319	13,264
135	4	8.0	7.2	*b*	0.2	4	29.8	22.1	26.4	1.8	4	758,100	416,100	549,775	76,783
147	4	8.1	7.2	*b*	0.2	4	25.3	11.4	18.8	3.0	4	9,211	190	4,443	2,144
150	4	8.2	6.7	*b*	0.3	4	31.5	15.1	24.6	3.4	4	6,483,800	533,900	2,327,550	1,394,717
157	4	7.7	7.3	*b*	0.1	4	23.1	9.6	17.7	2.9	4	3,804	761	1,902	677
160	4	8.1	7.2	*b*	0.2	4	32.6	22.1	27.0	2.2	4	110,700	20,900	64,947	18,337
162	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
163	4	7.7	7.2	*b*	0.1	4	29.3	19.3	24.8		4	363,700	218,200	299,472	33,184
166	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
168	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
169	4	8.1	7.1	*b*	0.2	4	25.6	16.6	21.0	1.8	4	530,900	380,426	475,582	33,144
181	2	7.6	7.3	*b*	0.2	2	21.0	15.7	18.4	2.7	2	761,700	433,700	597,700	164,000
191	0	*c*	*c*	*b*	*b*	0	*c*	*c*	*c*	*b*	0	*c*	*c*	*c*	*b*
192	4	7.8	6.5	*b*	0.3	4	25.2	15.2	19.5	2.1	4	6,110	402	3,150	1,322

[a]Flow during operations and/or discharging.
[b]Not applicable.
[c]No flow.

Table 4.29. CY 1991 NPDES Permit Number TN 002968

Y-12 Plant Category IV Outfalls

Outfall	Number of samples	pH (standard units)				Number of flows	Flow[a] (gal/d)			
		Max	Min	Av	Standard error		Max	Min	Av	Standard error
401	*b*					*b*				
402	15	8.7	7	*c*	0.1	*b*				
403	15	8.8	7.5	*c*	0.1	*b*				
404	*b*					*b*				
405	28	10.2	7.6	*c*	0.1	*b*				
406	*b*			c		*b*				
407	*b*					*b*				
408	48	8.4	7.2	*c*	0.0	*b*				
409	*b*					*b*				
410	*b*					*b*				
411	*b*					*b*				
412	*b*					*b*				
413	*b*					*b*				
414	*b*					*b*				
415	*b*					*b*				
416	*b*					*b*				
417	*b*					*b*				
418	*b*					*b*				
419	*b*					*b*				
420	*b*					*b*				
421	*b*					*b*				
422	*b*					*b*				

[a]Flow during operations and/or discharging.
[b]No discharge.
[c]Not applicable.

Table 4.30. CY 1990 NPDES Permit Number TN 002968

Y-12 Plant Non-permitted Outfalls[a]

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		4				
Flow[c], GPD	3		26,621	570	9,317	8,652
pH, standard units	3		8	7.2	*b*	0.3
Temperature, °C	3		22.7	12.4	17.2	3
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		9.9	5.6	7.5	1.3
Total organic carbon	3		26	2	13	7
Total suspended solids	3		<5	<5	<5	0
		8				
Flow[c], GPD	3		9,131	1,141	5,494	2,334
pH, standard units	3		7.5	6.8	*b*	0.2
Temperature, °C	3		23	16.1	19.7	2
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		10	<5	<7	2
Total organic carbon	3		16	9	12	2
Total suspended solids	3		<5	<5	<5	0
		10				
Flow[c], GPD	3		30,400	1,141	11,274	9,569
pH, standard units	3		7.8	6.9	*b*	0.3
Temperature,°C	3		25.6	21.7	23.6	1.1
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		5.6	<5	<5	0.2
Chemical oxygen demand	3		19	<5	<10	5
Total organic carbon	3		21	17	19	1
Total suspended solids	3		<5	<5	<5	0
		14				
Flow[c], GPD	3		114,250	3,044	49,277	33,442
pH, standard units	3		7.9	7.2	*b*	0.2
Temperature, °C	3		25.4	18	20.6	2.4
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		15	7.3	10.1	2.5
Total organic carbon	3		22	8.6	14.5	3.9
Total suspended solids	3		<5	<5	<5	0
		21				
Flow[c], GPD	3		628,300	239,000	438,700	11,2495
pH, standard units	3		7.7	7.4	*b*	0.1
Temperature,°C	3		26.3	18.5	22.7	2.3
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		12	<5	<8	2
Chemical oxygen demand	3		20	8.7	13.9	3.3
Total organic carbon	3		18	7.4	14.5	3.5
Total suspended solids	3		<5	<5	<5	0

Table 4.30 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		33				
Flow[c], GPD	3		7,609	1,141	3,424	2,095
pH, standard units	3		7.7	7.1	*b*	0.2
Temperature, °C	3		23.1	17.1	20.5	1.8
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		5.99	<5	<5.33	0.33
Chemical oxygen demand	3		12	<5	<7	2
Total organic carbon	3		18	11	15	2
Total suspended solids	3		6	<5	<5	0
		34				
Flow[c], GPD	3		95,110	45,600	72,267	14,420
pH, standard units	3		7.8	6.7	*b*	0.3
Temperature, °C	3		32.7	24.7	27.5	2.6
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		8.5	<5	<6.3	1.1
Total organic carbon	3		34	6.5	16.5	8.8
Total suspended solids	3		<5	<5	<5	0
		36				
Flow[c], GPD	2		2,282	1,522	1,902	380
pH, standard units	2		8	7.4	*b*	0.3
Temperature, °C	2		21.1	17.1	19.1	2
Ammonia	2		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	2		<5	<5	<5	0
Chemical oxygen demand	2		21	19	20	1
Total organic carbon	2		12	8.5	10.3	1.8
Total suspended solids	2		19	<5	<12	7
		39				
Flow[c], GPD	2		761	60	411	351
pH, standard units	2		7.8	7.3	*b*	0.3
Temperature, °C	2		21.5	16.3	18.9	2.6
Ammonia	2		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	2		<5	<5	<5	0
Chemical oxygen demand	2		10	7.3	8.7	1.4
Total organic carbon	2		13	3.3	8.2	4.9
Total suspended solids	2		<5	<5	<5	0
		42				
Flow[c], GPD	3		45,820	11,413	26,687	10,118
pH, standard units	3		7.6	7.2	*b*	0.1
Temperature, °C	3		31.7	24.3	27.8	2.1
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		8.2	<5	<6.1	1.1
Total organic carbon	3		16	14	15	1
Total suspended solids	3		<5	<5	<5	0

Table 4.30 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		47				
Flow[c], GPD	3		77,540	41,100	58,569	10,546
pH, standard units	3		7.9	7.1	*b*	0.2
Temperature, °C	3		26.3	22.3	24.3	1.2
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		6.8	<5	<5.6	0.6
Total organic carbon	3		16	9.2	11.7	2.1
Total suspended solids	3		<5	<5	<5	0
		48				
Flow[c], GPD	3		22,827	5,707	15,218	5,033
pH, standard units	3		7.9	7.2	*b*	0.2
Temperature, °C	3		25.8	22.9	24	0.9
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		5.3	<5	<5.1	0.1
Chemical oxygen demand	3		8.4	<5	<6.1	1.1
Total organic carbon	3		21	10	15	3
Total suspended solids	3		16	<5	<9	4
		49				
Flow[c], GPD	3		91,600	41,840	59,680	15,997
pH, standard units	3		7.6	7.3	*b*	0.1
Temperature, °C	3		22.5	15.9	19.9	2
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		5.1	<5	<5	0.03
Chemical oxygen demand	3		6.4	<5	<5.5	0.5
Total organic carbon	3		18	9.1	14.7	2.8
Total suspended solids	3		6	<5	<5	0.3
		51				
Flow[c], GPD	3		95,100	26,101	63,453	20,122
pH, standard units	3		7.2	6.9	*b*	0.1
Temperature, °C	3		17.4	17.1	17.3	0.1
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		5	5	5	0
Total organic carbon	3		43	30	37	4
Total suspended solids	3		<5	<5	<5	0
		55				
Flow[c], GPD	3		114,130	76,088	94,073	11,031
pH, standard units	3		7.4	7.3	*b*	0.03
Temperature, °C	3		31.4	18.6	25.9	3.8
Ammonia	3		0.21	<0.2	<0.2	0.003
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		<5	<5	<5	0
Total organic carbon	3		16	7.2	13.1	2.9
Total suspended solids	3		<5	<5	<5	0

Table 4.30 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		63				
Flow[c], GPD	3		22,827	6,087	15,008	4,864
pH, standard units	3		7.8	7.0	*b*	0.2
Temperature, °C	3		23.7	16.2	19.2	2.3
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	2		110	<5	<58	53
Chemical oxygen demand	3		97	<5	<41	28
Total organic carbon	3		48	13	25	11
Total suspended solids	3		22	<5	<11	6
		64				
Flow[c], GPD	2		11,413	1,522	6,468	4,946
pH, standard units	2		8.0	7.3	*b*	0.3
Temperature, °C	2		21	16.5	18.8	2.3
Ammonia	2		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	2		<5	<5	<5	0
Chemical oxygen demand	2		7.9	<5	<6.5	1.5
Total organic carbon	2		8	5.5	6.8	1.3
Total suspended solids	2		23	<5	<14	9
		67				
Flow[c], GPD	3		69,124	6,848	35,471	18,153
pH, standard units	3		7.9	7.5	*b*	0.1
Temperature, °C	3		26.2	16.2	21.6	2.9
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		5.8	<5	<5.3	0.3
Total organic carbon	3		21	9.5	16.5	3.5
Total suspended solids	3		<5	<5	<5	0
		71				
Flow[c], GPD	3		76,099	25,109	54,150	15,141
pH, standard units	3		8	7.3	*b*	0.2
Temperature, °C	3		20.5	18.4	19.4	0.6
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		6.2	<5	<5.4	0.4
Total organic carbon	3		19	6.9	13.6	3.6
Total suspended solids	3		<5	<5	<5	0
		83				
Flow[c], GPD	3		57,066	380	19,275	18,895
pH, standard units	3		7.8	7.3	*b*	0.1
Temperature, °C	3		19	15.1	17.5	1.2
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		16	<5	<10	3
Total organic carbon	3		11	2.5	5.8	2.6
Total suspended solids	3		<5	<5	<5	0

Table 4.30 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		88				
Flow[c], GPD	3		13,316	761	5,073	4,123
pH, standard units	3		7.6	7.2	*b*	0.1
Temperature, °C	3		23.9	19.5	21.5	1.3
Ammonia	3		0.45	<0.2	<0.28	0.08
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		10	<5	<7	2
Total organic carbon	3		10	3.7	7.6	2
Total suspended solids	3		<5	<5	<5	0
		99				
Flow[c], GPD	3		11,413	4,565	7,363	2,074
pH, standard units	3		7.8	7.4	*b*	0.1
Temperature, °C	3		21.7	17.1	19.2	1.3
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		6.3	<5	<5.4	0.4
Total organic carbon	3		19	8.8	14.3	3
Total suspended solids	3		<5	<5	<5	0
		109				
Flow[c], GPD	3		1,263,400	286,700	681,567	297,043
pH, standard units	3		8.1	7.4	*b*	0.2
Temperature, °C	3		21.6	13.3	18.7	2.7
Ammonia	3		<2	<0.2	<0.8	0.6
Biochemical oxygen demand	3		6.4	<5	<5.5	0.5
Chemical oxygen demand	3		9.8	<5	<7.3	1.4
Total organic carbon	3		21	3	14	5
Total suspended solids	3		8	<5	<6	1
		110				
Flow[c], GPD	2		254	95	175	80
pH, standard units	2		7.9	7.6	*b*	0.2
Temperature, °C	2		22	15.4	18.7	3.3
Ammonia	2		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	2		<5	<5	<5	0
Chemical oxygen demand	2		6.3	<5	<5.7	0.6
Total organic carbon	2		6.9	4.7	5.8	1.1
Total suspended solids	2		<5	<5	<5	0
		113				
Flow[c], GPD	3		13,680	380	8,491	4,108
pH, standard units	3		7.8	7.4	*b*	0.1
Temperature, °C	3		32.3	19.5	26	3.7
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		6.5	<5	<5.5	0.5
Total organic carbon	3		15	7.2	12.1	2.5
Total suspended solids	3		<5	<5	<5	0

Table 4.30 (continued)

Parameter	Number of samples	Discharge point	Concentration (mg/L)			
			Max	Min	Av	Standard error
		114				
Flow[c], GPD	2		2,282	1,141	1,712	571
pH, standard units	2		7.6	7.3	*b*	0.2
Temperature, °C	2		25.9	21.7	23.8	2.1
Ammonia	2		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	2		<5	<5	<5	0
Chemical oxygen demand	2		12	<5	<9	4
Total organic carbon	2		26	15	21	6
Total suspended solids	2		14	<5	<10	5
		122				
Flow[c], GPD	3		11,413	380	4,185	3,616
pH, standard units	3		7.6	7.0	*b*	0.2
Temperature, °C	3		28.8	21.2	26.2	2.5
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		11	<5	<7	2
Total organic carbon	3		20	8.2	14.4	3.4
Total suspended solids	3		19	<5	<10	5
		125				
Flow[c], GPD	3		146,160	28,533	106,654	39,062
pH, standard units	3		7.5	7.1	*b*	0.1
Temperature, °C	3		25.8	22.1	24.3	1.1
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		<5	<5	<5	0
Total organic carbon	3		17	9.8	14.3	2.3
Total suspended solids	3		<5	<5	<5	0
		135				
Flow[c], GPD	3		758,100	342,200	488,467	134,979
pH, standard units	3		7.7	7.5	*b*	0.1
Temperature, °C	3		29.8	26.7	28.5	0.9
Ammonia	3		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	3		<5	<5	<5	0
Chemical oxygen demand	3		9.6	<5	<7.4	1.3
Total organic carbon	3		20	14	16	2
Total suspended solids	3		<5	<5	<5	0
		142				
Flow[c], GPD	2		7,010	3,044	5,027	1,983
pH, standard units	2		7.5	7.4	*b*	0.05
Temperature, °C	2		32.9	27	30	3
Ammonia	2		<0.2	<0.2	<0.2	0
Biochemical oxygen demand	2		7.8	<5	<6.4	1.4
Chemical oxygen demand	2		6.5	<5	<5.8	0.8
Total organic carbon	2		17	16	17	0.5
Total suspended solids	2		<5	<5	<5	0

[a]Outfalls not included on the NPDES permit.

[b]Not applicable.

[c]Flow during operations and/or discharging.

Table 4.31. Y-12 Plant toxicity control monitoring program summary information for 1991[a]

Site/Building	Test date	Species	NOEC	IWC[b]
Evaporator Process Condensate (Outfall 402)	1/10–17/91	*Ceriodaphnia*	1%	*c*
Evaporator Process Condensate (Outfall 402)	1/10–17/91	FHM	25%	c
Steam Plant Wastewater Treatment Facility (SPWTF) (Outfall 503) Normal Flow	1/17–24/91	*Ceriodaphnia*	12%	11.0%
SPWTF (Outfall 503) Normal Flow	1/17–24/91	FHM	100%	11.0%
SPWTF (Outfall 503) High Flow	1/17–24/91	*Ceriodaphnia*	12%	11.3%
Evaporator Process Condensate (Outfall 402)	5/2–9/91	*Ceriodaphnia*	50%	*c*
Evaporator Process Condensate (Outfall 402)	5/2–9/91	FHM	6%	c
Plating Rinsewater Treatment Facility (PRTF) (Outfall 504)	9/5–12/91	FHM	100%	1.4%
PRTF (Outfall 504)	9/5–12/91	*Ceriodaphnia*	30%	1.4%
Evaporator Process Condensate (Outfall 402)	9/19–25/91	*Ceriodaphnia*	<50%	*c*
Cooling Tower (Outfall 622)	10/10–17/91	FHM	100%	0.3%
Cooling Tower (Outfall 622)	10/10–17/91	*Ceriodaphnia*	100%	0.3%
Central Pollution Control Facility (CPCF) (Outfall 501)[d]	10/24–31/91	FHM	1%	1.2%
CPCF (Outfall 501)[d]	10/24–31/91	*Ceriodaphnia*	6%	1.2%

[a]This table is a summary of the effluents and their corresponding no-observed-effect concentration (NOEC). The tests performed were 7-day toxicity tests using *Ceriodaphnia* and fathead minnows (FHM). Where only one NOEC value is given, it is based on both species.

[b]Based on 4.7 cfs at East Fork Poplar Creek, Station 8. (Annual average flow rate).

[c]NOEC is greater than the IWC. Some information, including flow rate for this effluent, is considered classified and available only to those with a "Q" security clearance. This effluent is scheduled to be converted to total recycle in 1993.

[d]Samples taken at startup, displacing old water.

Table 4.32. Sampling and analysis plan for White Oak Creek headwaters

Parameter	Collection frequency	Sample type	Analysis frequency
Anions			
Fluoride	Monthly	Grab	Monthly
Nitrate (as N)	Monthly	Grab	Monthly
Sulfate (as SO_4)	Monthly	Grab	Monthly
Field Measurements			
Conductivity	Monthly	Grab	Monthly
Dissolved oxygen	Monthly	Grab	Monthly
pH	Monthly	Grab	Monthly
Temperature	Monthly	Grab	Monthly
Turbidity	Monthly	Grab	Monthly
Metals			
Silver	Monthly	Grab	Monthly
Aluminum	Monthly	Grab	Monthly
Arsenic	Monthly	Grab	Monthly
Boron	Monthly	Grab	Monthly
Barium	Monthly	Grab	Monthly
Beryllium	Monthly	Grab	Monthly
Calcium	Monthly	Grab	Monthly
Cadmium	Monthly	Grab	Monthly
Cobalt	Monthly	Grab	Monthly
Chromium	Monthly	Grab	Monthly
Copper	Monthly	Grab	Monthly
Iron	Monthly	Grab	Monthly
Lithium	Monthly	Grab	Monthly
Magnesium	Monthly	Grab	Monthly
Manganese	Monthly	Grab	Monthly
Molybdenum	Monthly	Grab	Monthly
Sodium	Monthly	Grab	Monthly
Nickel	Monthly	Grab	Monthly
Lead	Monthly	Grab	Monthly
Antimony	Monthly	Grab	Monthly
Selenium	Monthly	Grab	Monthly
Silicon	Monthly	Grab	Monthly
Tin	Monthly	Grab	Monthly
Strontium	Monthly	Grab	Monthly
Titanium	Monthly	Grab	Monthly
Vanadium	Monthly	Grab	Monthly
Zinc	Monthly	Grab	Monthly
Zirconium	Monthly	Grab	Monthly
Others			
Oil and grease	Monthly	Grab	Monthly
Phosphorus	Monthly	Grab	Monthly
Solids, total dissolved	Monthly	Grab	Monthly
Carbon, total organic	Monthly	Grab	Monthly
Solids, total suspended	Monthly	Grab	Monthly
Radionuclides			
^{60}Co	Weekly	Flow proportional	Monthly
^{137}Cs	Weekly	Flow proportional	Monthly
Gross alpha	Weekly	Flow proportional	Monthly
Gross beta	Weekly	Flow proportional	Monthly

Table 4.33. Sampling and analysis plan for Melton Hill Dam

Parameter	Collection frequency	Sample type	Analysis frequency
Anions			
Fluoride	Monthly	Grab	Monthly
Nitrate (as N)	Monthly	Grab	Monthly
Sulfate (as SO_4)	Monthly	Grab	Monthly
Field Measurements			
Conductivity	Monthly	Grab	Monthly
Dissolved oxygen	Monthly	Grab	Monthly
pH	Monthly	Grab	Monthly
Temperature	Monthly	Grab	Monthly
Turbidity	Monthly	Grab	Monthly
Metals			
Silver	Monthly	Grab	Monthly
Aluminum	Monthly	Grab	Monthly
Arsenic	Monthly	Grab	Monthly
Boron	Monthly	Grab	Monthly
Barium	Monthly	Grab	Monthly
Beryllium	Monthly	Grab	Monthly
Calcium	Monthly	Grab	Monthly
Cadmium	Monthly	Grab	Monthly
Cobalt	Monthly	Grab	Monthly
Chromium	Monthly	Grab	Monthly
Copper	Monthly	Grab	Monthly
Iron	Monthly	Grab	Monthly
Lithium	Monthly	Grab	Monthly
Magnesium	Monthly	Grab	Monthly
Manganese	Monthly	Grab	Monthly
Molybdenum	Monthly	Grab	Monthly
Sodium	Monthly	Grab	Monthly
Nickel	Monthly	Grab	Monthly
Lead	Monthly	Grab	Monthly
Antimony	Monthly	Grab	Monthly
Selenium	Monthly	Grab	Monthly
Silicon	Monthly	Grab	Monthly
Tin	Monthly	Grab	Monthly
Strontium	Monthly	Grab	Monthly
Titanium	Monthly	Grab	Monthly
Vanadium	Monthly	Grab	Monthly
Zinc	Monthly	Grab	Monthly
Zirconium	Monthly	Grab	Monthly
Others			
Oil and grease	Monthly	Grab	Monthly
Phosphorus	Monthly	Grab	Monthly
Solids, total dissolved	Monthly	Grab	Monthly
Carbon, total organic	Monthly	Grab	Monthly
Solids, total suspended	Monthly	Grab	Monthly
Radionuclides			
^{60}Co	Weekly	Flow proportional	Monthly
^{137}Cs	Weekly	Flow proportional	Monthly
Gross alpha	Weekly	Flow proportional	Monthly
Gross beta	Weekly	Flow proportional	Monthly

Table 4.34. 1991 surface water analyses at White Oak Creek headwaters[a]

Parameter	Number detected/ number of samples	Concentration (mg/L)				Percentage of ref. value[d]
		Max	Min	Av[b]	Standard error[c]	
Anions						
Fluoride	1/12	<1.0	<0.10	<0.43*	0.13	<11
Nitrate, as N	1/12	<5.0	0.10	<1.5*	0.48	<15
Sulfate, as SO_4	10/12	<5.0	1.5	<2.9*	0.38	<1.2
Field measurements						
Conductivity, mS/cm	12/12	1.2	0.030	0.42*	0.12	*e*
Dissolved oxygen	12/12	13	3.1	9.7*	0.84	*e*
Temperature, °C	12/12	19	8.9	13*	0.98	*e*
Turbidity, JTU	12/12	240	15	85*	20	*e*
pH, standard units	12/12	8.7	7.4	7.9*	0.10	*e*
Metals						
Aluminum, total	12/12	1.8	0.075	0.50*	0.16	250
Antimony, total	0/12	<0.050	<0.050	<0.050	0	*e*
Arsenic, total	0/12	<0.010	<0.010	<0.010	0	*e*
Barium, total	11/12	0.10	<0.0010	<0.064*	0.0085	<3.2
Beryllium, total	1/12	<0.0010	<0.00030	<0.00055*	0.000097	*e*
Boron, total	0/12	<0.080	<0.080	<0.080	0	*e*
Cadmium, total	0/12	<0.0050	<0.0050	<0.0050	0	*e*
Calcium, total	12/12	34	18	26*	1.7	*e*
Chromium, total	10/12	0.0093	<0.0040	<0.0068*	0.00058	<14
Cobalt, total	1/12	0.0043	<0.0040	<0.0040*	0.000025	*e*
Copper, total	0/12	<0.0070	<0.0070	<0.0070	0	*e*
Iron, total	11/12	1.9	<0.050	<0.59*	0.17	<200
Lead, total	0/12	<0.050	<0.050	<0.050	0	*e*
Lithium, total	0/12	<15	<15	<15	0	*e*
Magnesium, total	12/12	17	6.2	12*	1.1	*e*
Manganese, total	9/12	0.32	<0.0050	<0.093*	0.028	<190
Molybdenum, total	0/12	<0.040	<0.040	<0.040	0	*e*
Nickel, total	3/12	0.0075	<0.0040	<0.0044*	0.00029	<4.4
Selenium, total	0/12	<0.0050	<0.0050	<0.0050	0	*e*
Silicon, total	12/12	5.8	2.9	4.0*	0.21	*e*
Silver, total	0/12	<0.0050	<0.0050	<0.0050	0	*e*
Sodium, total	0/12	<5.0	<5.0	<5.0	0	*e*
Strontium, total	12/12	0.040	0.020	0.029*	0.0019	*e*
Tin, total	0/12	<0.050	<0.050	<0.050	0	*e*
Titanium, total	1/12	0.030	<0.020	<0.021*	0.00083	*e*
Vanadium, total	1/12	0.0025	<0.0020	<0.0020*	0.000042	*e*
Zinc, total	3/12	0.026	<0.0050	<0.0075*	0.0018	<0.15
Zirconium, total	0/12	<0.020	<0.020	<0.020	0	*e*
Others						
Carbon, total organic	11/12	2.1	<0.50	<0.96*	0.12	*e*
Oil and grease	0/12	<2.0	<2.0	<2.0	0	*e*
Phosphorus	0/12	<0.30	<0.30	<0.30	0	*e*
Solids, total dissolved	12/12	160	53	110*	12	22
Solids, total suspended	9/12	130	<5.0	<36*	10	*e*

Table 4.34 (continued)

Parameter	Number detected/ number of samples	Concentration (mg/L)				Percentage of ref. value[d]
		Max	Min	Av[b]	Standard error[c]	
Radionuclides[f]						
^{60}Co, pCi/L	3/12	62*	–30	14	8.5	*e*
^{137}Cs, pCi/L	2/12	51*	–35	0.86	7.4	*e*
Gross alpha, pCi/L	8/12	6.2*	–1.6	1.6*	0.53	10
Gross beta, pCi/L	9/12	27*	0.81	10*	2.4	20

[a]See Figure 4.6, Vol. 1.

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

[c]Standard error of the mean.

[d]Mean concentration as a percentage of the National Primary or Secondary Water Regulation Level, or 4% of the DCG for ingestion of water (from DOE Order 5400.5), when a reference exists, the parameter is a contaminant, and mean concentration is significantly greater than zero.

[e]Not applicable.

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

Table 4.35. 1991 surface water analyses at Melton Hill Dam[a]

Parameter	Number detected/ number of samples	Concentration (mg/L)				Percentage of ref. value[d]
		Max	Min	Av[b]	Standard error[c]	
Anions						
Fluoride	4/12	1.1	<0.10	<0.47*	0.13	<12
Nitrate, as N	3/12	<5.0	0.60	<1.7*	0.46	<17
Sulfate, as SO_4	12/12	23	16	19*	0.59	7.6
Field measurements						
Conductivity, mS/cm	12/12	1.4	0.020	0.45*	0.13	*e*
Dissolved oxygen	12/12	12	2.8	9.0*	0.83	*e*
Temperature,°C	12/12	23	7.5	15*	1.5	*e*
Turbidity, JTU	12/12	270	4.2	90*	21	*e*
pH, standard units	12/12	8.2	7.1	7.7*	0.094	*e*
Metals						
Aluminum, total	10/12	2.4	<0.050	<0.65*	0.22	<330
Antimony, total	0/12	<0.050	<0.050	<0.050	0	*e*
Arsenic, total	0/12	<0.010	<0.010	<0.010	0	*e*
Barium, total	11/12	0.056	<0.0010	<0.032*	0.0042	<1.6
Beryllium, total	2/12	<0.0010	<0.00030	<0.00056*	0.000096	*e*
Boron, total	0/12	<0.080	<0.080	<0.080	0	*e*
Cadmium, total	0/12	<0.0050	<0.0050	<0.0050	0	*e*
Calcium, total	12/12	41	31	35*	0.91	*e*
Chromium, total	9/12	0.0083	<0.0040	<0.0063*	0.00043	<13
Cobalt, total	0/12	<0.0040	<0.0040	<0.0040	0	*e*
Copper, total	2/12	0.016	<0.0070	<0.0083*	0.00086	<0.83
Iron, total	12/12	3.1	0.15	0.79*	0.25	260
Lead, total	0/12	<0.050	<0.050	<0.050	0	*e*
Lithium, total	0/12	<15	<15	<15	0	*e*
Magnesium, total	12/12	11	8.5	9.5*	0.24	*e*
Manganese, total	11/12	0.70	<0.0050	<0.13*	0.058	<260
Molybdenum, total	0/12	<0.040	<0.040	<0.040	0	*e*
Nickel, total	5/12	0.013	<0.0040	<0.0058*	0.00085	<5.8
Selenium, total	0/12	<0.0050	<0.0050	<0.0050	0	*e*
Silicon, total	12/12	5.7	1.3	3.0*	0.42	*e*
Silver, total	0/12	<0.0050	<0.0050	<0.0050	0	*e*
Sodium, total	0/12	<5.0	<5.0	<5.0	0	*e*
Strontium, total	12/12	0.097	0.075	0.085*	0.0019	*e*
Tin, total	0/12	<0.050	<0.050	<0.050	0	*e*
Titanium, total	0/12	<0.020	<0.020	<0.020	0	*e*
Vanadium, total	3/12	0.0039	<0.0020	<0.0023*	0.00021	*e*
Zinc, total	2/12	0.012	<0.0050	<0.0058*	0.00060	<0.12
Zirconium, total	0/12	<0.020	<0.020	<0.020	0	*e*
Others						
Carbon, total organic	11/12	3.8	<0.50	<1.9*	0.23	*e*
Oil and grease	4/12	35	<2.0	<7.7*	3.7	*e*
Phosphorus	0/12	<0.30	<0.30	<0.30	0	*e*
Solids, total dissolved	12/12	180	110	150*	5.0	29
Solids, total suspended	11/12	62	<5.0	<22*	5.6	*e*

Table 4.35 (continued)

Parameter	Number detected/ number of samples	Concentration (mg/L)				Percentage of ref. value[d]
		Max	Min	Av[b]	Standard error[c]	
Radionuclides[f]						
^{60}Co, pCi/L	1/12	38*	–24	–3.7	5.1	*e*
^{137}Cs, pCi/L	1/12	24	–32	2.3	4.8	*e*
Gross alpha, pCi/L	4/12	3.5*	–3.5	0.41	0.60	*e*
Gross beta, pCi/L	10/12	9.2*	–19	2.8	2.4	*e*

[a]See Figure 4.1, Vol. 1.

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

[c]Standard error of the mean.

[d]Mean concentration as a percentage of the National Primary or Secondary Water Regulation Level, or 4% of the DCG for ingestion of water (from DOE Order 5400.5), when a reference exists, the parameter is a contaminant, and mean concentration is significantly greater than zero.

[e]Not applicable.

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

Table 4.36. ORNL Melton Branch (X13), 1991

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
^{3}H	Weekly	Flow proportional	Monthly
Total Sr[a]	Weekly	Flow proportional	Monthly
Gamma scan	Weekly	Flow proportional	Monthly

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

Table 4.37. ORNL White Oak Creek (X14), 1991

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
^{3}H	Weekly	Flow proportional	Monthly
Total Sr[a]	Weekly	Flow proportional	Monthly
Gamma scan	Weekly	Flow proportional	Monthly

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

Table 4.38. ORNL White Oak Dam (X15), 1991

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
^{3}H	Weekly	Flow proportional	Monthly
Total Sr[a]	Weekly	Flow proportional	Monthly
Gamma scan	Weekly	Flow proportional	Weekly
Gross alpha	Weekly	Flow proportional	Weekly
Gross beta	Weekly	Flow proportional	Weekly

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

Table 4.39. Summary of collection and analysis frequencies of ORNL surface water samples, 1991

Station	Parameter	Collection frequency	Sample type	Analysis frequency
7500 Bridge, MB2	Gamma scan, total Sr[a], ^{3}H	Weekly	Flow proportional	Monthly
First Creek, Fifth Creek, Raccoon Creek	Gamma scan, total Sr[a]	Weekly	Grab	Monthly
NWT	Gamma scan, total Sr[a]	Weekly	Flow proportional	Monthly

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

Table 4.40. 1991 ORNL radionuclide concentrations in First Creek[a]

Radionuclide	Number detected	Number of samples	Concentrations (pCi/L)[b]			
			Max	Min	Av[c]	Standard error[d]
^{60}Co	0	12	38	–59	1.4	9.1
^{137}Cs	0	12	32	–46	–1.6	8.4
$^{89}Sr + ^{90}Sr$	12	12	540*	120*	290*	42

[a]See Fig. 4.6, Vol. 1.
[b]Multiply pCi/L by 0.037 to convert to Bq/L.
[c]Mean concentrations significantly greater than zero are identified by an asterisk (*).
[d]Standard error of the mean.

Table 4.41. 1991 ORNL radionuclide concentrations in Fifth Creek[a]

Radionuclide	Number detected	Number of samples	Concentrations (pCi/L)[b]			
			Max	Min	Av[c]	Standard error[d]
^{60}Co	1	12	35*	–57	–9.5	7.9
^{137}Cs	0	12	46	–38	–1.8	6.9
$^{89}Sr + ^{90}Sr$	12	12	140*	18*	39*	9.3

[a]See Fig. 4.6, Vol. 1.
[b]Multiply pCi/L by 0.037 to convert to Bq/L.
[d]Mean concentrations significantly greater than zero are identified by an asterisk (*).
[c]Standard error of the mean.

Table 4.42. 1991 ORNL radionuclide concentrations at 7500 Bridge[a]

Radionuclide	Number detected	Number of samples	Concentrations (pCi/L)[b]			
			Max	Min	Av[c]	Standard error[d]
^{60}Co	2	12	38*	–46	11	6.2
^{137}Cs	10	12	760*	11	140*	60
^{3}H	12	12	4,900*	1,500*	3,100*	330
$^{89}Sr + ^{90}Sr$	12	12	180*	38*	81*	12

[a]See Fig. 4.6, Vol. 1.
[b]Multiply pCi/L by 0.037 to convert to Bq/L.
[c]Mean concentrations significantly greater than zero are identified by an asterisk (*).
[d]Standard error of the mean.

Table 4.43. 1991 ORNL radionuclide concentrations in Melton Branch 2[a]

Radionuclide	Number detected	Number of samples	Concentrations (pCi/L)[b]			
			Max	Min	Av[c]	Standard error[d]
^{60}Co	4	12	54*	–27	15*	7.7
^{137}Cs	1	12	97*	–35	6.1	9.7
^{3}H	11	12	11,000*	–220	4,200*	820
$^{89}Sr + ^{90}Sr$	6	12	5.4*	–0.054	2.7*	0.58

[a]See Fig. 4.6, Vol. 1.
[b]Multiply pCi/L by 0.037 to convert to Bq/L.
[c]Mean concentrations significantly greater than zero are identified by an asterisk (*).
[d]Standard error of the mean.

Table 4.44. 1991 ORNL radionuclide concentrations in Northwest Tributary[a]

Radionuclide	Number detected	Number of samples	Concentrations (pCi/L)[b]			
			Max	Min	Av[c]	Standard error[d]
^{60}Co	1	12	43*	–49	5.2	7.6
^{137}Cs	1	12	3000*	–43	240	250
$^{89}Sr + ^{90}Sr$	12	12	62*	2.4*	39*	5.7

[a]See Fig. 4.6, Vol. 1.
[b]Multiply pCi/L by 0.037 to convert to Bq/L.
[c]Mean concentrations significantly greater than zero are identified by an asterisk (*).
[d]Standard error of the mean.

Table 4.45. 1991 ORNL radionuclide concentrations in Raccoon Creek[a]

Radionuclide	Number detected	Number of samples	Concentrations (pCi/L)[b]			
			Max	Min	Av[c]	Standard error[d]
^{60}Co	0	12	30	–43	–3.4	7.1
^{137}Cs	0	12	32	–32	3.7	6.7
$^{89}Sr + ^{90}Sr$	11	12	65*	5.1	28*	6.7

[a]See Fig. 4.6, Vol, Vol. 1.
[b]Multiply pCi/L by 0.037 to convert to Bq/L.
[c]Mean concentrations significantly greater than zero are identified by an asterisk (*).
[d]Standard error of the mean.

Table 4.46. 1991 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	0.070	<0.050	<0.053	0.0033	2.9
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	0.10	0.060	<0.080	0.0089	4.2
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	0.10	<0.050	<0.052	0.0011	4.2
			Fifth Creek			
161	6	<0.050	<0.050	<0.050	0	<2.1
162	6	<0.050	<0.050	<0.060	0	<2.1
163	6	0.11	<0.050	<0.075	0.012	4.6
164	6	<0.050	<0.050	<0.050	0	<2.1
261	6	<0.050	<0.050	<0.050	0	<2.1
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	<0.050	<0.050	<0.050	0	<2.1
363	6	<0.050	<0.050	<0.050	0	<2.1
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	0.24	<0.050	<0.083	0.031	10
368	6	<0.050	<0.050	<0.050	0	<2.1
Stream summary	96	0.24	<0.050	<0.054	0.0022	10
			Melton Branch			
181	6	<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	6	<0.050	<0.050	<0.050	0	<2.1
386	6	<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	72	<0.050	<0.050	<0.050	0	<2.1

Table 4.46 (continued)

Station	Number of samples	Concentration (μg/L)				Percentage TWQ[c]
		Max	Min	Av	Standard error[b]	
			White Oak Creek			
101	6	0.17	<0.050	<0.11	0.027	7.1
103	6	0.19	<0.050	<0.12	0.031	7.9
106	6	0.18	<0.050	<0.11	0.028	7.5
109	6	<0.050	<0.050	<0.050	0	<2.1
116	6	<0.050	<0.050	<0.050	0	<2.1
202	6	0.10	<0.050	<0.067	0.0084	4.2
204	6	0.090	<0.050	<0.067	0.0076	3.8
206	6	0.12	<0.050	<0.080	0.014	5.0
207	6	0.26	<0.050	<0.15	0.044	11
208	6	0.20	<0.050	<0.12	0.033	8.3
209	6	0.25	<0.050	<0.13	0.037	10
210	6	0.20	<0.050	<0.13	0.034	8.3
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	0.12	0.050	0.087	0.014	5.0
302	6	0.13	0.050	0.085	0.016	5.4
304	6	0.15	<0.050	<0.098	0.022	6.3
310	6	0.15	<0.050	<0.097	0.021	6.3
311	6	0.31	<0.050	<0.16	0.051	13
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	<0.050	<0.050	<0.050	0	<2.1
FLUME	6	0.17	<0.050	<0.11	0.026	7.1
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	0.09	<0.050	<0.065	0.0072	3.8
X03	6	<0.050	<0.050	<0.050	0	<2.1
X12	6	0.070	0.050	0.060	0.0045	2.9
Stream summary	228	0.31	<0.050	<0.075	0.0035	13
Overall summary	480	0.31	<0.050	<0.063	0.0018	13

[a]See Figs. 4.6–4.8 in Vol. 1.

[b]Standard error of the mean.

[c]Maximum value percentage of proposed Tennessee Water Quality Standard, 2.4 μg/L, for the protection of fish and aquatic life.

Table 4.47. ORNL Sewage Treatment Plant (X01), 1991

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
Gamma scan	Weekly	Flow proportional	Monthly
Gross beta	Weekly	Flow proportional	Monthly
Total Sr[a]	Weekly	Flow proportional	Monthly

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

Table 4.48. ORNL Coal Yard Runoff Treatment Facility (X02), 1991

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 4.49. ORNL Nonradiological Wastewater Treatment Facility (X12), 1991

Parameter	Collection frequency	Type	Analysis frequency
Flow	Daily	Continuous	Daily
pH	Continuous	Continuous	Continuous
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
^{3}H	Weekly	Flow proportional	Monthly
Gamma scan	Weekly	Flow proportional	Monthly
Gross alpha	Weekly	Flow proportional	Monthly
Gross beta	Weekly	Flow proportional	Monthly
Total Sr[a]	Weekly	Flow proportional	Monthly

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

Table 4.50. NPDES Permit Number TN 0002941, 1991
ORNL discharge point X01 (Sewage Treatment Plant)

Flow rates (1×10^6 L/d)—Max: 2.5, Min: 0.000038, Av: 0.83

X01: Clinch River flow ratios—Max: 0.00089, Min: 0.00000068, Av: 0.00010

Parameter	Number detected/ number of samples	Concentration (mg/L)				CR av as % DWL[c]	CR max as % DWL[c]
		Max[a]	Min[a]	Av[a]	Standard error[b]		
Field measurements							
Chlorine, total residual	154/159	1.9	<0.010	<0.21*	0.012	*d*	*d*
Downstream pH, standard units	53/53	8.1	7.0	7.7*	0.033	*d*	*d*
Downstream temperature, °C	53/53	27	12	20*	0.62	*d*	*d*
Oxygen, dissolved	250/250	19	6.3	10*	0.11	*d*	*d*
Temperature, °C	303/303	29	12	21*	0.30	*d*	*d*
pH, standard units	53/53	8.0	7.0	7.5*	0.033	*d*	*d*
Metals							
Copper, total	2/12	0.011	<0.0070	<0.0074*	0.00034	<0.0001	0.00016
Mercury, total	1/12	0.000080	<0.000050	<0.000053*	0.0000025	0.0025	0.0059
Silver, total	0/12	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Zinc, total	12/12	0.099	0.024	0.050*	0.0060	0.00012	0.00047
Others							
Ammonia (as N)	158/158	6.0	0.010	0.33*	0.059	*d*	*d*
Biochemical oxygen demand	1/158	14	<5.0	<5.1*	0.057	*d*	*d*
Cyanide, total	1/12	0.0040	<0.0020	<0.0022*	0.00017	0.00010	0.00024
Fecal coliform, col/100 mL	57/158	3300	0	1.8	1.1	<0.0001	0.021
Oil and grease	23/158	190	<2.0	<3.6*	1.2	*d*	*d*
Phenolics, total recoverable	0/12	<0.0010	<0.0010	<0.0010	0	*d*	*d*
Suspended solids, total	18/158	86	<2.0	<6.0*	0.55	*d*	*d*
Radionuclides							
^{137}Cs, pCi/L	0/12	19	−46	−1.7	5.3	*d*	*d*
^{60}Co, pCi/L	1/12	43*	−49	2.3	7.3	*d*	*d*
Gross beta, pCi/L	11/11	760*	1.4*	420*	70	0.0033	0.0093
Total Sr, pCi/L	12/12	510*	97*	250*	36	0.011	0.026
Volatile organics							
Bromodichloromethane	1/12	<0.0050	J 0.0010	J 0.0047*	0.00033	0.00047	0.0012
Trichloroethylene	1/12	<0.0050	J 0.0010	J 0.0047*	0.00033	0.0096	0.024

[a] < = undetected; J = below detection limit, but estimated. Mean concentrations significantly greater than zero are followed by an asterisk (*).

[b] Standard error of the mean.

[c] Calculated Clinch River concentration as a percentage of a drinking water limit (DWL) or 4% of the derived concentration guide, when a reference exists and the parameter is a contaminant.

[d] Not applicable.

Table 4.51. NPDES Permit Number TN 0002941, 1991
ORNL discharge point X02 (Coal Yard Runoff Treatment Facility)

Flow rates (1×10^6 L/d)—Max: 0.57, Min: 0, Av: 0.043

X02: Clinch River flow ratios—Max: 0.00060, Min: 0, Av: 0.0000081

Parameter	Number detected/ number of samples	Concentration (mg/L)				CR av as % DWL[c]	CR max as % DWL[c]
		Max[a]	Min[a]	Av[a]	Standard error[b]		
Anions							
Sulfate, as SO_4	12/12	2000	730	1500*	120	0.0049	0.028
Field measurements							
Downstream pH, standard units	250/250	8.5	6.8	7.8*	0.016	*d*	*d*
Downstream temperature, °C	250/250	27	5.1	17*	0.35	*d*	*d*
Temperature, °C	250/250	30	2.6	18*	0.51	*d*	*d*
pH, standard units	250/250	11	6.4	7.6*	0.029	*d*	*d*
Metals							
Arsenic, total	9/41	0.54	<0.050	<0.069*	0.012	0.00073	0.0059
Cadmium, total	0/41	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Chromium, total	37/41	0.020	<0.0040	<0.011*	0.00078	0.00014	0.0016
Copper, total	13/41	0.084	<0.0070	<0.0098*	0.0019	<0.0001	<0.0001
Iron, total	37/41	3.5	<0.050	<0.38*	0.088	0.00088	0.020
Lead, total	1/41	0.075	<0.050	<0.051*	0.00061	0.00062	0.0059
Manganese, total	40/41	0.12	<0.0010	<0.039*	0.0047	0.00037	0.0014
Nickel, total	16/41	0.017	<0.0040	<0.0060*	0.00056	<0.0001	0.00050
Selenium, total	41/41	0.23	0.0080	0.078*	0.010	0.0066	0.088
Silver, total	3/41	0.0091	<0.0050	<0.0051*	0.00011	<0.0001	0.00059
Zinc, total	24/41	0.091	<0.0050	<0.014*	0.0030	<0.0001	<0.0001
Others							
Oil and grease	9/42	150	<2.0	<7.5*	3.5	*d*	*d*
Suspended solids, total	11/41	19	<5.0	<6.0*	0.46	*d*	*d*

[a]< = undetected. Mean concentrations significantly greater than zero are marked with an asterisk (*).

[b]Standard error of the mean.

[c]Calculated Clinch River concentration as a percentage of a drinking water limit (DWL) or 4% of the derived concentration guide, when a reference exists and the parameter is a contaminant.

[d]Not applicable.

Table 4.52. NPDES Permit Number TN 0002941, 1991
ORNL discharge point X12 (Nonradiological Wastewater Treatment Facility)
Flow rates (1×10^6 L/d)—Max: 3.5, Min: 1.2, Av: 1.8
X12: Clinch River flow ratios—Max: 0.0018, Min: 0.000032, Av: 0.00024

Parameter	Number detected/ number of samples	Concentration (mg/L)				CR av as % DWL[c]	CR max as % DWL[c]
		Max[a]	Min[a]	Av[a]	Standard error[b]		
Anions							
Fluoride, total	51/53	4.4	0.80	1.3*	0.068	0.0075	0.036
Nitrate	49/53	15	0.50	3.3*	0.36	0.0064	0.044
Sulfate, as SO_4	53/53	430	30	220*	10	0.021	0.087
Field measurements							
Downstream pH, standard units	250/250	8.7	6.6	7.9*	0.021	*d*	*d*
Downstream temperature, °C	250/250	27	8.4	17*	0.28	*d*	*d*
Temperature, °C	250/250	28	11	20*	0.30	*d*	*d*
pH, standard units	250/250	8.2	6.9	7.4*	0.0094	*d*	*d*
Metals							
Arsenic, total	0/53	<0.050	<0.050	<0.050	0	*d*	*d*
Cadmium, total	0/53	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Chromium, total	26/53	0.028	<0.00040	<0.0059*	0.00054	0.0031	0.050
Copper, total	7/53	0.012	<0.0070	<0.0073*	0.00015	0.00017	0.00062
Iron, total	4/53	4.7	<0.050	<0.14	0.088	*d*	*d*
Lead, total	2/53	0.068	<0.050	<0.051*	0.00042	0.023	0.089
Mercury, total	0/53	<0.000050	<0.000050	<0.000050	0	*d*	*d*
Nickel, total	11/53	0.011	<0.0040	<0.0047*	0.00024	0.0011	0.0061
Selenium, total	0/53	<0.050	<0.050	<0.050	0	0.12	0.44
Silver, total	2/53	0.0057	<0.0050	<0.0050*	0.000013	0.0023	0.0089
Zinc, total	51/53	0.081	<0.0050	<0.020*	0.0018	0.00010	0.00050
Others							
Biochemical oxygen demand	0/53	<5.0	<5.0	<5.0	0	*d*	*d*
Cyanide, total	3/53	0.0050	<0.0020	<0.0021*	0.000079	0.00024	0.00089
Oil and grease	3/53	3.0	<2.0	<2.0*	0.019	*d*	*d*
Phenolics, total recoverable	0/53	<0.0010	<0.0010	<0.0010	0	*d*	*d*
Phosphorus, total	36/53	0.55	0.10	0.28*	0.014	*d*	*d*
Suspended solids, total	0/53	<5.0	<5.0	<5.0	0	*d*	*d*
Total toxic organics	0/53	<0.010	<0.010	<0.010	0	*d*	*d*
Radionuclides							
^{137}Cs, pCi/L	12/12	1,400*	380*	900*	83	0.0066	0.018
^{3}H, pCi/L	12/12	54,000*	21,000*	32,000*	2,900	0.0014	0.0032
^{60}Co, pCi/L	1/12	68*	−27	12	6.9	*d*	*d*
Gross alpha, pCi/L	11/12	27*	6.2*	16*	2.0	0.00078	0.0020
Gross beta, pCi/L	12/12	2,400*	460*	870*	140	0.013	0.031
Total Sr, pCi/L	12/12	840*	19*	130*	68	0.0080	0.036
Volatile Organics							
1,1-Dichloroethane	0/53	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Benzene	0/53	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Bromodichloromethane	0/53	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Chlorobenzene	0/53	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Chloroform	3/53	<0.0050	J 0.0010	J 0.0048	0.00011	0.0011	0.0044
Methylene chloride	11/53	<0.0050	JB 0.0010	JB 0.0044	0.00018	*d*	*d*
Tetrachloroethene	0/53	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Trichloroethene	1/53	<0.0050	J 0.0020	J 0.0049	0.000057	0.023	0.089

[a] < = undetected; J = below detection limit, but estimated; B = found in the blank. Mean concentrations significantly greater than zero are followed by an asterisk (*).

[b] Standard error of the mean.

[c] Calculated Clinch River concentration as a percentage of a drinking water limit (DWL) or 4% of the derived concentration guide, when a reference exists and the parameter is a contaminant.

[d] Not applicable.

Table 4.53. NPDES Permit Number TN 0002941, 1991
ORNL discharge point X13 (Melton Branch 1)

Flow rates (1×10^6 L/d)—Max: 320, Min: 0.87, Av: 10
X13: Clinch River flow ratios—Max: 0.033, Min: 0.000074, Av: 0.0011

Parameter	Number detected/ number of samples	Concentration (mg/L)				CR av as % DWL[c]	CR max as % DWL[c]
		Max[a]	Min[a]	Av[a]	Standard error[b]		
Anions							
Fluoride, total	8/12	1.8	<0.10	<1.1*	0.16	0.022	0.065
Nitrate	5/12	<5.0	0.10	<1.2*	0.36	0.011	0.041
Sulfate, as SO_4	12/12	250	21	85*	21	0.030	0.082
Field Measurements							
Chlorine, total residual	1/53	0.010	<0.010	<0.010	0	*d*	*d*
Conductivity, mS/cm	12/12	2.0	0.10	0.84*	0.21	*d*	*d*
Oxygen, dissolved	53/53	14	7.0	11*	0.23	*d*	*d*
Temperature, °C	65/65	30	4.2	16*	0.85	*d*	*d*
Turbidity, JTU	12/12	34	4.0	15*	2.8	*d*	*d*
pH, standard units	12/12	8.0	7.4	7.7*	0.051	*d*	*d*
Metals							
Aluminum, total	10/12	16	<0.050	<2.1	1.3	*d*	*d*
Arsenic, total	0/12	<0.050	<0.050	<0.050	0	*d*	*d*
Cadmium, total	0/12	<0.0020	<0.0020	<0.0020	0	*d*	*d*
Chromium, total	11/12	0.052	<0.0040	<0.011*	0.0038	0.024	0.091
Copper, total	1/12	0.030	<0.0070	<0.0089*	0.0019	0.0010	0.0029
Iron, total	12/12	22	0.080	2.6	1.8	*d*	*d*
Lead, total	1/12	0.0080	<0.0040	<0.0043*	0.00033	0.010	0.033
Manganese, total	12/12	2.5	0.042	0.31	0.20	*d*	*d*
Mercury, total	1/12	0.000060	<0.000050	<0.000051*	0.00000083	0.030	0.10
Nickel, total	4/12	0.019	<0.0040	<0.0059*	0.0013	0.0062	0.017
Silver, total	0/12	<0.0050	<0.00050	<0.0046*	0.00038	0.0099	0.041
Zinc, total	8/12	0.16	<0.0050	<0.030*	0.013	0.00060	0.0028
Others							
Ammonia, as N	12/12	0.070	0.020	0.039*	0.0042	*d*	*d*
Biochemical oxygen demand	0/12	<5.0	<5.0	<5.0	0	*d*	*d*
Dissolved solids, total	12/12	580	150	300*	39	0.064	0.17
Oil and grease	14/53	53	<2.0	<5.3*	1.3	*d*	*d*
Organic carbon, total	12/12	4.3	1.7	2.7*	0.21	*d*	*d*
Phenolics, total recoverable	0/12	<0.0010	<0.0010	<0.0010	0	*d*	*d*
Phosphorus, total	5/12	1.1	<0.10	<0.39*	0.094	*d*	*d*
Suspended solids, total	7/12	910	5.0	97	75	*d*	*d*
PCBs							
PCB, total	0/12	<0.0050	<0.0020	<0.0023*	0.00025	*d*	*d*

Table 4.53 (continued)

Parameter	Number detected/ number of samples	Concentration (mg/L)				CR av as % DWL[c]	CR max as % DWL[c]
		Max[a]	Min[a]	Av[a]	Standard error[b]		
Radionuclides							
^{137}Cs, pCi/L	3/12	68*	–35	12	9.5	*d*	*d*
^{3}H, pCi/L	12/12	890,000	220,000*	540,000*	61,000	0.12	0.33
^{60}Co, pCi/L	2/12	38*	–59	9.8	9.0	*d*	*d*
Total Sr, pCi/L	12/12	510*	210*	400*	28	0.21	0.73
Volatile organics							
Chloroform	1/12	<0.0050	J 0.0010	J 0.0047*	0.00033	0.0058	0.021
Trichloroethylene	1/12	<0.0050	J 0.0010	J 0.0047*	0.00033	0.11	0.41

[a]< = undetected; J = below detection limit,, but estimated. Mean concentrations significantly greater than zero are followed by an asterisk (*).

[b]Standard error of the mean.

[c]Calculated Clinch River concentration as a percentage of a drinking water limit (DWL) or 4% of the derived concentration guide, when a reference exists and the parameter is a contaminant.

[d]Not applicable.

Table 4.54. NPDES Permit Number TN 0002941, 1991
ORNL discharge point X14 (White Oak Creek)

Flow rates (1×10^6 L/d)—Max: 510, Min: 1.9, Av: 29
X14: Clinch River flow ratios—Max: 0.040, Min: 0.00039, Av: 0.0031

Parameter	Number detected/ number of samples	Concentration (mg/L)				CR av as % DWL[c]	CR max as % DWL[c]
		Max[a]	Min[a]	Av[a]	Standard error[b]		
Anions							
Fluoride, total	9/12	<1.0	0.10	<0.76*	0.075	0.054	0.11
Nitrate	9/12	<5.0	0.40	<1.4*	0.35	0.039	0.094
Sulfate, as SO_4	12/12	52	21	36*	3.2	0.044	0.094
Field measurements							
Chlorine, total residual	1/53	0.020	<0.010	<0.010*	0.00019	*d*	*d*
Conductivity, mS/cm	12/12	1.9	0.20	0.80*	0.19	*d*	*d*
Oxygen, dissolved	53/53	14	6.8	11*	0.23	*d*	*d*
Temperature, °C	65/65	27	8.0	17*	0.70	*d*	*d*
Turbidity, JTU	12/12	18	6.0	12*	1.1	*d*	*d*
pH, standard units	12/12	8.2	7.6	7.9*	0.048	*d*	*d*
Metals							
Aluminum, total	9/12	2.0	<0.050	<0.41*	0.19	0.77	3.7
Arsenic, total	0/12	<0.050	<0.050	<0.050	0	*d*	*d*
Cadmium, total	0/12	<0.0050	<0.0020	<0.0023*	0.00025	0.066	0.13
Chromium, total	8/12	0.012	<0.0040	<0.0060*	0.00073	0.040	0.10
Copper, total	1/12	0.0094	<0.0070	<0.0072*	0.00020	0.0023	0.0046
Iron, total	11/12	2.1	<0.050	<0.43*	0.18	0.54	2.6
Lead, total	2/12	0.0060	<0.0040	<0.0043*	0.00018	0.026	0.053
Manganese, total	12/12	0.17	0.0042	0.046*	0.013	0.34	1.2
Mercury, total	1/12	0.000080	<0.000050	<0.000053*	0.0000025	0.087	0.26
Nickel, total	3/12	0.0057	<0.0040	<0.0043*	0.00017	0.013	0.026
Silver, total	0/12	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Zinc, total	11/12	0.062	<0.0050	<0.027*	0.0050	0.0017	0.0043
Others							
Ammonia, as N	12/12	0.10	0.030	0.049*	0.0066	*d*	*d*
Biochemical oxygen demand	0/12	<5.0	<5.0	<5.0	0	*d*	*d*
Dissolved solids, total	12/12	240	150	180*	8.9	0.11	0.21
Oil and grease	10/53	35	<2.0	<3.6*	0.81	*d*	*d*
Organic carbon, total	12/12	2.8	1.4	1.8*	0.14	*d*	*d*
Phenolics, total recoverable	0/12	<0.0010	<0.0010	<0.0010	0	*d*	*d*
Phosphorus, total	9/12	0.50	0.10	0.28*	0.037	*d*	*d*
Suspended solids, total	5/12	97	<5.0	<17*	8.0	*d*	*d*
PCBs							
PCB, total	0/12	<0.0050	<0.0020	<0.0023*	0.00025	*d*	*d*

Table 4.54 (continued)

Parameter	Number detected/ number of samples	Concentration (mg/L)				CR av as % DWL[c]	CR max as % DWL[c]
		Max[a]	Min[a]	Av[a]	Standard error[b]		
Radionuclides							
^{137}Cs, pCi/L	10/12	350*	23*	100*	31	0.0084	0.036
^{3}H, pCi/L	12/12	97,000*	3,200*	45,000*	8,800	0.027	0.071
^{60}Co, pCi/L	0/12	49	–19	5.2	5.7	*d*	*d*
Total Sr, pCi/L	12/12	230*	49*	130*	19	0.21	0.64
Volatile Organics							
Chloroform	10/12	<0.0050	J 0.0010	J 0.0024*	0.00036	0.0071	0.018
Trichloroethylene	1/12	<0.0050	J 0.0010	J 0.0047*	0.00033	0.30	0.66

[a]< = undetected; J = below detection limit, but estimated. Mean concentrations significantly greater than zero are followed by an asterisk (*).

[b]Standard error of the mean.

[c]Calculated Clinch River concentration as a percentage of a drinking water limit (DWL) or 4% of the derived concentration guide, when a reference exists and the parameter is a contaminant.

[d]Not applicable.

Table 4.55. NPDES Permit Number TN 0002941, 1991
ORNL discharge point X15 (White Oak Dam)
Flow rates (1×10^6 L/d)—Max: 760, Min: 10, Av: 39
X15: Clinch River flow ratios—Max: 0.046, Min: 0.00055, Av: 0.0041

Parameter	Number detected/ number of samples	Concentration (mg/L)				CR av as % DWL[c]	CR max as % DWL[c]
		Max[a]	Min[a]	Av[a]	Standard error[b]		
Anions							
Fluoride, total	9/12	<1.0	0.20	<0.75*	0.074	0.069	0.16
Nitrate	4/12	<5.0	0.10	<1.1*	0.37	0.040	0.081
Sulfate, as SO_4	12/12	50	22	34*	3.2	0.053	0.098
Field measurements							
Chlorine, total residual	0/53	<0.010	<0.010	<0.010	0	*d*	*d*
Conductivity, mS/cm	12/12	1.8	0.20	0.81*	0.17	*d*	*d*
Oxygen, dissolved	53/53	15	6.8	10*	0.27	*d*	*d*
Temperature, °C	65/65	30	4.9	17*	0.94	*d*	*d*
Turbidity, JTU	12/12	120	6.0	30*	9.0	*d*	*d*
pH, standard units	12/12	8.4	7.5	7.8*	0.094	*d*	*d*
Metals							
Aluminum, total	12/12	3.5	0.25	1.2*	0.33	2.3	8.0
Arsenic, total	0/12	<0.010	<0.010	<0.010	0	*d*	*d*
Cadmium, total	0/12	<0.0020	<0.0020	<0.0020	0	*d*	*d*
Chromium, total	12/12	0.043	0.0094	0.019*	0.0031	0.14	0.27
Copper, total	5/12	0.012	<0.0070	<0.0078*	0.00042	0.0031	0.0058
Iron, total	12/12	3.7	0.33	1.4*	0.30	1.8	4.7
Lead, total	4/12	0.0060	0.0030	0.0041	0.00019	0.034	0.065
Manganese, total	12/12	0.28	0.037	0.16*	0.023	1.3	2.7
Mercury, total	4/12	0.00020	<0.000050	<0.000079*	0.000017	0.17	0.81
Nickel, total	5/12	0.0087	<0.0040	<0.0050*	0.00048	0.020	0.036
Silver, total	1/12	<0.0050	<0.0050	<0.0050	0	*d*	*d*
Zinc, total	11/12	0.056	<0.0050	<0.027*	0.0049	0.0021	0.0043
Others							
Ammonia, as N	12/12	0.19	0.040	0.090*	0.015	*d*	*d*
Biochemical oxygen demand	0/12	<5.0	<5.0	<5.0	0	*d*	*d*
Dissolved solids, total	12/12	260	140	190*	11	0.15	0.28
Oil and grease	32/53	180	<2.0	<12*	3.5	*d*	*d*
Organic carbon, total	12/12	12	1.6	3.9*	0.81	*d*	*d*
Phosphorus, total	7/12	5.1	<0.10	<0.71	0.40	*d*	*d*
Suspended solids, total	12/12	87	8.0	39*	7.6	*d*	*d*
PCBs							
PCB, total	0/12	<0.0050	<0.0020	<0.0023*	0.00025	*d*	*d*

Table 4.55 (continued)

Parameter	Number detected/ number of samples	Concentration (mg/L)				CR av as % DWL[c]	CR max as % DWL[c]
		Max[a]	Min[a]	Av[a]	Standard error[b]		
Radionuclides							
^{137}Cs, pCi/L	52/53	680*	4.6	120*	21	0.017	0.17
^{3}H, pCi/L	12/12	250,000*	54,000*	150,000*	20,000	0.12	0.34
^{60}Co, pCi/L	32/53	62*	−3.0	8.1*	1.6	0.0010	0.022
Gross alpha, pCi/L	53/53	140*	2.2*	11*	2.6	0.018	0.51
Gross beta, pCi/L	53/53	1,100*	73*	450*	25	0.14	0.63
Total Sr, pCi/L	12/12	270*	110*	190*	13	0.36	0.76
Volatile Organics							
Chloroform	0/12	<0.0050	<0	<0.0046*	0.00042	0.018	0.041
Trichloroethylene	0/12	<0.0050	<0	<0.0046*	0.00042	0.37	0.81

[a]< = undetected. Mean concentrations significantly greater than zero are followed by an asterisk (*).

[b]Standard error of the mean.

[c]Calculated Clinch River concentration as a percentage of a drinking water limit (DWL) or 4% of the derived concentration guide, when a reference exists and the parameter is a contaminant.

[d]Not applicable.

Table 4.56. 1991 surface water analyses at Gallaher

Parameter	Number detected/ number of samples	Concentration				Percentage of ref. value[c]
		Max	Min	Av[a]	Standard errorb	
Metals (mg/L)						
Uranium, total	4/4	0.0060	0.000080	0.0018	0.0014	*d*
Radionuclides, pCi/L[e]						
^{60}Co	1/4	1.3*	–1.9	–0.21	0.68	*d*
^{137}Cs	1/4	6.2	–0.27	2.8	1.3	*d*
Gross alpha	4/4	3.2*	0.84*	2.0*	0.49	13
Gross beta	4/4	11*	3.2*	6.6*	1.8	13
^{3}H	4/4	4,600*	1,000*	2,100*	850	10
^{238}Pu	1/4	0.035	–0.081	–0.0082	0.025	*d*
^{239}Pu	0/4	0.0062	–0.027	–0.0041	0.0077	*d*
$^{89}Sr + ^{90}Sr$	3/4	1.1*	0.27	0.78*	0.20	9.8
U,[f] total	4/4	4.0	0.053	1.2	0.93	*d*

[a]Mean concentrations significantly greater than zero are followed by an asterisk (*).
[b]Standard error of the mean.
[c]Mean concentration as a percentage of the National Primary Drinking Water Limit, or 4% of the DCG for ingestion of water (from DOE Order 5400.5), when a reference exists, mean concentration is significantly greater than zero.
[d]Not applicable.
[e]Multiply pCi/L by 0.037 to convert to Bq/L.
[f]Calculated activity, assuming natural abundance.

Table 4.57. 1991 surface water analyses at Kingston

Parameter	Number detected/ number of samples	Concentration				Percentage of ref. value[c]
		Max	Min	Av[a]	Standard error[b]	
Metals (mg/L)						
Uranium, total	4/4	0.00055	0.000040	0.00028*	0.00012	*d*
Radionuclides, pCi/L[e]						
^{60}Co	0/4	1.4	–0.11	0.57	0.30	*d*
^{137}Cs	0/4	0.81	–0.35	0.18	0.25	*d*
Gross alpha	2/4	1.5*	0.19	0.66	0.29	*d*
Gross beta	4/4	7.0*	2.6*	5.2*	0.92	10
^{3}H	2/4	3,000*	–54	890	700	*d*
^{238}Pu	0/4	–0.00076	–0.081	–0.022	0.020	*d*
^{239}Pu	0/4	0.00059	–0.054	–0.017	0.013	*d*
$^{89}Sr + ^{90}Sr$	3/4	0.89*	0.062	0.54*	0.20	6.7
U,[f] total	4/4	0.36	0.026	0.19*	0.077	*d*

[a]Mean concentrations significantly greater than zero are followed by an asterisk (*).
[b]Standard error of the mean.
[c]Mean concentration as a percentage of the National Primary Drinking Water Limit, or 4% of the DCG for ingestion of water (from DOE Order 5400.5), when a reference exists and mean concentration is significantly greater than zero.
[d]Not applicable.
[e]Multiply pCi/L by 0.037 to convert to Bq/L.
[f]Calculated activity, assuming natural abundance.

Table 4.58. Summary of collection and analysis frequencies of Gallaher and Kingston surface water samples, 1991

Station	Parameter	Collection frequency	Sample type	Analysis frequency
Gallaher	^{3}H, gamma scan, gross alpha, gross beta, total U, total Sr[a], ^{238}Pu, ^{239}Pu	Weekly	Time proportional	Quarterly
Kingston	^{3}H, gamma scan, gross alpha, gross beta, total U, total Sr[a], ^{238}Pu, ^{239}Pu	Weekly	Grab	Quarterly

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

Table 4.59. ORNL category I outfalls (storm drains), 1991

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
Gross beta	Yearly	Grab	Yearly

Table 4.60. ORNL category II outfalls (parking lot drains, storage area drains, once-through water, condensate), 1991

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
Gross beta	Quarterly	Grab	Quarterly

Table 4.61. ORNL category III outfalls (process and/or lab drains), 1991

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

Table 4.62. ORNL steam plant (SP2519), 1991

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

[a]Not applicable.

Table 4.63. ORNL cooling systems (cooling tower blowdown), 1991

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 4.64. NPDES Permit Number TN 0002941, 1991

ORNL discharge point SP2519 (Steam Plant)

Flow (L/d): Max 440; Min 170; Av 320

Parameter	Number of samples	Max	Min	Av	Standard error
pH, standard units	3	11	8.6	*a*	*a*
Temperature, °C	3	50	14	30	11

[a]Not applicable.

Table 4.65. NPDES Permit Number TN 0002941, 1991

Cooling systems at ORNL

Flow (L/d): Max 710,000; Min 3,800; Av 100,000

Parameter	Number of samples	Concentration (mg/L)[a]			
		Max	Min	Av	Standard error
Chlorine, total residual	53	0.20	<0.010	<0.059	0.0097
Chromium, total	56	2.5	<0.0040	<0.067	0.044
Copper, total	56	3.5	<0.0070	<0.16	0.065
Downstream pH, standard units	53	8.5	7.5	*b*	*b*
pH, standard units	53	9.0	7.2	*b*	*b*
Temperature, °C	53	38	13	26	0.71
Zinc, total	56	3.0	0.017	0.31	0.064

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

Table 4.66. NPDES Permit Number TN 0002941, 1991

Category I outfalls at ORNL

Flow (L/d): Max 330,000; Min 1,400; Av 58,000

Parameter	Number of samples	Concentration (mg/L)[a]			
		Max	Min	Av	Standard error
Downstream pH, standard units	21	8.2	7.0	*b*	*b*
Gross beta, pCi/L	21	54	1.6	14	2.9
Oil and grease	21	54	<2.0	<6.7	2.6
pH, standard units	21	8.5	7.0	*b*	*b*
Suspended solids, total	21	250	<5.0	<54	15
Temperature, °C	21	24	15	19	0.47

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

Table 4.67. NPDES Permit Number TN 0002941, 1991

Category II outfalls at ORNL

Flow (L/d): Max 760,000; Min 550; Av 96,000

Parameter	Number of samples	Concentration (mg/L)[a]			
		Max	Min	Av	Standard error
Downstream pH, standard units	189	8.7	7.0	*b*	*b*
Gross beta, pCi/L	206	5,700	–3	68	29
Oil and grease	209	110	<2.0	<5.3	0.70
pH, standard units	188	8.5	6.8	*b*	*b*
Suspended solids, total	206	1,500	<5.0	<32	8.2
Total Sr[c]	1	3.7	3.7	3.7	*b*
Temperature, °C	188	63	10	20	0.55

[a]< = undetected.
[b]Not applicable.
[c]Total radioactive Sr(^{89}Sr + ^{90}Sr).

Table 4.68. NPDES Permit Number TN 0002941, 1991

Category III outfalls at ORNL

Flow (L): Max 1,600,000; Min 550; Av 130,000

Parameter	Number of samples	Max	Min	Av	Standard error
pH, standard units	59	9.2	7.3	*a*	*a*

[a]Not applicable.

Table 4.69. 1991 Toxicity test results of ORNL wastewaters and ambient waters

Outfall	Test date	Fathead minnow NOEC[a] (%)	*Ceriodaphnia* NOEC[a] (%)	In-stream waste concentration[b] (%)
Coal Yard Runoff Treatment Facility (X02)	April	100	6	0.0–4.0
Sewage Treatment Plant (X01)	Jan.	12	12	18.0
	March	NT[c]	<6	NC[d]
	June	100	25	18.0
	Aug.	100	100	21.3
	Aug.	100	25	21.3
	Sep.	100	50	14.0
Nonradiological wastewater treatment plant (X12)	June	100	100	NC[d]
	Dec.	NT[c]	<6	NC[d]
Melton Branch (X13)	Jan.	100	100	
	April	<100[e]	100	
	June	100	100	
	Aug.	<100	100	
	Sep.	100	100	
	Oct.	100	100	
	Dec.	<100[e]	100	
White Oak Creek (X14)	Jan.	100	100	
	April	100	100	
	June	100	100	
	Aug.	<100	100	
	Sep.	100	100	
	Oct.	100	100	
	Dec.	100	100	

[a]NOEC = no-observed-effect concentration.
[b]Based on critical low flow of White Oak Creek.
[c]Not tested.
[d]Not calculated.
[e]Based on survival.

Table 4.70. 1991 Average water quality parameters measured during toxicity tests of ORNL wastewaters and ambient waters

Values are averages of full-strength wastewater for each test (N = 7)

Outfall	Test date	pH standard (units)	Conductivity (μS/cm)	Alkalinity (mg/L $CaCO_3$)	Hardness (mg/L $CaCO_3$)
Coal Yard Runoff Treatment Facility (X02)	April	7.3	1693	15	1037
Sewage Treatment Plant (X01)	Jan.	7.9	441	110	156
	March	7.9	435	112	159
	June	7.8	401	99	152
	Aug.	7.7	351	98	135
	Aug.	7.8	360	98	145
	Sep.	7.6	351	102	150
Nonradiological wastewater treatment plant (X12)	June	7.7	616	85	127
	Dec.	7.6	679	86	193
Melton Branch (X13)	Jan.	8.1	341	131	172
	April	7.7	341	123	160
	June	7.7	469	117	231
	Aug.	7.8	392	96	193
	Sep.	7.7	429	91	212
	Oct.	7.8	513	98	259
	Dec.	8.0	303	92	157
White Oak Creek (X14)	Jan.	8.1	357	122	158
	April	7.8	313	110	133
	June	7.7	324	113	153
	Aug.	7.8	311	108	128
	Sep.	7.8	322	110	146
	Oct.	7.9	348	118	149
	Dec.	8.1	268	130	128

Table 4.71. Radionuclide concentrations in surface waters around the K-25 Site in 1991

Radionuclide	Number of samples[a]	Concentrations (pCi/L)[b]					Percentage of DCG[e]
		Max	Min	Av	Standard error[c]	DCG[d]	
		West Fork Poplar Creek (upstream of K-25 Site)					
Total U (mg/L)	4	0.001	0.001	0.001	*f*	*f*	*f*
^{237}Np	4	0.24	–0.417	–0.044	0.236	30	<0.001
^{238}Pu	4	0.12	–4.59	–1.12	2.01	40	<0.001
^{239}Pu	4	0.12	–1.67	–0.39	0.74	30	<0.001
^{137}Cs	4	23.1	–3.33	5.03	10.54	3,000	0.168
^{99}Tc	4	400	–299	–64.03	278.40	100,000	<0.001
Gross alpha	2	1.8	0.75	1.28	0.53	*f*	*f*
Gross beta	2	3.23	2.9	3.07	0.17	*f*	*f*
		K-1710 (Poplar Creek upstream of K-25 Site)					
Total U (mg/L)	12	0.012	0.001	0.003	0.003	*f*	*f*
^{237}Np	12	0.89	–0.811	0.086	0.373	30	0.286
^{238}Pu	12	0.41	–35.3	–3.28	9.758	40	<0.001
^{239}Pu	12	0.41	–1.62	–0.081	0.478	30	<0.001
^{137}Cs	12	53.5	–32.6	13.63	24.24	3,000	0.454
^{99}Tc	12	384	–469	–105	254	100,000	<0.001
Gross alpha	7	6.05	0.012	3.18	1.99	*f*	*f*
Gross beta	7	11.7	2.71	7.99	3.37	*f*	*f*
		K-716 (Poplar Creek downstream of K-25 Site)					
Total U (mg/L)	12	0.008	0.001	0.003	0.002	*f*	*f*
^{237}Np	12	11.6	–0.821	1.011	3.22	30	3.37
^{238}Pu	12	0.80	–17.4	–1.79	4.91	40	<0.001
^{239}Pu	12	5.79	–1.64	–0.343	1.704	30	<0.001
^{137}Cs	12	32.7	–12.4	6.04	11.15	3,000	0.201
^{99}Tc	12	407	–474	40.24	267.43	100,000	0.040
Gross alpha	7	33.4	1.68	7.72	10.58	*f*	*f*
Gross beta	7	24	2.07	9.22	6.79	*f*	*f*
		K-1513 (Clinch River upstream of K-25 Site)					
Total U (mg/L)	12	0.001	0.001	0.001	*f*	*f*	*f*
^{237}Np	12	10.4	–0.220	0.900	2.868	30	3.000
^{238}Pu	12	0.72	–5.23	–0.392	1.473	40	<0.001
^{239}Pu	12	5.19	–1.74	0.318	1.553	30	1.060
^{137}Cs	12	799	–22.4	69.468	220.988	3,000	2.316
^{99}Tc	12	492,407	–646	–45.675	304.512	100,000	–0.046
Gross alpha	7	8.45	–1.19	1.383	3.016	*f*	*f*
Gross beta	7	8.88	1.15	4.889	2.769	*f*	*f*
		K-1770 (Clinch River downstream of K-25 Site)					
Total U (mg/L)	12	0.001	0.001	0.001	0.002	*f*	*f*
^{237}Np	12	0.47	–0.843	–0.0378	0.278	30	<0.001
^{238}Pu	12	0.26	–10.2	–1.23	2.989	40	<0.001
^{239}Pu	12	0.63	–1.67	–0.026	10.548	30	<0.001
^{137}Cs	12	75	–37.5	7.63	29.24	3,000	0.254
^{99}Tc	12	287	–696	–258.16	328.68	100,000	<0.001
Gross alpha	7	3.45	–1.2	0.416	1.521	*f*	*f*
Gross beta	7	7.62	–3.97	0.563	3.96	*f*	*f*

Table 4.71 (continued)

Radionuclide	Number of samples[a]	Concentrations (pCi/L)[b]					Percentage of DCG[e]
		Max	Min	Av	Standard error[c]	DCG[d]	
		Clinch River at Brashear Island (downstream of K-25 Site)					
Total U (mg/L)	4	0.001	0.001	0.001	*f*	*f*	*f*
^{237}Np	4	0	–0.811	–0.227	–0.227	30	<0.001
^{238}Pu	4	0.15	–4.46	–1.05	1.971	40	<0.001
^{239}Pu	4	0.15	–1.62	–0.343	0.739	30	<0.001
^{137}Cs	4	18.3	–21.6	0.037	14.214	3,000	0.001
^{99}Tc	4	268	–294	–64.78	240.635	100,000	<0.001
Gross alpha	2	1.82	0.87	1.345	0.475	*f*	*f*
Gross beta	2	5.06	4.13	4.595	0.465	*f*	*f*
		Mitchell Branch (within facility)					
Total U (mg/L)	4	0.001	0.001	0.001	*f*	*f*	*f*
^{237}Np	4	0.140	0.000	0.070	*f*	30	<0.001
^{238}Pu	4	1.010	0.000	0.505	0.505	40	1.263
^{239}Pu	4	0.000	0.000	0.000	0.739	30	<0.001
^{137}Cs	4	36.3	0.920	18.298	16.971	3,000	0.610
^{99}Tc	4	139	–397	–129	268	100,000	<0.001
Gross alpha	4	2.52	–0.79	0.638	1.305	*f*	*f*
Gross beta	4	3.14	0.340	1.293	1.139	*f*	*f*

[a]Grab samples were taken quarterly at West Fork Poplar Creek, the Clinch River, and Mitchell Branch. At the other locations a 24-hour composite sample was taken monthly.

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

[c]Standard deviation 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 DCG.

[f]Not applicable.

Table 4.72. 1991 K-25 Site concentrations at West Fork Poplar Creek

Parameter	Concentration			
	Max	Min	Av	Standard deviation
1,1,1-Trichloroethane, µg/L	<5	<5	<5	0
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5	0
1,1,2-Trichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethene, µg/L	<5	<5	<5	0
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichloroethane, µg/L	<5	<5	<5	0
1,2-Dichloropropane, µg/L	<5	<5	<5	0
1,3-Dichlorobenzene, µg/L	<10	<10	<10	0
1,4-Dichlorobenzene, µg/L	<10	<10	<10	0
2,4,6-Trichlorophenol, µg/L	<10	<10	<10	0
2,4-Dichlorophenol, µg/L	<10	<10	<10	0
2,4-Dimethylphenol, µg/L	<10	<10	<10	0
2,4-Dinitrophenol, µg/L	<10	<10	<10	0
2,4-Dinitrotoluene, µg/L	<10	<10	<10	0
2,6-Dinitrotoluene, µg/L	<10	<10	<10	0
2-Chloroethylvinyl ether, µg/L	<10	<10	<10	0
2-Chloronaphthalene, µg/L	<10	<10	<10	0
2-Chlorophenol, µg/L	<10	<10	<10	0
2-Nitrophenol, µg/L	<10	<10	<10	0
3,3-Dichlorobenzidine, µg/L	<20	<20	<20	0
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50	0
4-Bromophenyl-phenylether, µg/L	<10	<10	<10	0
4-Chloro-3-methylphenol, µg/L	<10	<10	<10	0
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10	0
4-Nitrophenol, µg/L	<50	<50	<50	0
Acenaphthene, µg/L	<10	<10	<10	0
Acenaphthylene, µg/L	<10	<10	<10	0
Ammonia nitrogen, mg/L	<200	<200	<200	0
Anthracene, µg/L	<10	<10	<10	0
Arsenic, µg/L	<5	<5	<5	0
Benzene, µg/L	<5	<5	<5	0
Benzidine, µg/L	<10	<10	<10	0
Benzo(a)anthracene, µg/L	<10	<10	<10	0
Benzo(a)pyrene, µg/L	<10	<10	<10	0
Benzo(b)fluoranthene, µg/L	<10	<10	<10	0
Benzo(g,h,i)perylene, µg/L	<10	<10	<10	0
Benzo(k)fluoranthene, µg/L	<10	<10	<10	0
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10	0
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10	0
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10	0
bis(2-Ethylhexyl)phthalate, µg/L	<10	<10	<10	0
Bromodichloromethane, µg/L	<5	<5	<5	0
Bromoform, µg/L	<5	<5	<5	0
Bromomethane, µg/L	<10	<10	<10	0
Butylbenzylphthalate, µg/L	<10	<10	<10	0
Cadmium, mg/L	<2	<2	<2	0
Carbon tetrachloride, µg/L	<5	<5	<5	0
Chemical oxygen demand (COD), mg/L	21,000	7,000	13,000	5,571
Chlorobenzene, µg/L	<5	<5	<5	0
Chloroethane, µg/L	<10	<10	<10	0

Table 4.72 (continued)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
Chloroform, µg/L	<5	<5	<5	0
Chloromethane, µg/L	<10	<10	<10	0
Chromium, mg/L	<10	<10	<10	0
Chrysene, µg/L	<10	<10	<10	0
cis-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Copper, mg/L	8.6	8.6	8.6	0.0
Cyanide colorimetric, mg/L	<100	<100	<100	0
Di-n-butylphthalate, µg/L	<10	<10	<10	0
Di-n-octylphthalate, µg/L	<10	<10	<10	0
Dibenz(a,h)anthracene, µg/L	<10	<10	<10	0
Dibromochloromethane, µg/L	<5	<5	<5	0
Diethylphthalate, µg/L	<10	<10	<10	0
Dimethylphthalate, µg/L	<10	<10	<10	0
Dissolved solids, mg/L	214,000	80,000	155,500	49,406
Ethylbenzene, µg/L	<5	<5	<5	0
Fluoranthane, µg/L	<10	<10	<10	0
Fluorene, µg/L	<10	<10	<10	0
Flouride, mg/L	IC	100	100	0
Hexachlorobenzene, µg/L	<10	<10	<10	0
Hexachlorobutadiene, µg/L	<10	<10	<10	0
Hexachlorocyclopentadiene, µg/L	<10	<10	<10	0
Hexachloroethane, µg/L	<10	<10	<10	0
Ideno(1,2,3-cd)pyrene, µg/L	<10	<10	<10	0
Isophorone, µg/L	<10	<10	<10	0
Lead, mg/L	8.1	8.1	8.1	0.0
Manganese, mg/L	300.0	89.3	162.3	91.4
Mercury, µg/L	<0.2	<0.2	<0.2	0.0
Methylene chloride, µg/L	<5	<5	<5	0
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10	0
N-nitrpsodimethylamine, µg/L	<10	<10	<10	0
N-nitrodiphenylamine, µg/L	<10	<10	<10	0
Naphthalene, µg/L	<10	<10	<10	0
Nickel, mg/L	<10	<10	<10	0
Nitrate nitrogen, mg/L	390	200	313	82
Nitrobenzene, µg/L	<10	<10	<10	0
Pentachlorophenol, µg/L	<50	<50	<50	0
pH, standard units	7.95	7.60	7.79	0.13
Phenanthrene, µg/L	<10	<10	<10	0
Phenol, µg/L	<10	<10	<10	0
Pyrene, µg/L	<10	<10	<10	0
Sodium, mg/L	6,100	2,000	4,330	1,677
Sulfate, mg/L	51,000	27,000	38,000	7,720
Suspended solids, mg/L	28000	8000	18000	0
Tetrachloroethene, µg/L	<5	<5	<5	0
Toluene, µg/L	<5	<5	<5	0
trans-1,2-Dichloroethene, µg/L	<5	<5	<5	0
trans-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Trichloroethene, µg/L	<5	<5	<5	0
Trichlorofluoromethane, µg/L				0
Uranium fluorometric, µg/L	<1	<1	<1	0
Vinyl chloride, µg/L	<10	<10	<10	0
Zinc, mg/L	12	6.5	8.8	2.3

Table 4.73. 1991 K-25 Site concentrations at Clinch River (Brashear Island)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
1,1,1-Trichloroethane, µg/L	<5	<5	<5	0
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5	0
1,1,2-Trichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethene, µg/L	<5	<5	<5	0
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichloroethane, µg/L	<5	<5	<5	0
1,2-Dichloropropane, µg/L	<5	<5	<5	0
1,3-Dichlorobenzene, µg/L	<10	<10	<10	0
1,4-Dichlorobenzene, µg/L	<10	<10	<10	0
2,4,6-Trichlorophenol, µg/L	<10	<10	<10	0
2,4-Dichlorophenol, µg/L	<10	<10	<10	0
2,4-Dimethylphenol, µg/L	<10	<10	<10	0
2,4-Dinitrophenol, µg/L	<10	<10	<10	0
2,4-Dinitrotoluene, µg/L	<10	<10	<10	0
2,6-Dinitrotoluene, µg/L	<10	<10	<10	0
2-Chloroethylvinyl ether, µg/L	<10	<10	<10	0
2-Chloronaphthalene, µg/L	<10	<10	<10	0
2-Chlorophenol, µg/L	<10	<10	<10	0
2-Nitrophenol, µg/L	<10	<10	<10	0
3,3-Dichlorobenzidine, µg/L	<20	<20	<20	0
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50	0
4-Bromophenyl-phenylether, µg/L	<10	<10	<10	0
4-Chloro-3-methylphenol, µg/L	<10	<10	<10	0
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10	0
4-Nitrophenol, µg/L	<50	<50	<50	0
Acenaphthene, µg/L	<10	<10	<10	0
Acenaphthylene, µg/L	<10	<10	<10	0
Ammonia nitrogen, mg/L	<200	<200	<200	0
Anthracene, µg/L	<10	<10	<10	0
Arsenic, mg/L	<5	<5	<5	0
Benzene, µg/L	<5	<5	<5	0
Benzidine, µg/L	<10	<10	<10	0
Benzo(a)anthracene, µg/L	<10	<10	<10	0
Benzo(a)pyrene, µg/L	<10	<10	<10	0
Benzo(b)fluoranthene, µg/L	<10	<10	<10	0
Benzo(g,h,i)perylene, µg/L	<10	<10	<10	0
Benzo(k)fluoranthene, µg/L	<10	<10	<10	0
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10	0
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10	0
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10	0
bis(2-Ethylhexyl)phthalate, µg/L	<10	<10	<10	0
Bromodichloromethane, µg/L	<5	<5	<5	0
Bromoform, µg/L	<5	<5	<5	0
Bromomethane, µg/L	<10	<10	<10	0
Butylbenzylphthalate, µg/L	<10	<10	<10	0
Cadmium, mg/L	<2	<2	<2	0
Carbon tetrachloride, µg/L	<5	<5	<5	0
Chemical oxygen demand (COD), µg/L	16,000	15,000	15,500	500
Chlorobenzene, µg/L	<5	<5	<5	0
Chloroethane, µg/L	<10	<10	<10	0

Table 4.73 (continued)

Parameter	Concentration			Standard deviation
	Max	Min	Av	
Chloroform, µg/L	<5	<5	<5	0
Chloromethane, µg/L	<10	<10	<10	0
Chromium, mg/L	<10	<10	<10	0
Chrysene, µg/L	<10	<10	<10	0
cis-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Copper, mg/L	<4.0	<4.0	<4.0	0
Cyanide colorimetric, mg/L	<100	<100	<100	0
Di-n-butylphthalate, µg/L	<10	<10	<10	0
Di-n-octylphthalate, µg/L	<10	<10	<10	0
Dibenz(a,h)anthracene, µg/L	<10	<10	<10	0
Dibromochloromethane, µg/L	<5	<5	<5	0
Diethylphthalate, µg/L	<10	<10	<10	0
Dimethylphthalate, µg/L	<10	<10	<10	0
Dissolved solids, mg/L	158,000	134,000	142,000	9,381
Ethylbenzene, µg/L	<5	<5	<5	0
Fluoranthane, µg/L	<10	<10	<10	0
Fluorene, µg/L	<10	<10	<10	0
Flouride IC, mg/L	<100	<100	<100	0
Hexachlorobenzene, µg/L	<10	<10	<10	0
Hexachlorobutadiene, µg/L	<10	<10	<10	0
Hexachlorocyclopentadiene, µg/L	<10	<10	<10	0
Hexachloroethane, µg/L	<10	<10	<10	0
Ideno(1,2,3-cd)pyrene, µg/L	<10	<10	<10	0
Isophorone, µg/L	<10	<10	<10	0
Lead, mg/L	<4	<4	<4	0
Manganese, mg/L	150	30.6	74.4	45.4
Mercury, mg/L	<0.2	<0.2	<0.2	0.0
Methylene chloride, µg/L	<5	<5	<5	0
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10	0
N-nitrpsodimethylamine, µg/L	<10	<10	<10	0
N-nitrodiphenylamine, µg/L	<10	<10	<10	0
Naphthalene, µg/L	<10	<10	<10	0
Nickel, mg/L	<10	<10	<10	0
Nitrate nitrogen, mg/L	480	180	320	123
Nitrobenzene, µg/L	<10	<10	<10	0
Pentachlorophenol, µg/L	<50	<50	<50	0
pH, standard units	8.50	7.75	8.24	0.31
Phenanthrene, µg/L	<10	<10	<10	0
Phenol, µg/L	<10	<10	<10	0
Pyrene, µg/L	<10	<10	<10	0
Sodium, mg/L	4,600	3,240	4,035	525
Sulfate, mg/L	21,000	18,000	19,250	0
Suspended solids, mg/L	76,000	8,000	26,500	1,090
Tetrachloroethene, µg/L	<5	<5	<5	28,684
Toluene, µg/L	<5	<5	<5	0
trans-1,2-Dichloroethene, µg/L	<5	<5	<5	0
trans-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Trichloroethene, µg/L	<5	<5	<5	0
Trichlorofluoromethane				0
Uranium fluorometric, µg/L	1	1	1	0
Vinyl chloride, µg/L	<10	<10	<10	0
Zinc, mg/L	22.00	3.44	10.16	7.11

Table 4.74. 1991 K-25 Site concentrations at K-716 (Poplar Creek)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
1,1,1-Trichloroethane, µg/L	<5	<5	<5	0
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5	0
1,1,2-Trichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethene, µg/L	<5	<5	<5	0
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichloroethane, µg/L	<5	<5	<5	0
1,2-Dichloropropane, µg/L	<5	<5	<5	0
1,3-Dichlorobenzene, µg/L	<10	<10	<10	0
1,4-Dichlorobenzene, µg/L	<10	<10	<10	0
2,4,6-Trichlorophenol, µg/L	<10	<10	<10	0
2,4-Dichlorophenol, µg/L	<10	<10	<10	0
2,4-Dimethylphenol, µg/L	<10	<10	<10	0
2,4-Dinitrophenol, µg/L	<50	<50	<50	0
2,4-Dinitrotoluene, µg/L	<10	<10	<10	0
2,6-Dinitrotoluene, µg/L	<10	<10	<10	0
2-Chloroethylvinyl ether, µg/L	<10	<10	<10	0
2-Chloronaphthalene, µg/L	<10	<10	<10	0
2-Chlorophenol, µg/L	<10	<10	<10	0
2-Nitrophenol, µg/L	<10	<10	<10	0
3,3-Dichlorobenzidine, µg/L	<20	<20	<20	0
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50	0
4-Bromophenyl-phenylether, µg/L	<10	<10	<10	0
4-Chloro-3-methylphenol, µg/L	<10	<10	<10	0
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10	0
4-Nitrophenol, µg/L	<50	<50	<50	0
Acenaphthene, µg/L	<10	<10	<10	0
Acenaphthylene, µg/L	<10	<10	<10	0
Ammonia nitrogen, mg/L	<200	<200	<200	0
Anthracene, µg/L	<10	<10	<10	0
Arsenic, mg/L	<5	<5	<5	0
Benzene, µg/L	<5	<5	<5	0
Benzidine, µg/L	<50	<50	<50	0
Benzo(a)anthracene, µg/L	<10	<10	<10	0
Benzo(a)pyrene, µg/L	<10	<10	<10	0
Benzo(b)fluoranthene, µg/L	<10	<10	<10	0
Benzo(g,h,i)perylene, µg/L	<10	<10	<10	0
Benzo(k)fluoranthene, µg/L	<10	<10	<10	0
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10	0
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10	0
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10	0
bis(2-Ethylhexyl)phthalate, µg/L	<10	<10	<10	0
Bromodichloromethane, µg/L	<5	<5	<5	0
Bromoform, µg/L	<5	<5	<5	0
Bromomethane, µg/L	<10	<10	<10	0
Butylbenzylphthalate, µg/L	<10	<10	<10	0
Cadmium, µg/L	<2	<2	<2	0
Carbon tetrachloride, µg/L	<5	<5	<5	0
Chemical oxygen demand (COD), mg/L	41,000	7,000	20,250	11,214
Chlorobenzene, µg/L	<5	<5	<5	0
Chloroethane, µg/L	<10	<10	<10	0

Table 4.74 (continued)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
Chloroform, µg/L	<5	<5	<5	0
Chloromethane, µg/L	<10	<10	<10	0
Chromium, mg/L	13	13	13	0
Chrysene, µg/L	<10	<10	<10	0
cis-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Copper, mg/L	14.00	4.60	8.37	3.01
Cyanide colorimetric, mg/L	<100	<100	<100	0
Di-n-butylphthalate, µg/L	<10	<10	<10	0
Di-n-octylphthalate, µg/L	<10	<10	<10	0
Dibenz(a,h)anthracene, µg/L	<10	<10	<10	0
Dibromochloromethane, µg/L	<5	<5	<5	0
Diethylphthalate, µg/L	<10	<10	<10	0
Dimethylphthalate, µg/L	<10	<10	<10	0
Dissolved solids, mg/L	180,000	82,000	138,333	29,715
Ethylbenzene, µg/L	<5	<5	<5	0
Fluoranthane, µg/L	<10	<10	<10	0
Fluorene, µg/L	<10	<10	<10	0
Flouride IC, mg/L	200	100	178	39
Hexachlorobenzene, µg/L	<10	<10	<10	0
Hexachlorobutadiene, µg/L	<10	<10	<10	0
Hexachlorocyclopentadiene, µg/L	<10	<10	<10	0
Hexachloroethane, µg/L	<10	<10	<10	0
Ideno(1,2,3-cd)pyrene, µg/L	<10	<10	<10	0
Isophorone, µg/L	<10	<10	<10	0
Lead, mg/L	14.0	4.6	7.8	3.2
Manganese, mg/L	500.0	84.1	208.8	146.4
Mercury, mg/L	3.60	0.23	1.10	1.07
Methylene chloride, µg/L	<5	<5	<5	0
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10	0
N-nitrpsodimethylamine, µg/L	<10	<10	<10	0
N-nitrodiphenylamine, µg/L	<10	<10	<10	0
Naphthalene, µg/L	<10	<10	<10	0
Nickel, mg/L	17	12	15	3
Nitrate nitrogen, mg/L	700	110	476	146
Nitrobenzene, µg/L	<10	<10	<10	0
Pentachlorophenol, µg/L	<50	<50	<50	0
pH, standard units	8.70	7.25	7.90	0.44
Phenanthrene, µg/L	<10	<10	<10	0
Phenol, µg/L	<10	<10	<10	0
Pyrene, µg/L	<10	<10	<10	0
Sodium, mg/L	6,300	2,800	4,218	1,165
Sulfate, mg/L	33,000	19,000	24,667	5,019
Suspended solids, mg/L	243,000	9,000	91,750	81,618
Tetrachloroethene, µg/L	<5	<5	<5	0
Toluene, µg/L	<5	<5	<5	0
trans-1,2-Dichloroethene, µg/L	<5	<5	<5	0
trans-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Trichloroethene, µg/L	<5	<5	<5	0
Trichlorofluoromethane, µg/L	<5	<5	<5	0
Uranium fluorometric, µg/L	8	1	3	0
Vinyl chloride, µg/L	10	8	9	0
Zinc, mg/L	60.0	15.3	26.6	13.0

Table 4.75. 1991 K-25 Site concentrations at K-1513 (Clinch River)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
1,1,1-Trichloroethane, µg/L	<5	<5	<5	0
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5	0
1,1,2-Trichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethene, µg/L	<5	<5	<5	0
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichloroethane, µg/L	<5	<5	<5	0
1,2-Dichloropropane, µg/L	<5	<5	<5	0
1,3-Dichlorobenzene, µg/L	<10	<10	<10	0
1,4-Dichlorobenzene, µg/L	<10	<10	<10	0
2,4,6-Trichlorophenol, µg/L	<10	<10	<10	0
2,4-Dichlorophenol, µg/L	<10	<10	<10	0
2,4-Dimethylphenol, µg/L	<10	<10	<10	0
2,4-Dinitrophenol, µg/L	<50	<50	<50	0
2,4-Dinitrotoluene, µg/L	<10	<10	<10	0
2,6-Dinitrotoluene, µg/L	<10	<10	<10	0
2-Chloroethylvinyl ether, µg/L	<10	<10	<10	0
2-Chloronaphthalene, µg/L	<10	<10	<10	0
2-Chlorophenol, µg/L	<10	<10	<10	0
2-Nitrophenol, µg/L	<10	<10	<10	0
3,3-Dichlorobenzidine, µg/L	<20	<20	<20	0
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50	0
4-Bromophenyl-phenylether, µg/L	<10	<10	<10	0
4-Chloro-3-methylphenol, µg/L	<10	<10	<10	0
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10	0
4-Nitrophenol, µg/L	<50	<50	<50	0
Acenaphthene, µg/L	<10	<10	<10	0
Acenaphthylene, µg/L	<10	<10	<10	0
Ammonia nitrogen, mg/L	<200	<200	<200	0
Anthracene, µg/L	<10	<10	<10	0
Arsenic, mg/L	<5	<5	<5	0
Benzene, µg/L	<5	<5	<5	0
Benzidine, µg/L	<50	<50	<50	0
Benzo(a)anthracene, µg/L	<10	<10	<10	0
Benzo(a)pyrene, µg/L	<10	<10	<10	0
Benzo(b)fluoranthene, µg/L	<10	<10	<10	0
Benzo(g,h,i)perylene, µg/L	<10	<10	<10	0
Benzo(k)fluoranthene, µg/L	<10	<10	<10	0
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10	0
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10	0
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10	0
bis(2-Ethylhexyl)phthalate, µg/L	<10	<10	<10	0
Bromodichloromethane, µg/L	<5	<5	<5	0
Bromoform, µg/L	<5	<5	<5	0
Bromomethane, µg/L	<10	<10	<10	0
Butylbenzylphthalate, µg/L	<10	<10	<10	0
Cadmium, mg/L	<2	<2	<2	0
Carbon tetrachloride, µg/L	<5	<5	<5	0
Chemical oxygen demand (COD), mg/L	11,000	7,000	8,200	1,600
Chlorobenzene, µg/L	<5	<5	<5	0
Chloroethane, µg/L	<10	<10	<10	0

Table 4.75 (continued)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
Chloroform, µg/L	<5	<5	<5	0
Chloromethane, µg/L	<10	<10	<10	0
Chromium, mg/L	<10	<10	<10	0
Chrysene, µg/L	<10	<10	<10	0
cis-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Copper, mg/L	<4	<4	<4	0
Cyanide colorimetric, mg/L	236	236	236	0
Di-n-butylphthalate, µg/L	<10	<10	<10	0
Di-n-octylphthalate, µg/L	<10	<10	<10	0
Dibenz(a,h)anthracene, µg/L	<10	<10	<10	0
Dibromochloromethane, µg/L	<5	<5	<5	0
Diethylphthalate, µg/L	<10	<10	<10	0
Dimethylphthalate, µg/L	<10	<10	<10	0
Dissolved solids, mg/L	166,000	78,000	142,666	23,028
Ethylbenzene, µg/L	<5	<5	<5	0
Fluoranthane, µg/L	<10	<10	<10	0
Fluorene, µg/L	<10	<10	<10	0
Flouride IC, mg/L	200	200	200	0
Hexachlorobenzene, µg/L	<10	<10	<10	0
Hexachlorobutadiene, µg/L	<10	<10	<10	0
Hexachlorocyclopentadiene, µg/L	<10	<10	<10	0
Hexachloroethane, µg/L	<10	<10	<10	0
Ideno(1,2,3-cd)pyrene, µg/L	<10	<10	<10	0
Isophorone, µg/L	<10	<10	<10	0
Lead, mg/L	8.6	8.6	8.6	0.0
Manganese, mg/L	54	21	38	11
Mercury, mg/L	<0.2	<0.2	<0.2	0.0
Methylene chloride, µg/L	<5	<5	<5	0
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10	0
N-nitrpsodimethylamine, µg/L	<10	<10	<10	0
N-nitrodiphenylamine, µg/L	<10	<10	<10	0
Naphthalene, µg/L	<10	<10	<10	0
Nickel, mg/L	130	130	130	0
Nitrate nitrogen, mg/L	720	140	421	175
Nitrobenzene, µg/L	<10	<10	<10	0
Pentachlorophenol, µg/L	<50	<50	<50	0
pH, standard units	8.60	7.50	8.03	0.33
Phenanthrene, µg/L	<10	<10	<10	0
Phenol, µg/L	<10	<10	<10	0
Pyrene, µg/L	<10	<10	<10	0
Sodium, mg/L	5,600	3,210	4,209	804
Sulfate, mg/L	28,000	16,500	20,792	3,652
Suspended solids, mg/L	22,000	4,000	9,167	5,359
Tetrachloroethene, µg/L	<5	<5	<5	0
Toluene, µg/L	<5	<5	<5	0
trans-1,2-Dichloroethene, µg/L	<5	<5	<5	0
trans-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Trichloroethene, µg/L	<5	<5	<5	0
Trichlorofluoromethane, µg/L	<5	<5	<5	0
Uranium fluorometric, µg/L	<1	<1	<1	0
Vinyl chloride, µg/L	<10	<10	<10	0
Zinc, mg/L	74.0	4.6	18.8	22.9

Table 4.76. 1991 K-25 Site concentrations at K-1710 (Poplar Creek)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
1,1,1-Trichloroethane, µg/L	<5	<5	<5	0
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5	0
1,1,2-Trichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethene, µg/L	<5	<5	<5	0
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichloroethane, µg/L	<5	<5	<5	0
1,2-Dichloropropane, µg/L	<5	<5	<5	0
1,3-Dichlorobenzene, µg/L	<10	<10	<10	0
1,4-Dichlorobenzene, µg/L	<10	<10	<10	0
2,4,6-Trichlorophenol, µg/L	<10	<10	<10	0
2,4-Dichlorophenol, µg/L	<10	<10	<10	0
2,4-Dimethylphenol, µg/L	<10	<10	<10	0
2,4-Dinitrophenol, µg/L	<50	<50	<50	0
2,4-Dinitrotoluene, µg/L	<10	<10	<10	0
2,6-Dinitrotoluene, µg/L	<10	<10	<10	0
2-Chloroethylvinyl ether, µg/L	<10	<10	<10	0
2-Chloronaphthalene, µg/L	<10	<10	<10	0
2-Chlorophenol, µg/L	<10	<10	<10	0
2-Nitrophenol, µg/L	<10	<10	<10	0
3,3-Dichlorobenzidine, µg/L	<20	<20	<20	0
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50	0
4-Bromophenyl-phenylether, µg/L	<10	<10	<10	0
4-Chloro-3-methylphenol, µg/L	<10	<10	<10	0
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10	0
4-Nitrophenol, µg/L	<50	<50	<50	0
Acenaphthene, µg/L	<10	<10	<10	0
Acenaphthylene, µg/L	<10	<10	<10	0
Ammonia nitrogen, mg/L	250	250	250	0
Anthracene, µg/L	<10	<10	<10	0
Arsenic, µg/L	7.2	7.2	7.2	0.0
Benzene, µg/L	<5	<5	<5	0
Benzidine, µg/L	<50	<50	<50	0
Benzo(a)anthracene, µg/L	<10	<10	<10	0
Benzo(a)pyrene, µg/L	<10	<10	<10	0
Benzo(b)fluoranthene, µg/L	<10	<10	<10	0
Benzo(g,h,i)perylene, µg/L	<10	<10	<10	0
Benzo(k)fluoranthene, µg/L	<10	<10	<10	0
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10	0
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10	0
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10	0
bis(2-Ethylhexyl)phthalate, µg/L	<10	<10	<10	0
Bromodichloromethane, µg/L	<5	<5	<5	0
Bromoform, µg/L	<5	<5	<5	0
Bromomethane, µg/L	<10	<10	<10	0
Butylbenzylphthalate, µg/L	<10	<10	<10	0
Cadmium, mg/L	2.4	2.4	2.4	0.0
Carbon tetrachloride, µg/L	<5	<5	<5	0
Chemical oxygen demand (COD), mg/L	23,000	7,000	14,071	5,571
Chlorobenzene, µg/L	<5	<5	<5	0
Chloroethane, µg/L	<10	<10	<10	0

Table 4.76 (continued)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
Chloroform, µg/L	<5	<5	<5	0
Chloromethane, µg/L	<10	<10	<10	0
Chromium, mg/L	12	12	12	0
Chrysene, µg/L	<10	<10	<10	0
cis-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Copper, mg/L	29.00	4.40	9.68	8.18
Cyanide colorimetric, mg/L	<100	<100	<100	0
Di-n-butylphthalate, µg/L	<10	<10	<10	0
Di-n-octylphthalate, µg/L	<10	<10	<10	0
Dibenz(a,h)anthracene, µg/L	<10	<10	<10	0
Dibromochloromethane, µg/L	<5	<5	<5	0
Diethylphthalate, µg/L	<10	<10	<10	0
Dimethylphthalate, µg/L	<10	<10	<10	0
Dissolved solids, mg/L	244,000	70,000	151,666	61,538
Ethylbenzene, µg/L	<5	<5	<5	0
Fluoranthane, µg/L	<10	<10	<10	0
Fluorene, µg/L	<10	<10	<10	0
Flouride IC, mg/L	400	200	310	90
Hexachlorobenzene, µg/L	<10	<10	<10	0
Hexachlorobutadiene, µg/L	<10	<10	<10	0
Hexachlorocyclopentadiene, µg/L	<10	<10	<10	0
Hexachloroethane, µg/L	<10	<10	<10	0
Ideno(1,2,3-cd)pyrene, µg/L	<10	<10	<10	0
Isophorone, µg/L	<10	<10	<10	0
Lead, mg/L	49.0	4.1	16.6	18.8
Manganese, mg/L	2,000	97	378	662
Mercury, mg/L	16.00	0.22	2.77	5.42
Methylene chloride, µg/L	<5	<5	<5	0
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10	0
N-nitrpsodimethylamine, µg/L	<10	<10	<10	0
N-nitrodiphenylamine, µg/L	<10	<10	<10	0
Naphthalene, µg/L	<10	<10	<10	0
Nickel, mg/L	24.0	11.3	15.8	5.8
Nitrate nitrogen, mg/L	4500	300	1223	1,552
Nitrobenzene, µg/L	<10	<10	<10	0
Pentachlorophenol, µg/L	<50	<50	<50	0
pH, standard units	8.0	7.5	7.8	0.2
Phenanthrene, µg/L	<10	<10	<10	0
Phenol, µg/L	<10	<10	<10	0
Pyrene, µg/L	<10	<10	<10	0
Sodium, mg/L	15,000	2,500	6,769	4,502
Sulfate, mg/L	45,000	6,000	31,417	10,574
Suspended solids, mg/L	1,230,000	1,000	194,917	425,945
Tetrachloroethene, µg/L	<5	<5	<5	0
Toluene, µg/L	<5	<5	<5	0
trans-1,2-Dichloroethene, µg/L	<5	<5	<5	0
trans-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Trichloroethene, µg/L	<5	<5	<5	0
Trichlorofluoromethane, µg/L	<5	<5	<5	0
Uranium fluorometric, µg/L	12	1	4	0
Vinyl chloride, µg/L	<10	<10	<10	0
Zinc, mg/L	120.0	4.3	29.9	31.2

Table 4.77. 1991 K-25 Site concentrations at K-1770 (Clinch River)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
1,1,1-Trichloroethane, µg/L	<5	<5	<5	0
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5	0
1,1,2-Trichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethene, µg/L	<5	<5	<5	0
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichloroethane, µg/L	<5	<5	<5	0
1,2-Dichloropropane, µg/L	<5	<5	<5	0
1,3-Dichlorobenzene, µg/L	<10	<10	<10	0
1,4-Dichlorobenzene, µg/L	<10	<10	<10	0
2,4,6-Trichlorophenol, µg/L	<10	<10	<10	0
2,4-Dichlorophenol, µg/L	<10	<10	<10	0
2,4-Dimethylphenol, µg/L	<10	<10	<10	0
2,4-Dinitrophenol, µg/L	<50	<50	<50	0
2,4-Dinitrotoluene, µg/L	<10	<10	<10	0
2,6-Dinitrotoluene, µg/L	<10	<10	<10	0
2-Chloroethylvinyl ether, µg/L	<10	<10	<10	0
2-Chloronaphthalene, µg/L	<10	<10	<10	0
2-Chlorophenol, µg/L	<10	<10	<10	0
2-Nitrophenol, µg/L	<10	<10	<10	0
3,3-Dichlorobenzidine, µg/L	<20	<20	<20	0
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50	0
4-Bromophenyl-phenylether, µg/L	<10	<10	<10	0
4-Chloro-3-methylphenol, µg/L	<10	<10	<10	0
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10	0
4-Nitrophenol, µg/L	<50	<50	<50	0
Acenaphthene, µg/L	<10	<10	<10	0
Acenaphthylene, µg/L	<10	<10	<10	0
Ammonia nitrogen, mg/L	<200	<200	<200	0
Anthracene, µg/L	<10	<10	<10	0
Arsenic, mg/L	<5	<5	<5	0
Benzene, µg/L	<5	<5	<5	0
Benzidine, µg/L	<50	<50	<50	0
Benzo(a)anthracene, µg/L	<10	<10	<10	0
Benzo(a)pyrene, µg/L	<10	<10	<10	0
Benzo(b)fluoranthene, µg/L	<10	<10	<10	0
Benzo(g,h,i)perylene, µg/L	<10	<10	<10	0
Benzo(k)fluoranthene, µg/L	<10	<10	<10	0
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10	0
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10	0
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10	0
bis(2-Ethylhexyl)phthalate, µg/L	<10	<10	<10	0
Bromodichloromethane, µg/L	<5	<5	<5	0
Bromoform, µg/L	<5	<5	<5	0
Bromomethane, µg/L	<10	<10	<10	0
Butylbenzylphthalate, µg/L	<10	<10	<10	0
Cadmium, mg/L	<2	<2	<2	0
Carbon tetrachloride, µg/L	<5	<5	<5	0
Chemical oxygen demand (COD), mg/L	27,500	5,000	11,071	7,174
Chlorobenzene, µg/L	<5	<5	<5	0
Chloroethane, µg/L	<10	<10	<10	0

Table 4.77 (continued)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
Chloroform, µg/L	<5	<5	<5	0
Chloromethane, µg/L	<10	<10	<10	0
Chromium, µg/L	<10	<10	<10	0
Chrysene, µg/L	<10	<10	<10	0
cis-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Copper, mg/L	5.5	4.9	5.2	0.3
Cyanide colorimetric, mg/L	<100	<100	<100	0
Di-n-butylphthalate, µg/L	<10	<10	<10	0
Di-n-octylphthalate, µg/L	<10	<10	<10	0
Dibenz(a,h)anthracene, µg/L	<10	<10	<10	0
Dibromochloromethane, µg/L	<5	<5	<5	0
Diethylphthalate, µg/L	<10	<10	<10	0
Dimethylphthalate, µg/L	<10	<10	<10	0
Dissolved solids, mg/L	174,000	64,000	140,000	27,092
Ethylbenzene, µg/L	<5	<5	<5	0
Fluoranthane, µg/L	<10	<10	<10	0
Fluorene, µg/L	<10	<10	<10	0
Flouride IC, mg/L	100	100	100	0
Hexachlorobenzene, µg/L	<10	<10	<10	0
Hexachlorobutadiene, µg/L	<10	<10	<10	0
Hexachlorocyclopentadiene, µg/L	<10	<10	<10	0
Hexachloroethane, µg/L	<10	<10	<10	0
Ideno(1,2,3-cd)pyrene, µg/L	<10	<10	<10	0
Isophorone, µg/L	<10	<10	<10	0
Lead, mg/L	<4	<4	<4	0
Manganese, mg/L	88.3	26.0	49.3	19.8
Mercury, mg/L	0.24	0.24	0.24	0.00
Methylene chloride, µg/L	<5	<5	<5	0
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10	0
N-nitrosodimethylamine, µg/L	<10	<10	<10	0
N-nitrodiphenylamine, µg/L	<10	<10	<10	0
Naphthalene, µg/L	<10	<10	<10	0
Nickel, mg/L	<10	<10	<10	0
Nitrate nitrogen, µg/L	600	130	373	137
Nitrobenzene, µg/L	<10	<10	<10	0
Pentachlorophenol, µg/L	<50	<50	<50	0
ph, standard units	8.40	7.65	8.04	0.22
Phenanthrene, µg/L	<10	<10	<10	0
Phenol, µg/L	<10	<10	<10	0
Pyrene, µg/L	<10	<10	<10	0
Sodium, mg/L	6,390	3,500	4,393	836
Sulfate, mg/L	28,000	17,000	21,333	2,953
Suspended solids, mg/L	63,000	4,000	17,917	17,100
Tetrachloroethene, µg/L	<5	<5	<5	0
Toluene, µg/L	<5	<5	<5	0
trans-1,2-Dichloroethene, µg/L	<5	<5	<5	0
trans-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Trichloroethene, µg/L	<5	<5	<5	0
Trichlorofluoromethane, µg/L	<5	<5	<5	0
Uranium fluorometric, µg/L	1	1	1	0
Vinyl chloride, µg/L	<10	<10	<10	0
Zinc, mg/L	14.00	4.24	8.05	3.38

Table 4.78. 1991 K-25 Site concentrations at Mitchell Branch

Parameter	Concentration			
	Max	Min	Av	Standard deviation
1,1,1-Trichloroethane, µg/L	<5	<5	<5	0
1,1,2,2-Tetrachloroethane, µg/L	<5	<5	<5	0
1,1,2-Trichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethane, µg/L	<5	<5	<5	0
1,1-Dichloroethene, µg/L	<5	<5	<5	0
1,2,4-Trichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichlorobenzene, µg/L	<10	<10	<10	0
1,2-Dichloroethane, µg/L	<5	<5	<5	0
1,2-Dichloropropane, µg/L	<5	<5	<5	0
1,3-Dichlorobenzene, µg/L	<10	<10	<10	0
1,4-Dichlorobenzene, µg/L	<10	<10	<10	0
2,4,6-Trichlorophenol, µg/L	<10	<10	<10	0
2,4-Dichlorophenol, µg/L	<10	<10	<10	0
2,4-Dimethylphenol, µg/L	<10	<10	<10	0
2,4-Dinitrophenol, µg/L	<10	<10	<10	0
2,4-Dinitrotoluene, µg/L	<10	<10	<10	0
2,6-Dinitrotoluene, µg/L	<10	<10	<10	0
2-Chloroethylvinyl ether, µg/L	<10	<10	<10	0
2-Chloronaphthalene, µg/L	<10	<10	<10	0
2-Chlorophenol, µg/L	<10	<10	<10	0
2-Nitrophenol, µg/L	<10	<10	<10	0
3,3-Dichlorobenzidine, µg/L	<20	<20	<20	0
4,6-Dinitro-2-methylphenol, µg/L	<50	<50	<50	0
4-Bromophenyl-phenylether, µg/L	<10	<10	<10	0
4-Chloro-3-methylphenol, µg/L	<10	<10	<10	0
4-Chlorophenyl-phenylether, µg/L	<10	<10	<10	0
4-Nitrophenol, µg/L	<50	<50	<50	0
Acenaphthene, µg/L	<10	<10	<10	0
Acenaphthylene, µg/L	<10	<10	<10	0
Ammonia nitrogen, mg/L	<200	<200	<200	0
Anthracene, µg/L	<10	<10	<10	0
Arsenic, mg/L	<5	<5	<5	0
Benzene, µg/L	<5	<5	<5	0
Benzidine, µg/L	<10	<10	<10	0
Benzo(a)anthracene, µg/L	<10	<10	<10	0
Benzo(a)pyrene, µg/L	<10	<10	<10	0
Benzo(b)fluoranthene, µg/L	<10	<10	<10	0
Benzo(g,h,i)perylene, µg/L	<10	<10	<10	0
Benzo(k)fluoranthene, µg/L	<10	<10	<10	0
bis(2-Chloroethoxy)methane, µg/L	<10	<10	<10	0
bis(2-Chloroethyl)ether, µg/L	<10	<10	<10	0
bis(2-Chloroisopropyl)ether, µg/L	<10	<10	<10	0
bis(2-Ethylhexyl)phthalate, µg/L	<10	<10	<10	0
Bromodichloromethane, µg/L	<5	<5	<5	0
Bromoform, µg/L	<5	<5	<5	0
Bromomethane, µg/L	<10	<10	<10	0
Butylbenzylphthalate, µg/L	<10	<10	<10	0
Cadmium, mg/L	<2	<2	<2	0
Carbon tetrachloride, µg/L	<5	<5	<5	0
Chemical oxygen demand (COD), mg/L	21,000	7,000	14,000	7,000
Chlorobenzene, µg/L	<5	<5	<5	0
Chloroethane, µg/L	<10	<10	<10	0

Table 4.78 (continued)

Parameter	Concentration			
	Max	Min	Av	Standard deviation
Chloroform, µg/L	<5	<5	<5	0
Chloromethane, µg/L	<10	<10	<10	0
Chromium, mg/L	<10	<10	<10	0
Chrysene, µg/L	<10	<10	<10	0
cis-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Copper, mg/L	8.6	8.6	8.6	0.0
Cyanide colorimetric, mg/L	<100	<100	<100	0
Di-n-butylphthalate, µg/L	<10	<10	<10	0
Di-n-octylphthalate, µg/L	<10	<10	<10	0
Dibenz(a,h)anthracene, µg/L	<10	<10	<10	0
Dibromochloromethane, µg/L	<5	<5	<5	0
Diethylphthalate, µg/L	<10	<10	<10	0
Dimethylphthalate, µg/L	<10	<10	<10	0
Dissolved solids, mg/L	132,000	68,000	108,000	24,351
Ethylbenzene, µg/L	<5	<5	<5	0
Fluoranthane, µg/L	<10	<10	<10	0
Fluorene, µg/L	<10	<10	<10	0
Flouride IC, mg/L	<100	<100	<100	0
Hexachlorobenzene, µg/L	<10	<10	<10	0
Hexachlorobutadiene, µg/L	<10	<10	<10	0
Hexachlorocyclopentadiene, µg/L	<10	<10	<10	0
Hexachloroethane, µg/L	<10	<10	<10	0
Ideno(1,2,3-cd)pyrene, µg/L	<10	<10	<10	0
Isophorone, µg/L	<10	<10	<10	0
Lead, mg/L	8.1	8.1	8.1	0.0
Manganese, mg/L	620	13	210	270
Mercury, mg/L	<0.2	<0.2	<0.2	0.0
Methylene chloride, µg/L	<5	<5	<5	0
N-nitroso-di-n-propylamine, µg/L	<10	<10	<10	0
N-nitrpsodimethylamine, µg/L	<10	<10	<10	0
N-nitrodiphenylamine, µg/L	<10	<10	<10	0
Naphthalene, µg/L	<10	<10	<10	0
Nickel, mg/L	14	14	14	0
Nitrate nitrogen, mg/L	<20	<20	<20	0
Nitrobenzene, µg/L	<10	<10	<10	0
Pentachlorophenol, µg/L	<50	<50	<50	0
ph, standard units	8.10	7.15	7.76	0.35
Phenanthrene, µg/L	<10	<10	<10	0
Phenol, µg/L	<10	<10	<10	0
Pyrene, µg/L	<10	<10	<10	0
Sodium, mg/L	830	461	640	145
Sulfate, mg/L	4,000	2,000	2,667	943
Suspended solids, mg/L	177,000	9,000	65,333	78,961
Tetrachloroethene, µg/L	<5	<5	<5	0
Toluene, µg/L	<5	<5	<5	0
trans-1,2-Dichloroethene, µg/L	<5	<5	<5	0
trans-1,3-Dichloropropene, µg/L	<5	<5	<5	0
Trichloroethene, µg/L	<5	<5	<5	0
Trichlorofluoromethane				0
Uranium fluorometric, µg/L	<1	<1	<1	0
Vinyl chloride, µg/L	<10	<10	<10	0
Zinc, mg/L	13.0	3.8	8.1	3.8

Table 4.79. K-25 Site water monitoring locations

Location	Agency	Type	NPDES ID if applicable
Clinch River (Brashaer Island)	DOE	Perimeter	
West Fork Poplar Creek	DOE	Perimeter	
K-710A (inactive)	TDC	NPDES	008
K-716	DOE	Perimeter	
K-901-A	TDC	NPDES	007
K-1007-B	TDC	NPDES	006
K-1203	TDC	NPDES	005
K-1407-E and K-1407-F	TDC	NPDES	010
K-1407-J	TDC	NPDES	011
K-1513	DOE	Perimeter	
K-1515-C	TDC	NPDES	009
K-1700	TDC	NPDES	001
K-1710	DOE	Perimeter	
K-1770	DOE	Perimeter	

Table 4.80. K-25 Site NPDES sampling frequency

Location	Sampling type	Sample frequency	Analysis[a] frequency	Parameter analyzed
K-1700 (001)	Grab	Daily		pH
K-1700 (001)	*b*	Daily		Flow
K-1700 (001)	24 h/comp.	2/week		Aluminum
K-1700 (001)	24 h/comp.	4/week		Chemical oxygen demand
K-1700 (001)	24 h/comp.	2/week		Chromium
K-1700 (001)	24 h/comp.	2/week		Dissolved solids
K-1700 (001)	24 h/comp.	2/week		Fluoride
K-1700 (001)	24 h/comp.	2/week		Nitrate
K-1700 (001)	Grab	2/week		Oil and grease
K-1700 (001)	24 h/comp.	4/week		Total suspended solids
K-1700 (001)	Grab	4/week		Temperature
K-1700 (001)	Grab	4/week		Turbidity
K-1700 (001)	24 h/comp.	2/week		Lead
K-1700 (001)	24 h/comp.	2/week		Zinc
K-1700 (001)	24 h/comp.	1/week		Uranium[c]
K-1700 (001)	24 h/comp.	1/week	1/month	Cesium
K-1700 (001)	24 h/comp.	1/week	1/month	Neptunium
K-1700 (001)	24 h/comp.	1/week	1/month	Plutonium
K-1700 (001)	24 h/comp.	1/week	1/month	Technetium
K-1203 (005)	Grab	Daily		pH
K-1203 (005)	Grab	Daily		Chlorine, residual
K-1203 (005)	Grab	Daily		Dissolved oxygen
K-1203 (005)	Grab	Daily		Settleable solids
K-1203 (005)	*b*	Daily		Flow
K-1203 (005)	24 h/comp.	3/week		Ammonia nitrogen
K-1203 (005)	24 h/comp.	3/week		Biochemical oxygen demand
K-1203 (005)	Grab	3/week		Fecal coliform
K-1203 (005)	24 h/comp.	3/week		Total suspended solids
K-1203 (005)	24 h/comp.	1/week		Uranium[c]
K-1203 (005)	24 h/comp.	1/week	1/month	Technetium
K-1007-B (006)	Grab	Daily		pH
K-1007-B (006)	Grab	1/week		Dissolved oxygen
K-1007-B (006)	*b*	Daily		Flow
K-1007-B (006)	24 h/comp.	1/week		Chemical oxygen demand
K-1007-B (006)	24 h/comp.	1/week		Chromium
K-1007-B (006)	24 h/comp.	1/week		Fluoride
K-1007-B (006)	Grab	1/week		Oil and grease
K-1007-B (006)	24 h/comp.	1/week		Total suspended solids
K-1007-B (006)	24 h/comp.	1/week		Uranium[c]
K-1007-B (006)	24 h/comp.	1/week	1/month	Cesium
K-1007-B (006)	24 h/comp.	1/week	1/month	Plutonium
K-1007-B (006)	24 h/comp.	1/week	1/month	Neptunium
K-1007-B (006)	24 h/comp.	1/week	1/month	Technetium
K-901-A (007)	Grab	Daily		pH
K-901-A (007)	Grab	Daily		Dissolved oxygen
K-901-A (007)	*b*	Daily		Flow
K-901-A (007)	24 h/comp.	2/week		Chemical oxygen demand
K-901-A (007)	24 h/comp.	1/week		Chromium
K-901-A (007)	24 h/comp.	1/week		Fluoride
K-901-A (007)	Grab	1/week		Oil and grease
K-901-A (007)	24 h/comp.	2/week		Total suspended solids
K-901-A (007)	Grab	2/week		Turbidity

Table 4.80 (continued)

Location	Sampling type	Sample frequency	Analysis[a] frequency	Parameter analyzed
K-901-A (007)	24 h/comp.	1/week		Uranium[c]
K-901-A (007)	24 h/comp.	1/week	1/month	Cesium
K-901-A (007)	24 h/comp.	1/week	1/month	Neptunium
K-901-A (007)	24 h/comp.	1/week	1/month	Plutonium
K-901-A (007)	24 h/comp.	1/week	1/month	Technetium
K-1515-C (009)	Grab	1/week		pH
K-1515-C (009)	*b*	Daily		Flow
K-1515-C (009)	Grab	1/week		Total suspended solids
K-1515-C (009)	Grab	1/week		Aluminum
K-1515-C (009)	Grab	1/week		Sulfate
K-1515-C (009)	Grab	1/week		Chemical oxygen demand
K-1407-J (011)	Continuous	Daily		pH
K-1407-J (011)	Continuous	Daily		Flow
K-1407-J (011)	Grab	Daily		Temperature
K-1407-J (011)	24 h/comp.	2/week		Cadmium
K-1407-J (011)	24 h/comp.	2/week		Chromium
K-1407-J (011)	24 h/comp.	2/week		Copper
K-1407-J (011)	24 h/comp.	2/week		Lead
K-1407-J (011)	24 h/comp.	2/week		Nickel
K-1407-J (011)	24 h/comp.	2/week		Silver
K-1407-J (011)	24 h/comp.	2/week		Zinc
K-1407-J (011)	Grab	1/week		Cyanide
K-1407-J (011)	Grab	1/week		Total toxic organics
K-1407-J (011)	Grab	2/week		Oil and grease
K-1407-J (011)	24 h/comp.	4/week		Total suspended solids
K-1407-J (011)	24 h/comp.	1/week		Polychlorinated biphenyls
K-1407-J (011)	24 h/comp.	4/week		Chemical oxygen demand
K-1407-J (011)	24 h/comp.	4/week		Total dissolved solids
K-1407-J (011)	24 h/comp.	2/week		Total organic carbon
K-1407-J (011)	24 h/comp.	1/week		Ammonia
K-1407-J (011)	24 h/comp.	1/week		Bromide
K-1407-J (011)	24 h/comp.	1/week		Chlorine, total residual
K-1407-J (011)	24 h/comp.	1/week		Chloride
K-1407-J (011)	24 h/comp.	4/week		Fluoride
K-1407-J (011)	24 h/comp.	2/week		Nitrate-Nitrite
K-1407-J (011)	24 h/comp.	1/week		Nitrogen
K-1407-J (011)	24 h/comp.	1/week		Phosphorus
K-1407-J (011)	24 h/comp.	1/week		Sulfate
K-1407-J (011)	24 h/comp.	1/week		Sulfide
K-1407-J (011)	24 h/comp.	1/week		Sulfite
K-1407-J (011)	24 h/comp.	1/week		Surfactants
K-1407-J (011)	24 h/comp.	2/week		Aluminum
K-1407-J (011)	24 h/comp.	1/week		Barium
K-1407-J (011)	24 h/comp.	2/week		Boron
K-1407-J (011)	24 h/comp.	2/week		Cobalt
K-1407-J (011)	24 h/comp.	2/week		Iron
K-1407-J (011)	24 h/comp.	2/week		Magnesium
K-1407-J (011)	24 h/comp.	2/week		Molybdenum
K-1407-J (011)	24 h/comp.	2/week		Manganese
K-1407-J (011)	24 h/comp.	1/week		Tin
K-1407-J (011)	24 h/comp.	2/week		Titanium
K-1407-J (011)	24 h/comp.	2/week		Antimony

Table 4.80 (continued)

Location	Sampling type	Sample frequency	Analysis[a] frequency	Parameter analyzed
K-1407-J (011)	24 h/comp.	1/week		Arsenic
K-1407-J (011)	24 h/comp.	2/week		Beryllium
K-1407-J (011)	24 h/comp.	2/week		Mercury
K-1407-J (011)	24 h/comp.	2/week		Selenium
K-1407-J (011)	24 h/comp.	1/week		Thallium
K-1407-J (011)	24 h/comp.	1/week		Uranium[c]
K-1407-J (011)	Grab	1/week		Phenols
K-1407-J (011)	Grab	5/week		GC/MS[d] fraction volatile compounds
K-1407-J (011)	72 h/comp.	1/month		GC/MS acid compounds
K-1407-J (011)	72 h/comp.	1/month		GC/MS base/neutral compounds
K-1407-J (011)	24 h/comp.	1/week	1/month	Cesium
K-1407-J (011)	24 h/comp.	1/week	1/month	Plutonium
K-1407-J (011)	24 h/comp.	1/week	1/month	Neptunium
K-1407-J (011)	24 h/comp.	1/week	1/month	Technetium
K-1407-E/F (010)	Grab	Continuous		Flow
K-1407-E/F (010)	Grab	1/week		Temperature
K-1407-E/F (010)	24 h/comp.	1/week		Total suspended solids
K-1407-E/F (010)	Grab	1/week		Oil and grease
K-1407-E/F (010)	24 h/comp.	1/week		Chromium
K-1407-E/F (010)	24 h/comp.	1/week		Copper
K-1407-E/F (010)	24 h/comp.	1/week		Iron
K-1407-E/F (010)	24 h/comp.	1/week		Zinc
K-1407-E/F (010)	24 h/comp.	1/week		Arsenic
K-1407-E/F (010)	24 h/comp.	1/week		Cadmium
K-1407-E/F (010)	24 h/comp.	1/week		Lead
K-1407-E/F (010)	24 h/comp.	1/week		Manganese
K-1407-E/F (010)	24 h/comp.	1/week		Nickel
K-1407-E/F (010)	24 h/comp.	1/week		Selenium
K-1407-E/F (010)	24 h/comp.	1/week		Silver
K-1407-E/F (010)	24 h/comp.	1/month		Sulfate
K-1407-E/F (010)	Grab	Continuous		pH
K-1407-E/F (010)	24 h/comp.	1/week		Polychlorinated biphenyls
K-1407-E/F (010)	24 h/comp.	1/week		Uranium[c]
K-1407-E/F (010)	24 h/comp.	1/week		Cesium
K-1407-E/F (010)	24 h/comp.	1/week		Neptunium
K-1407-E/F (010)	24 h/comp.	1/week		Plutonium
K-1407-E/F (010)	24 h/comp.	1/week		Technetium

[a]Analysis frequency–identical to sample frequency unless otherwise noted.

[b]Not applicable.

[c]An isotopic analysis is conducted on uranium if any week is above 0.02 mg/L.

[d]Gas chromatograph/mass spectrometer.

Table 4.81. K-25 Site NPDES permit discharges

Serial discharges	Effluent discharges	Average flow (gal × 10^6/d)	Receiving stream
K-1700 (001)	K-1407-E/F effluent surface runoff once-through cooling	0.81	Poplar Creek
K-1407-J (011)	Metals cleaning facility Uranium recovery Chemical Process Development Facility TSCA Incinerator	0.006	Poplar Creek
K-1407-E/F (010)	Steam plant and coal yard effluents Surface runoff	0.105	Mitchell Branch
K-901-A (007)	Lime-softening sludges from fire water makeup treatment Surface runoff	1.87	Clinch River
K-1203 (005)	Sanitary wastewaters Organic industrial wastewaters	0.47	Poplar Creek
K-1007-B (006)	Potable water from once-through cooling systems Fire water from once-through systems Surface runoff	1.76	Poplar Creek
K-1515-C (009)	Water from sludge and backwash systems associated with the potable water plant Surface runoff	0.48	Clinch River

Table 4.82. Radionuclide concentrations at K-25 Site NPDES locations in 1991

Radionuclide	Number of samples[a]	Concentrations (pCi/L)[b]					Percentage of DCG[e]
		Max	Min	Av	Standard error[c]	DCG[d]	
		K-1203 Sewage Treatment Plant (005)					
^{234}U	12	6.17	0.62	2.42	1.54	500	0.48
^{235}U	12	0.20	0.02	0.08	0.05	600	0.01
^{236}U	12	0.06	0.006	0.02	0.02	500	0.005
^{238}U	12	3.3	0.33	1.29	0.83	600	0.22
^{137}Cs	12	0.63	–0.36	11.8	23.7	3,000	0.39
^{99}Tc	12	66.4	–868	–140	248	100,000	<0.001
Gross alpha	12	81.8	7.32	23.2	19.1	*f*	*f*
Gross beta	12	47.2	3.7	16.1	10.4	*f*	*f*
		K-1700 Coal Pile Runoff, and Once-Through Cooling Water (001)					
^{234}U	12	14.87	3.09	5.81	3.05	500	1.16
^{235}U	12	0.28	0.11	0.20	0.06	600	0.03
^{236}U	12	0.20	0.03	0.06	0.04	500	0.01
^{238}U	12	4.29	1.65	2.66	0.74	600	0.44
^{137}Cs	12	51.8	–0.38	6.33	0.25	3,000	0.21
^{99}Tc	12	1,530	–359	96.9	461	100,000	0.10
^{237}Np	12	0.66	–0.10	0.16	0.25	30	0.53
^{238}Pu	12	0.91	–0.44	0.03	0.32	40	0.08
^{239}Pu	12	0.75	–0.20	0.05	0.22	30	0.17
Gross alpha	12	38.2	3.23	9.50	8.95	*f*	*f*
Gross beta	12	59.5	12.1	23.9	12.2	*f*	*f*
		K-1007-B Settling Basin for Laboratory and Surface Water Runoff (006)					
^{234}U	12	6.17	0.62	1.08	1.54	500	0.22
^{235}U	12	0.25	0.03	0.04	0.06	600	0.007
^{236}U	12	0.06	0.006	0.01	0.002	500	0.002
^{238}U	12	3.30	0.33	0.58	0.08	600	0.09
^{137}Cs	12	51.8	–0.38	6.33	0.25	3,000	0.21
Gross alpha	12	14.6	–1.31	2.24	3.97	*f*	*f*
Gross beta	12	28.0	3.04	10.0	5.92	*f*	*f*
		K-901-A Settling Basin for Surface Runoff and Lime-Softening Sludges (007)					
^{234}U	12	6.17	0.62	1.95	1.38	500	0.39
^{235}U	12	0.15	0.02	0.05	0.03	600	0.008
^{236}U	12	0.06	0.006	0.02	0.01	500	0.004
^{238}U	12	3.31	0.33	1.05	0.74	600	0.18
^{137}Cs	12	49.2	–18.3	2.65	0.18	3,000	0.09
Gross alpha	12	15.9	–1.43	3.36	4.13	*f*	*f*
Gross beta	12	33.3	0.52	19.6	10.5	*f*	*f*
		K-1407-J Treated Effluents from CNF and TSCA (011)					
^{234}U	12	679	25.9	374	186	500	74.9
^{235}U	12	84.3	3.22	20.8	23.2	600	3.47
^{236}U	12	13.0	0.27	5.07	3.72	500	1.01
^{238}U	12	363	13.9	201	99.9	600	33.4
^{137}Cs	12	20.8	–16.9	0.75	13	3,000	0.02
^{99}Tc	12	2,760	–460	754	1,040	100,000	0.75
^{237}Np	12	20.7	0	4.60	5.7	30	15.3
^{238}Pu	12	0.24	–0.24	–0.01	0.13	40	<0.001
^{239}Pu	12	0.47	–0.12	0.05	0.01	30	0.17
Gross alpha	12	962	7.76	290	259	*f*	*f*
Gross beta	12	1,690	–0.13	545	454	*f*	*f*

Table 4.82 (continued)

Radionuclide	Number of samples[a]	Concentrations (pCi/L.)[b]					Percentage of DCG[e]
		Max	Min	Av	Standard error[c]	DCG[d]	
K-1407-E/F Steam Plant, Coal Pile Runoff, and Surface Runoff (010)[g]							
^{234}U	12	2.47	0.62	1.54	0.69	500	0.31
^{235}U	12	0.08	0.02	0.05	0.02	600	0.008
^{236}U	12	0.03	0.006	0.02	0.007	500	0.003
^{238}U	12	1.32	0.33	0.83	0.37	600	0.14
^{137}Cs	12	0.44	–3.41	–0.85	1.81	3,000	<0.001
^{99}Tc	12	110	–115	22.3	98.3	100,000	0.02
^{237}Np	12	–0.05	–0.14	–0.06	0.06	30	<0.001
^{238}Pu	12	0.18	–0.05	–0.29	0.33	40	<0.007
^{239}Pu	12	0.22	–0.20	0.07	0.17	30	0.23
Gross alpha	12	9.10	–0.15	0.59	9.35	*f*	*f*
Gross beta	12	11.8	–3.41	5.05	5.45	*f*	*f*

[a]The outfalls are sampled weekly, combined for a monthly composite, and then analyzed.
[b]Multiply pCi/L by 0.037 to convert to Bq/L.
[c]Standard deviation 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 DCG.
[f]Not applicable.
[g]Data are for January, February, March, and December only.

Table 4.83. 1991 NPDES Permit Number TN 0002950

Discharge Point K-1700, Mitchell Branch, K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
1,1,1-Trichloroethane, µg/L	89	<5	<5	<5	0
1,1,2,2-Tetrachloroethane, µg/L	89	<5	<5	<5	0
1,1-Dichloroethane, µg/L	188	<5	<5	<5	0
1,2-Dichloroethane, µg/L	85	<5	<5	<5	0
1,2-Dichlorobenzene, µg/L	14	<5	<5	<5	0
1,2,-Dichloropropene, µg/L	89	<5	<5	<5	0
2-Chlorovinyl ether, µg/L	89	<10	<10	<10	0
Aluminum, mg/L	108	3.5	0.031	0.287	0.42
Benzene, µg/L	89	<5	<5	<5	0
Beryllium, mg/L	89	0.003	0.0003	0.0011	0
Bromodichloromethane, µg/L	89	<5	<5	<5	0
Bromoform, µg/L	89	<5	<5	<5	0
Bromomethane, µg/L	89	<10	<10	<10	0
Cadmium, µg/L	89	0.049	0.002	0.0026	0.0049
Carbon tetrachloride, µg/L	89	<5	<5	<5	0
Chemical oxygen demand (COD), mg/L	224	36	<5	6.46	4.44
Chlorobenzene, µg/L	97	<5	<5	<5	0
Chloroethane, µg/L	89	<10	<10	<10	0
Chloroform, µg/L	89	<5	<5	<5	0
Chloromethane, µg/L	89	<10	<10	<10	0
Chromium, mg/L	111	0.055	0.01	0.011	0.0046
Cis-1,3-dichloropropene, µg/L	89	<5	<5	<5	0
Dibromochloromethane, µg/L	89	<5	<5	<5	0
Dissolved solids, mg/L	114	1,080	74	218.9	108.49
Ethyl benzene, µg/L	89	<5	<5	<5	0
Flow, MGD	365	7.4246	0.0632	0.7183	2.589
Fluoride, mg/L	113	0.9	0.1	0.1863	0.0924
Lead, mg/L	112	0.026	0.004	0.00487	0.0029
Mercury, mg/L	90	0.00051	0.0002	0.00021	0.00004
Methylene chloride, µg/L	90	<17	<5	5.4	2.14
Nitrate nitrogen, mg/L	111	1.13	0.04	0.3515	0.145
Oil and grease, mg/L	113	10.98	2	2.16	1.05
pH, standard units	365	8.5	6.95	*a*	*a*
Selenium, mg/L	94	0.013	0.005	0.0051	0.0008
Silver, mg/L	94	0.077	0.01	0.011	0.0068
Tetrachloroethene, µg/L	89	<5	<5	<5	0
Toluene, µg/L	89	<5	<5	<5	0
Total suspended solids, mg/L	220	1,080	1	6.4	9.572
Trans-1,2-dichloroethane, µg/L	89	50	<5	25.08	14.816
Trans-1,3-dichloroethane, µg/L	85	<5	<5	<5	0
Trichloroethelene, µg/L	87	69	<5	41,773	15.64
Trichlorofluoromethane, µg/L	8	<5	<5	<5	0
Turbidity, NTU	222	72	0.85	6.91	7.41
Vinyl chloride, µg/L	89	<10	<10	<10	0

[a]Not applicable.

Table 4.84. 1991 NPDES Permit Number TN 0002950

Discharge Point K-1203 Sewage Treatment Plant, K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Ammonia nitrogen, mg/L	174	1.61	0.2	0.215	0.1148
Antimony, mg/L	1	<0.05	<0.05	<0.05	0
Arsenic, mg/L	2	<0.05	<0.05	<0.05	0
Beryllium, mg/L	1	<0.001	<0.001	<0.001	0
Biological oxygen demand (BOD), mg/L	175	12	2.7	5.291	1.08
Boron, mg/L	1	0.027	0.027	0.027	0
Cadmium, mg/L	1	0.003	0.003	0.003	0
Calcium, mg/L	1	35	35	35	0
Chemical oxygen demand (COD), mg/L	220	159	5	12,109	12.23
Chromium, mg/L	1	0.01	0.01	0.01	0
Cobalt, mg/L	1	<0.1	<0.1	<0.1	0
Copper, mg/L	1	0.0081	0.0081	0.0081	0
Fecal coliform, col/100 mL	174	>5,000	0	125.469	598.4935
Flow, MGD	365	2.787	0.1915	0.4479	0.83919
Iron, mg/L	1	0.41	0.41	0.41	0
Lead, mg/L	2	0.05	<0.004	0.027	0.023
Magnesium, mg/L	1	9.9	9.9	9.9	0
Manganese, mg/L	1	0.15	0.15	0.15	0
Mercury, mg/L	1	0.00022	0.00022	0.00022	0
Molybdenum, mg/L	1	<0.01	<0.01	<0.01	0
Nickel, mg/L	1	<0.05	<0.05	<0.05	0
Nitrate nitrogen, mg/L	125	226	0.65	8.083	19.7543
pH, standard units	365	8.9	6.8	*a*	*a*
Potassium, mg/L	1	3.3	3.3	3.3	0
Selenium, mg/L	2	0.05	<0.005	0.0275	0.0225
Settleable solids, mg/L	307	4	0.1	0.119	0.2241
Silicon, mg/L	1	1.9	1.9	1.9	0
Silver, mg/L	1	<0.01	<0.01	<0.01	0
Sodium, mg/L	1	13	13	13	0
Suspended solids, mg/L	173	230	2	9.546	17.242
Total organic carbon, mg/L	43	9	1	3.725	1.896
Total residual chlorine, mg/L	455	13	0.003	0.066	0.03195
Vanadium, mg/L	1	<0.5	<0.5	<0.5	0
Zinc, mg/L	1	0.049	0.049	0.049	0

[a]Not applicable.

Table 4.85. 1991 NPDES Permit Number TN 0002950

Discharge Point K-1007-B Holding Pond, K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Chemical oxygen demand (COD), mg/L	98	21	<5	8.939	4.686
Chromium, mg/L	52	0.04	0.01	0.0106	0.00409
Flow, MGD	365	46.521	0.343	1.9718	14.745
Fluoride, mg/L	52	1	<0.01	0.1217	0.1238
Oil and grease, mg/L	48	3.5	<2	2.03	0.2121
pH, standard units	365	9.5	7	*a*	*a*
Suspended solids, mg/L	103	24	1	10.144	4.1889

[a]Not applicable.

Table 4.86. 1991 NPDES Permit Number TN 0002950

Discharge Point K-901-A Holding Pond, K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Chemical oxygen demand (COD), mg/L	114	43	<5	7.579	5.567
Chromium, mg/L	57	0.12	<0.01	0.0136	0.01477
Flow, MGD	365	5.689	0.00338	0.3753	1.64331
Fluoride, mg/L	57	1	<0.1	0.1334	0.1283
Oil and grease, mg/L	57	2.4	<2	2.007	0.0521
pH, standard units	365	8.6	7.1	*a*	*a*
Suspended solids, mg/L	123	395	2	24.235	50.288
Turbidity, mg/L	87	72	2.7	15.9552	11.19

[a]Not applicable.

Table 4.87. 1991 NPDES Permit Number TN 0002950

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

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Aluminum, mg/L	69	0.86	0.21	0.4715	0.153
Chemical oxygen demand (COD), mg/L	69	15	<5	5.884	2.393
Flow, MGD	365	8.942	0.0296	0.371	2.643
pH, standard units	365	8.5	6.3	*a*	*a*
Sulfate, mg/L	69	34	8	18.2	4.216
Suspended solids, mg/L	67	13	0	5.971	2.637

[a]Not applicable.

Table 4.88. 1991 NPDES Permit Number TN 0002950

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

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
1,1,1-Trichloroethane, µg/L	230	<5	<5	<5	0
1,1,2,2-Tetrachloroethane, µg/L	230	<5	<5	<5	0
1,1,2-Trichloroethane, µg/L	230	<5	<5	<5	0
1,1-Dichloroethane, µg/L	230	<5	<5	<5	0
1,1-Dichloroethene, µg/L	230	<5	<5	<5	0
1,2,4-Trichlorobenzene, µg/L	66	<40	<10	10.45	3.66
1,2-Dichlorobenzene, µg/L	99	<40	<10	<10.3	3.0
1,2-Dichloroethane, µg/L	229	<5	<5	<5	0
1,2-Dichloropropane, µg/L	229	<5	<5	<5	0
1,3-Dichlorobenzene, µg/L	100	<40	<10	<10.3	3.5
1,4-Dichlorobenzene, µg/L	103	<40	<10	<10.3	3.5
2,4,6-Trichlorophenol, µg/L	67	<40	<10	<10.5	3.6
2,4-Dichlorophenol, µg/L	67	<40	<10	<10.5	3.6
2,4-Dimethylphenol, µg/L	67	<40	<10	<10.5	3.6
2,4-Dinitrophenol, µg/L	67	<40	<10	<10.5	3.6
2,4-Dinitrotoluene, µg/L	67	<40	<10	<10.5	3.6
2,6-Dinitrotoluene, µg/L	67	<40	<10	<10.5	3.6
2-Chloroethylvinyl ether, µg/L	228	<10	<10	<10	0
2-Chloronaphthalene, µg/L	70	<40	<10	<10.5	3.6
2-Chlorophenol, µg/L	70	<40	<10	<10.4	3.6
2-Nitrophenol, µg/L	70	<40	<10	<10.4	3.6
3,3'-Dichlorobenzidine, µg/L	70	<80	<20	<28.9	7.17
4,6-Dinitro-2-methylphenol, µg/L	70	<200	<50	<52.17	17.93
4-Bromophenyl-phenylether, µg/L	70	<40	<10	<10.4	3.6
4-Chloro-3-methylphenol, µg/L	70	<40	<10	<10.4	3.6
4-Chlorophenyl-phenylether, µg/L	70	<40	<10	<10.4	3.6
4-Nitrophenol, µg/L	70	200	50	52.17	17.9
Acenaphthene, µg/L	70	<40	<10	<10.4	3.6
Acenaphthylene, µg/L	70	<40	<10	<10.4	3.6
Aluminum, mg/L	96	1.9	0.095	0.205	0.23
Ammonia nitrogen, mg/L	47	0.25	<0.2	0.201	0.007
Anthracene, µg/L	55	<40	<10	<10.5	3.9
Antimony, mg/L	103	<0.05	<0.05	<0.05	0
Arsenic, mg/L	129	<0.005	<0.005	<0.005	0
Barium, mg/L	160	0.33	0.022	0.098	0.0297
Benzene, µg/L	231	<5	<5	5	0
Benzidine, µg/L	69	40	<10	10.43	3.6
Benzo(a)anthracene, µg/L	69	<40	10.43	3.6	3.6
Benzo(a)pyrene, µg/L	69	40	<10	10.43	3.6
Benzo(b)fluoranthene, µg/L	69	40	<10	10.43	3.6
Benzo(g,h,i)perylene, µg/L	69	40	<10	10.43	3.6
Benzo(k)fluoranthene, µg/L	69	40	<10	10.43	3.6
Beryllium, mg/L	99	<0.003	<0.0003	<0.00097	0.0003
Bis(2-chloroethoxy)methane, µg/L	68	<40	<10	10.4	3.6
Bis(2-chloroethyl)ether, µg/L	68	<40	<10	10.4	3.6
Bis(2-chloroisopropyl)ether, µg/L	67	<40	<10	10.4	3.6
Bis(2-ethylhexyl)phthalate, µg/L	68	<40	<10	<10.4	3.6
Boron, mg/L	95	1.6	0.019	0.367	0.4

Table 4.88 (continued)

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Bromide, mg/L	44	10	1	2.39	1.7
Bromodichloromethane, µg/L	230	7	<2	4.996	0.238
Bromoform, µg/L	230	<5	<5	<5	0
Bromomethane, µg/L	230	<10	<10	<10	0
Butylbenzylphthalte, µg/L	69	<40	<10	<10.4	3.6
Cadmium, mg/L	126	0.0057	<0.002	<0.0021	0.0004
Carbon tetrachloride, µg/L	231	<5	<5	<5	0
Chemical oxygen demand, mg/L	167	343	<5	<15.5	28.04
Chloride, mg/L	34	3090	<20	626.21	638.988
Chlorobenzene, µg/L	231	<5	<5	<5	0
Chloroethane, µg/L	231	<10	<10	<10	0
Chloroform, µg/L	214	52	<1	<5.86	6.76
Chloromethane, µg/L	230	<10	<10	<10	0
Chromium, mg/L	123	0.1	<10	0.014	0.012
Chrysene, µg/L	69	<40	<10	<10.4	3.6
Cis-1,3-dichloropropene, µg/L	230	<5	<5	<5	0
Cobalt, mg/L	103	<0.1	<0.1	<0.1	0
Copper, mg/L	120	0.081	<0.004	<0.014	0.013
Cyanide, mg/L	59	0.33	<0.1	<0.11	0.032
Di-n-butylphthalate, µg/L	69	<40	<10	<10.4	3.6
Di-n-octylphthalate, µg/L	69	<40	<10	<10.4	3.6
Dibenz(a.h)anthracene, µg/L	69	<40	<10	<10.4	3.6
Dibromochloromethane, µg/L	231	<5	<5	<5	0
Diethylphthalate, µg/L	68	<40	<10	<10.4	3.6
Dimethylphthalate, µg/L	68	<40	<1.0	<10.4	3.6
Dissolved solids, µg/L	177	7322	260	2077.2	1374.6
Ethyl benzene, µg/L	229	<5	<5	<5	0
Fluoranthene, µg/L	69	<40	<10	<10.4	3.6
Fluorene, µg/L	69	<40	<10	<10.4	3.6
Fluoride, mg/L	164	71	0.2	13.2	17.3
Hexachlorobenzene, µg/L	69	<40	<10	<10.4	3.6
Hexachlorobutadiene, µg/L	69	<40	<10	<10.4	3.6
Hexacylopentadiene, µg/L	69	<40	<10	<10.4	3.6
Hexachloroethane, µg/L	69	<40	<10	<10.4	3.6
Indeno(1,2,3-cd)pyrene, µg/L	69	<40	<10	<10.4	3.6
Iron, mg/L	119	3.3	0.099	0.68	0.73
Isophorone, µg/L	70	<40	<10	<10.4	3.6
Kjeldahl nitrogen, mg/L	45	2.74	0.84	1.08	0.3
Lead, mg/L	125	0.016	<0.004	<0.0046	0.002
Magnesium, mg/L	95	0.47	8.9	17.36	13.73
Manganese, mg/L	118	0.342	<0.01	0.034	0.036
MBAS, mg/L	57	0.3	<0.2	<0.203	0.015
Methylene chloride, µg/L	102	19	<2	5.66	2.36
Molybdenum, mg/L	99	<0.1	<0.01	<0.016	0.018
N-nitroso-di-N-propylamine, µg/L	69	<40	<10	<10.4	3.6
N-nitrosodimethylamine, µg/L	69	<40	<10	<10.4	3.6
N-nitrosodiphenylamine, µg/L	69	<40	<10	<10.4	3.6
Naphthalene, µg/L	69	<40	<10	<10.4	3.6
Nickel, mg/L	125	0.5	<0.01	<0.06	0.06
Nitrate nitrogen, mg/L	98	23	<0.2	<2.02	2.5
Nitrobenzene, µg/L	70	<40	<10	<10.4	3.6
Oil and grease, mg/L	109	14.5	<2	<2.3	1.8

Table 4.88 (continued)

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
PCB					
Aroclor-1016, μg/L	63	<0.5	<0.5	<0.5	0
Aroclor-1221, μg/L	63	<0.5	<0.5	<0.5	0
Aroclor-1232, μg/L	63	<0.5	<0.5	<0.5	0
Aroclor-1242, μg/L	63	<0.5	<0.5	<0.5	0
Aroclor-1248, μg/L	63	<0.5	<0.5	<0.5	0
Aroclor-1250, μg/L	63	1.4	<1	1.01	0.05
Aroclor-1260, μg/L	63	<1	<1	<1	0
Pentachlorophenol, μg/L	70	<200	<50	<52.14	17.8
pH, standard units	365	8.9	6.7	*a*	*a*
Phenanthrene, μg/L	70	<40	<10	<10.4	3.6
Phenol, μg/L	70	<40	<10	<10.4	3.6
Phenols, μg/L	46	1.5	0.03	<0.07	0.21
Phosphorus, mg/L	95	3.7	<0.2	<3.06	6.12
Pyrene, μg/L	69	<40	<10	<10.4	3.6
Selenium, mg/L	130	<0.025	<0.005	<0.00538	0.0025
Silver, mg/L	129	0.06	<0.01	<0.011	0.0078
Sulfate, mg/L	61	1500	135	553.23	284.4
Sulfide, mg/L	43	2	<1	<1.02	0.151
Sulfite, mg/L	41	2	<0.1	<1.38	0.73
Suspended solids, mg/L	218	36	0.1	7.18	5.68
Tetrachloroethene, μg/L	230	<5	<5	<5	0
Thallium, mg/L	104	<0.01	<0.01	<0.01	0
Tin, mg/L	101	0.05	<0.01	<0.02	0.017
Titanium, mg/L	101	0.03	<0.003	<0.0053	0.0056
Toluene, μg/L	229	11	<5	<5.03	0.396
Total organic carbon, mg/L	83	19	<1	<4.05	2.52
Phosphate, mg/L	40	92	0.6	9.32	15.2
Total residual chlorine, mg/L	39	0.22	<0.02	<0.072	0.04
Trans-1,2-dichloroethene, μg/L	219	8	<5	<5.04	0.3
Trans-1,3-dichloropropene, μg/L	231	<5	<5	<5	0
Trichloroethene, μg/L	231	<5	<5	<5	0
Vinyl chloride, μg/L	231	<10	<10	<10	0
Zinc, mg/L	122	0.29	<0.002	<0.028	0.03
Trichlorofluoromethane, μg/L	51	<5	<5	<5	0

[a]Not applicable.

Table 4.89. 1991 NPDES Permit Number TN 0002950

Discharge Point K-1407-E/F Treatment Ponds, K-25 Site

Parameter	Number of samples	Concentration			Standard error
		Max	Min	Av	
Arsenic, mg/L	15	<0.005	<0.005	<0.005	0
Cadmium, mg/L	15	<0.002	<0.002	<0.002	0
Chromium, mg/L	15	<0.01	<0.01	<0.01	0
Copper, mg/L	15	0.037	0.00733	0.0242	0.009
Flow, MGD	365	0.6554	0	0.13947	0.241998
Iron, mg/L	15	2.4	0.2	0.745	0.552
Lead, mg/L	15	0.008	0.004	0.0044	0.0011
Manganese, mg/L	15	0.54	0.06	0.181	0.1096
Nickel, mg/L	15	0.239	<0.05	0.085746	0.0483
Oil and grease, mg/L	17	<2	<2	<2	0
PCB					
Aroclor 1016, µg/L	15	<0.5	<0.5	<0.5	0
Aroclor 1221, µg/L	15	<0.5	<0.5	<0.5	0
Aroclor 1232, µg/L	15	<0.5	<0.5	<0.5	0
Aroclor 1242, µg/L	15	<0.5	<0.5	<0.5	0
Aroclor 1248, µg/L	15	<0.5	<0.5	<0.5	0
Aroclor 1254, µg/L	15	2.6	<1	1.10667	3.99
Aroclor 1260, µg/L	15	<1	<1	<1	0
pH, standard units	365	9	6.4	*a*	*a*
Selenium, mg/L	15	0.02	0.005	0.006	0.0037
Silver, mg/L	15	<0.01	<0.01	<0.01	0
Sulfate, mg/L	4	1660	76	1007.25	637.62
Suspended solids, mg/L	14	14	4	8.286	3.37
Zinc, mg/L	13	0.047	0.02	0.025	0.0078

[a]Not applicable.

Table 4.90. 1991 toxicity test results of the K-25 Site wastewater

K-25 Site outfall	Test date	Fathead minnow NOEC[a] (%)	*Ceriodaphnia* NOEC[a] (%)
K-1407-E/F (010)	Feb.	100	50
K-1407-J (011)	Feb.	100	50
	April	100	50
	June	100	50
	Aug.	100	100
	Oct.	100	50
	Dec.	100	100

[a]No-observed-effect concentration.

Table 4.91. 1991 average water quality parameters measured during toxicity tests of the K-25 Site wastewaters

Values are averages of full-strength wastewater for each test (N = 7)

K-25 Site outfall	Test date	pH (standard units)	Conductivity (μs/cm)	Alkalinity (mg/L $CaCO_3$)	Hardness (mg/L $CaCO_3$)
K-1407-E/F	Feb.	7.7	2287	58	631
K-1407-J	Feb.	7.7	2979	61	596
	April	7.8	8663	122	359
	June	7.9	1601	163	443
	Aug.	8.1	2187	224	456
	Oct.	7.9	3114	143	555
	Dec.	7.8	2327	136	589

5. GROUNDWATER

REFERENCES

The following references are referred to in Tables 5.1–5.11.

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 5.1. Primary drinking water parameters monitored in groundwater during 1991

Parameter	Reference[a]	Applicable standards[b] (mg/L)
As	1, 2, 4	0.05
Ba	1, 2, 4	2.0
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 5.2. Parameters establishing groundwater quality monitored during 1991

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 5.3. Indicator parameters monitored in groundwater semiannually in 1991

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 5.4. 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	2.0[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]
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 5.5. 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	2.0
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 5.6. Typical anions sought in groundwater

Results used for required monitoring characterization studies

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

[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.

Table 5.7. 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 5.8. 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 5.9. Base/neutral/acid extractable organics (hazardous substance list) sought in groundwater

Parameter	Reference	Chemical Abstracts Service No.	Applicable[a] standards (mg/L)
Phenol	6	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		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 5.9 (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 5.10. 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)	5	0.89[c]

[a]Maximum contaminant level.

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

[c]Converted from DOE 5400.5 values.

Table 5.11. 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	1.0
Total Kjeldahl nitrogen		None
Ammonia (as N)		None
Chemical oxygen demand		None
MBAS		None

Table 5.12. Constituents in groundwater at the Y-12 Plant site Upper East Fork Poplar Creek Hydrogeologic Regime (UEFPCHR), 1991

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Beta-4 Security Pit							
Iron, total (mg/L)	12	12	48	0.11	8	0.3	11
Manganese, total (mg/L)	12	12	15	0.016	2.6	0.05	11
Selenium, total (mg/L)	1	12	0.16	<0.050	0.16	0.01	1
Turbidity (NTU)	*a*	12	130	3.7	52	5	10
1,2-Dichloroethene, total (µg/L)	4	12	36	<5	25	*b*	*a*
Methylene chloride (µg/L)	4	12	17	<5	16	*b*	*a*
Tetrachloroethene (µg/L)	1	12	5	<5	5	*b*	*a*
New Hope Pond							
Arsenic, total (mg/L)	2	58	0.10	<0.050	0.076	0.05	2
Chromium, total (mg/L)	12	58	1.1	<0.010	0.16	0.05	5
Iron, total (mg/L)	56	58	19	<0.0050	1.6	0.3	36
Lead, total (mg/L)	15	58	0.063	<0.0080	0.017	0.05	1
Manganese, total (mg/L)	54	58	1.5	<0.0010	0.23	0.05	29
Selenium, total (mg/L)	1	58	0.096	<0.050	0.096	0.01	1
Silver, total (mg/L)	2	58	0.078	<0.0060	0.043	0.05	1
Chloride (mg/L)	58	58	750	2	44	250	2
Dissolved solids (mg/L)	58	58	710	180	360	500	3
pH	*a*	58	9.4	6.3	7.3	6.5/8.5	7
Sulfate (mg/L)	57	58	830	<10	34	250	1
Turbidity (NTU)	*a*	58	1.7 E3	0.20	65	5	32
1,2-Dichloroethene, total (µg/L)	11	58	97	<5	38	*b*	*a*
Acetone (µg/L)	4	58	170	<10	63	*b*	*a*
Carbon tetrachloride (µg/L)	31	58	7.1 E3	<5	1.8 E3	5	31
Chloroform (µg/L)	23	58	830	<5	220	*b*	*a*
Methylene chloride (µg/L)	4	58	42	<5	30	*b*	*a*
Tetrachloroethene (µg/L)	24	58	390	<5	110	*b*	*a*
Toluene (µg/L)	3	58	70	<5	54	*b*	*a*
Trichloroethene (µg/L)	9	58	150	<5	67	5	9
^{234}U (pCi/L)	*a*	17	450	0.00	35	*b*	*a*
^{238}U (pCi/L)	*a*	17	280	0.00	22	*b*	*a*
Gross alpha (pCi/L)	*a*	58	550	–0.50	20	15	6
Gross beta (pCi/L)	*a*	58	340	0.76	17	50	3
Strontium (pCi/L)	*a*	2	17	2.7	9.6	8	1
Rust Garage Area							
Chromium, total (mg/L)	4	5	0.21	<0.010	0.10	0.05	2
Iron, total (mg/L)	5	5	5.9	0.11	2.8	0.3	3
Manganese, total (mg/L)	5	5	3.6	0.086	1.2	0.05	5
pH	*a*	5	6.5	4.5	5.8	6.5/8.5	3
Turbidity (NTU)	*a*	5	360	4.7	130	5	4
Acetone (µg/L)	1	5	23	<10	23	*b*	*a*
Benzene (µg/L)	1	5	1.8 E4	<5	1.8 E4	5	1
Ethylbenzene (µg/L)	1	5	6.6 E3	<5	6.6 E3	*b*	*a*
Toluene (µg/L)	1	5	4.5 E4	<5	4.5 E4	*b*	*a*
Xylenes (µg/L)	1	5	4.4 E4	<5	4.4 E4	*b*	*a*
Gross alpha (pCi/L)	*a*	5	21	1.5	10	15	1

Table 5.12 (UEFPCHR continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
			S2 Site				
Arsenic, total (mg/L)	1	14	0.071	<0.050	0.071	0.05	1
Cadmium, total (mg/L)	6	14	5	<0.010	1.7	0.01	6
Copper, total (mg/L)	13	14	130	<0.0040	18	1	2
Iron, total (mg/L)	12	14	2.7	<0.0050	0.72	0.3	7
Lead, total (mg/L)	8	14	0.055	<0.0040	0.018	0.05	1
Manganese, total (mg/L)	14	14	40	0.0050	7	0.05	8
Mercury, total (mg/L)	3	14	0.0090	<0.00020	0.0052	0.002	2
Selenium, total (mg/L)	1	14	0.053	<0.050	0.053	0.01	1
Zinc, total (mg/L)	14	14	7.1	0.0060	1	5	2
Chloride (mg/L)	13	14	360	<10	41	250	1
Dissolved solids (mg/L)	14	14	3.3 E3	22	740	500	6
Nitrate-N (mg/L)	14	14	1.0 E3	0.2	100	10	6
pH	*a*	14	7.6	5.2	6.9	6.5/8.5	2
Sulfate (mg/L)	14	14	650	2	61	250	1
Turbidity (NTU)	*a*	14	85	0.70	29	5	12
1,2-Dichloroethene, total (μg/L)	4	14	88	<5	48	*b*	*a*
4-Methyl-2-pentanone (μg/L)	1	14	16	<10	16	*b*	*a*
Carbon tetrachloride (μg/L)	6	14	20	<5	14	5	6
Chloroform (μg/L)	6	14	35	<5	16	*b*	*a*
Methylene chloride (μg/L)	2	14	16	<5	16	*b*	*a*
Tetrachloroethene (μg/L)	6	14	660	<5	380	*b*	*a*
Trichloroethene (μg/L)	6	14	360	<5	180	5	6
^{234}U (pCi/L)	*a*	4	0.43	0.00	0.32	*b*	*a*
^{238}U (pCi/L)	*a*	4	0.81	0.00	0.20	*b*	*a*
Gross alpha (pCi/L)	*a*	14	230	0.16	29	15	4
Gross beta (pCi/L)	*a*	14	93	1.9	21	50	2
			S3 ponds				
Cadmium, total (mg/L)	4	16	0.027	<0.010	0.020	0.01	4
Chromium, total (mg/L)	2	16	0.054	<0.010	0.036	0.05	1
Iron, total (mg/L)	16	16	3.2	0.0080	0.68	0.3	9
Manganese, total (mg/L)	15	16	2	<0.0010	0.77	0.05	8
Dissolved solids (mg/L)	16	16	2.0 E4	10	1.4 E3	500	1
pH	*a*	16	10	5.7	7.4	6.5/8.5	6
Turbidity (NTU)	*a*	16	70	0.48	16	5	9
1,2-Dichloroethane (μg/L)	1	16	1.1 E3	<5	1.1 E3	5	1
1,2-Dichloroethene, total (μg/L)	14	16	1.2 E3	<5	350	*b*	*a*
4-Methyl-2-pentanone (μg/L)	1	16	26	<10	26	*b*	*a*
Methylene chloride (μg/L)	2	16	160	<5	120	*b*	*a*
Tetrachloroethene (μg/L)	12	16	960	<5	370	*b*	*a*
Toluene (μg/L)	1	16	13	<5	13	*b*	*a*
Trichloroethene (μg/L)	11	16	330	<5	140	5	11

Table 5.12 (UEFPCHR continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Underground Storage Tank Pgm.							
Barium, total (mg/L)	76	76	39	0.038	1.8	1	4
Cadmium, total (mg/L)	13	76	0.040	<0.0020	0.0099	0.01	4
Chromium, total (mg/L)	34	76	7.2	<0.050	0.82	0.05	17
Iron, total (mg/L)	76	76	110	0.087	8.2	0.3	70
Lead, total (mg/L)	29	76	0.10	<0.0040	0.022	0.05	3
Manganese, total (mg/L)	76	76	14	0.021	2.8	0.05	75
Mercury, total (mg/L)	10	76	0.0048	<0.00020	0.0011	0.002	1
Selenium, total (mg/L)	1	76	0.091	<5	0.091	0.01	1
Chloride (mg/L)	71	76	330	<100	41	250	3
Dissolved solids (mg/L)	76	76	3.4 E4	38	1.8 E3	500	19
Nitrate-N (mg/L)	28	76	1.5 E4	<2	1.0 E3	10	7
pH	*a*	76	8	5	7	6.5/8.5	21
Turbidity (NTU)	*a*	76	2.9 E3	0.3	230	5	62
1,1,2,2-Tetrachloroethane (μg/L)	1	76	29	<5	29	*b*	*a*
1,1-Dichloroethane (μg/L)	2	76	71	<5	43	*b*	*a*
1,1-Dichloroethene (μg/L)	4	76	2.4 E3	<5	2.1 E3	7	4
1,2-Dichloroethane (μg/L)	2	76	940	<5	520	5	2
1,2-Dichloroethene, total (μg/L)	7	76	1.1 E3	<5	390	*b*	*a*
2-Hexanone (μg/L)	1	76	220	<10	220	*b*	*a*
4-Methyl-2-pentanone (μg/L)	5	76	1.4 E3	<10	420	*b*	*a*
Acetone (μg/L)	1	76	17	<10	17	*b*	*a*
Benzene (μg/L)	33	76	1.0 E4	<5	2.7 E3	5	33
Chloroform (μg/L)	8	76	37	<5	26	*b*	*a*
Chloromethane (μg/L)	5	76	530	<10	230	*b*	*a*
Ethylbenzene (μg/L)	28	76	1.6 E3	<5	440	*b*	*a*
Methylene chloride (μg/L)	21	76	1.7 E3	<5	330	*b*	*a*
Tetrachloroethene (μg/L)	13	76	170	<5	54	*b*	*a*
Toluene (μg/L)	32	76	5.5 E3	<5	1.2 E3	*b*	*a*
Trichloroethene (μg/L)	15	76	1.7 E4	<5	3.9 E3	5	14
Vinyl acetate (μg/L)	2	76	2.6 E3	<10	1.3 E3	*b*	*a*
Vinyl chloride (μg/L)	1	76	38	<10	38	2	1
Xylenes (μg/L)	34	76	8.7 E3	<5	2.1 E3	*b*	*a*
^{234}U (pCi/L)	*a*	7	250	−17	33	*b*	*a*
^{237}Np (pCi/L)	*a*	5	4.6	−2.9	0.83	*b*	*a*
^{238}U (pCi/L)	*a*	7	290	−2.4	41	*b*	*a*
^{241}Am (pCi/L)	*a*	5	0.86	−0.38	0.23	*b*	*a*
Gross alpha (pCi/L)	*a*	76	290	−2	10	15	8
Gross beta (pCi/L)	*a*	76	850	−3.9	38	50	4
Strontium (pCi/L)	*a*	5	370	−3.7	97	8	2
Tritium (pCi/L)	*a*	2	2.0 E5	4.9 E3	1.0 E5	20,000	1

Table 5.12 (UEFPCHR continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
U.S. Geological Survey sites							
Iron, total (mg/L)	35	35	49	0.040	6.2	0.3	27
Lead, total (mg/L)	13	35	0.30	<0.0080	0.052	0.05	4
Manganese, total (mg/L)	31	35	4	<0.0010	0.52	0.05	13
Chloride (mg/L)	33	35	520	<1	54	250	4
Dissolved solids (mg/L)	35	35	1.2 E3	230	450	500	7
pH	*a*	35	9.2	6.2	7.3	6.5/8.5	8
Turbidity (NTU)	*a*	35	3.0 E3	0.40	280	5	24
Acetone (μg/L)	3	35	45	<10	23	*b*	*a*
Carbon tetrachloride (μg/L)	4	35	100	<5	74	5	4
Chloroform (μg/L)	4	35	28	<5	13	*b*	*a*
Tetrachloroethene (μg/L)	3	35	10	<5	8	*b*	*a*
Toluene (μg/L)	1	35	7	<5	7	*b*	*a*
Trichloroethene (μg/L)	2	35	6	<5	6	5	1
^{234}U (pCi/L)	*a*	18	4.9	0.00	0.92	*b*	*a*
^{238}U (pCi/L)	*a*	18	4.3	–0.46	0.52	*b*	*a*
Gross alpha (pCi/L)	*a*	35	46	–0.42	4.3	15	2
Gross beta (pCi/L)	*a*	35	71	–0.45	8.7	50	1
Waste coolant facilities							
Chromium, total (mg/L)	6	20	0.57	<0.010	0.13	0.05	2
Iron, total (mg/L)	20	20	6.6	0.011	0.84	0.3	13
Manganese, total (mg/L)	20	20	0.91	0.0030	0.17	0.05	16
pH	*a*	20	7.7	6	6.9	6.5/8.5	3
Turbidity (NTU)	*a*	20	130	0.17	36	5	12
1,1,1-Trichloroethane (μg/L)	10	20	500	<5	220	200	4
1,1-Dichloroethane (μg/L)	8	20	210	<5	110	*b*	*a*
1,1-Dichloroethene (μg/L)	10	20	300	<5	200	7	9
1,2-Dichloroethene, total (μg/L)	14	20	1.3 E4	<5	5.4 E3	*b*	*a*
Acetone (μg/L)	1	20	1.5 E3	<10	1.5 E3	*b*	*a*
Chloroform (μg/L)	1	20	5	<5	5	*b*	*a*
Methylene chloride (μg/L)	7	20	1.6 E3	<5	520	*b*	*a*
Tetrachloroethene (μg/L)	14	20	2.2 E3	<5	820	*b*	*a*
Toluene (μg/L)	1	20	72	<5	72	*b*	*a*
Trichloroethene (μg/L)	14	20	1.4 E3	<5	690	5	14
Vinyl chloride (μg/L)	6	20	450	<10	250	2	6
Y-12 Salvage Yard							
Chromium, total (mg/L)	3	16	0.40	<0.010	0.28	0.05	3
Iron, total (mg/L)	16	16	2.4	0.048	0.77	0.3	11
Manganese, total (mg/L)	16	16	0.062	0.0020	0.032	0.05	2
Dissolved solids (mg/L)	16	16	680	190	350	500	4
Turbidity (NTU)	*a*	16	70	2.4	13	5	11
1,2-Dichloroethene, total (μg/L)	1	16	46	<5	46	*b*	*a*
Methylene chloride (μg/L)	2	16	15	<5	15	*b*	*a*
^{234}U (pCi/L)	*a*	8	0.88	–0.44	0.11	*b*	*a*
^{238}U (pCi/L)	*a*	8	0.46	0.00	0.22	*b*	*a*

[a]Not applicable.

[b]No reference.

Table 5.13. Constituents in groundwater at the Y-12 Plant site Bear Creek Hydrogeologic Regime (BCHR), 1991

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Bear Creek Springs							
Iron, total (mg/L)	19	20	1.5	<0.0050	0.22	0.3	2
Manganese, total (mg/L)	20	20	0.57	0.0020	0.057	0.05	5
Dissolved solids (mg/L)	20	20	950	81	330	500	4
Nitrate-N (mg/L)	14	20	57	<10	21	10	7
Turbidity (NTU)	NA	20	28	0.060	4.8	5	4
Trichloroethene (µg/L)	2	19	13	<5	10	5	2
^{234}U (pCi/L)	NA	20	17	–0.43	3.9	NR	NA
^{238}U (pCi/L)	NA	20	21	–0.43	5.6	NR	NA
Gross alpha (pCi/L)	NA	20	32	–0.44	12	15	8
Gross beta (pCi/L)	NA	20	120	–5.3	40	50	6
Bear Creek Surface Water							
Arsenic, total (mg/L)	3	20	0.060	<0.050	0.055	0.05	2
Iron, total (mg/L)	20	20	30	0.013	1.8	0.3	6
Manganese, total (mg/L)	20	20	5.7	0.0080	0.62	0.05	11
Selenium, total (mg/L)	1	20	0.066	<0.050	0.066	0.01	1
Dissolved solids (mg/L)	20	20	960	36	310	500	4
Nitrate-N (mg/L)	16	20	74	<0.2	23	10	7
pH	*a*	20	8.1	6.4	7.3	6.5/8.5	1
Turbidity (NTU)	*a*	20	100	0.75	11	5	8
1,2-Dichloroethene, total (µg/L)	3	20	11	<5	8	*b*	*a*
^{234}U (pCi/L)	*a*	20	33	0.00	7.1	*b*	*a*
^{238}U (pCi/L)	*a*	20	83	–0.44	16	*b*	*a*
Gross alpha (pCi/L)	*a*	20	77	–1	28	15	12
Gross beta (pCi/L)	*a*	20	270	–5	73	50	8
Exit Pathway- Traverse A							
Iron, total (mg/L)	9	9	3.3	0.021	0.71	0.3	2
Manganese, total (mg/L)	9	9	0.46	0.0010	0.079	0.05	3
Nitrate-N (mg/L)	8	9	20	<0.2	8.4	10	2
pH	*a*	9	7.9	6.2	7	6.5/8.5	2
Turbidity (NTU)	*a*	9	41	0.25	8.5	5	4
Methylene chloride (µg/L)	1	9	16	<5	16	*b*	*a*
Gross alpha (pCi/L)	*a*	9	28	1.4	11	15	2
Gross beta (pCi/L)	*a*	9	93	–2.4	28	50	1
Exit Pathway- Traverse B							
Iron, total (mg/L)	18	18	230	0.37	16	0.3	18
Lead, total (mg/L)	3	18	0.25	<0.0040	0.091	0.05	1
Manganese, total (mg/L)	18	18	3.5	0.0070	0.32	0.05	9
Selenium, total (mg/L)	1	18	0.67	<0.050	0.67	0.01	1
Dissolved solids (mg/L)	18	18	960	210	430	500	6
Nitrate-N (mg/L)	17	18	84	<1	16	10	6
pH	*a*	18	9	7	8	6.5/8.5	4
Turbidity (NTU)	*a*	18	450	1.4	58	5	15
1,2-Dichloroethene, total (µg/L)	2	18	38	<5	25	*b*	*a*
Acetone (µg/L)	4	18	180	<10	80	*b*	*a*
Methylene chloride (µg/L)	5	18	17	<5	16	*b*	*a*
Trichloroethene (µg/L)	8	18	79	<5	42	5	8
Gross alpha (pCi/L)	*a*	18	58	–0.62	14	15	5
Gross beta (pCi/L)	*a*	18	200	0.86	38	50	4

Table 5.13 (BCHR continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Exit Pathway—Traverse W							
Iron, total (mg/L)	3	3	15	5.4	11	0.3	3
Manganese, total (mg/L)	3	3	0.14	0.065	0.11	0.05	3
Chloride (mg/L)	3	3	1.6 E3	45	740	250	2
Dissolved solids (mg/L)	3	3	6.0 E3	900	3.8 E3	500	3
Sulfate (mg/L)	3	3	2.2 E3	46	890	250	2
Turbidity (NTU)	*a*	3	95	54	72	5	3
Gross alpha (pCi/L)	*a*	3	32	1.8	19	15	2
Lysimeter Demo							
Arsenic, total (mg/L)	1	20	0.061	<0.50	0.061	0.05	1
Barium, total (mg/L)	19	20	2.1	<0.0010	0.61	1	3
Iron, total (mg/L)	20	20	32	0.0060	3.5	0.3	12
Lead, total (mg/L)	4	20	0.066	<0.0040	0.032	0.05	1
Manganese, total (mg/L)	18	20	2.5	<0.010	0.36	0.05	15
Selenium, total (mg/L)	2	20	0.086	<0.50	0.075	0.01	2
Dissolved solids (mg/L)	20	20	4.4 E3	100	1.0 E3	500	4
Nitrate-N (mg/L)	4	20	3.3 E3	<0.2	1.3 E3	10	4
pH	*a*	20	8.2	5.9	7.2	6.5/8.5	2
Turbidity (NTU)	*a*	20	340	0.65	42	5	10
Acetone (μg/L)	2	20	49	<10	36	*b*	*a*
Methylene chloride (μg/L)	4	20	17	<5	16	*b*	*a*
Gross beta (pCi/L)	*a*	20	400	1	50	50	4
Oil Landfarm							
Arsenic, total (mg/L)	4	112	0.071	<0.050	0.066	0.05	4
Chromium, total (mg/L)	18	112	0.44	<0.011	0.053	0.05	2
Iron, total (mg/L)	111	112	82	<0.0040	3	0.3	59
Lead, total (mg/L)	28	112	0.16	<0.0060	0.022	0.05	3
Manganese, total (mg/L)	105	112	16	<0.0010	0.42	0.05	33
Mercury, total (mg/L)	4	112	0.0097	<0.00020	0.0026	0.002	1
Selenium, total (mg/L)	3	112	0.17	<0.050	0.096	0.01	3
Silver, total (mg/L)	5	112	0.13	<0.0060	0.031	0.05	1
Dissolved solids (mg/L)	111	111	1.0 E3	100	400	500	27
Fluoride (mg/L)	69	112	270	<0.1	4.5	4	5
Nitrate-N (mg/L)	40	112	170	<10	33	10	17
pH	*a*	112	11.1	3.9	7.1	6.5/8.5	32
Sulfate (mg/L)	107	112	470	<10	47	250	7
Turbidity (NTU)	*a*	112	800	0.20	42	5	56
1,1-Dichloroethane (μg/L)	6	112	5	<5	5	*b*	*a*
1,1-Dichloroethene (μg/L)	9	112	16	<5	9	7	4
1,2-Dichloroethene, total (μg/L)	14	112	52	<5	24	*b*	*a*
Acetone (μg/L)	4	112	21	<10	17	*b*	*a*
Carbon tetrachloride (μg/L)	4	112	8	<5	7	5	3
Chlorobenzene (μg/L)	2	112	8	<5	7	*b*	*a*
Methylene chloride (μg/L)	5	112	32	<5	19	*b*	*a*
Tetrachloroethene (μg/L)	3	112	6	<5	5	*b*	*a*
Toluene (μg/L)	1	111	6	<5	6	*b*	*a*
Trichloroethene (μg/L)	33	112	400	<5	88	5	33
^{234}U (pCi/L)	*a*	8	3.3	0	0.62	*b*	*a*
^{237}Np (pCi/L)	*a*	1	2	2	2	*b*	*a*
^{238}U (pCi/L)	*a*	8	0.87	0	0.32	*b*	*a*
Gross alpha (pCi/L)	*a*	112	48	-0.82	3.7	15	6
Gross beta (pCi/L)	*a*	112	89	-2.5	13	50	6

Table 5.13 (BCHR continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
			Rust Spoil Area				
Arsenic, total (mg/L)	1	20	0.068	<0.050	0.068	0.05	1
Iron, total (mg/L)	19	20	8.1	<0.0050	0.88	0.3	5
Manganese, total (mg/L)	19	20	3.6	<0.0010	0.69	0.05	7
Dissolved solids (mg/L)	20	20	670	150	430	500	8
Nitrate-N (mg/L)	16	20	18	<0.2	9	10	9
pH	*a*	20	12.5	6.3	7.4	6.5/8.5	4
Turbidity (NTU)	*a*	20	75	0.20	8.2	5	5
1,2-Dichloroethene, total (μg/L)	10	20	34	<5	13	*b*	*a*
Chloroform (μg/L)	2	20	5	<5	5	*b*	*a*
Trichloroethene (μg/L)	16	20	80	<5	41	5	16
$^{125}I + ^{129}I$ (Bq/L)	*a*	16	0.10	0.010	0.061	*b*	*a*
Gross beta (pCi/L)	*a*	20	57	–0.78	21	50	1
			S3 ponds				
Arsenic, total (mg/L)	2	51	0.095	<5	0.073	0.05	1
Barium, total (mg/L)	51	51	390	0.0010	31	1	13
Cadmium, total (mg/L)	10	51	4	<0.0020	0.81	0.01	6
Chromium, total (mg/L)	6	51	0.31	<0.010	0.17	0.05	4
Copper, total (mg/L)	23	51	1.6	<4	0.26	1	3
Iron, total (mg/L)	47	51	25	<5	2.7	0.3	27
Lead, total (mg/L)	17	51	1.3	<0.0040	0.082	0.05	1
Manganese, total (mg/L)	47	51	210	<0.010	15	0.05	25
Mercury, total (mg/L)	7	51	0.11	<0.00020	0.027	0.002	3
Selenium, total (mg/L)	1	51	0.079	<5	0.079	0.01	1
Zinc, total (mg/L)	44	51	20	<0.20	0.71	5	1
Chloride (mg/L)	42	51	440	<100	64	250	3
Dissolved solids (mg/L)	50	51	6.2 E4	<1	7.1 E3	500	27
Fluoride (mg/L)	24	51	110	<0.1	7	4	8
Nitrate-N (mg/L)	28	51	1.1 E4	<0.2	2.1 E3	10	23
pH	*a*	51	9.9	3.7	7.4	6.5/8.5	21
Sulfate (mg/L)	45	51	1.8 E3	<5.0 E3	95	250	3
Turbidity (NTU)	*a*	51	85	0.40	10	5	30
Acetone (μg/L)	10	51	1.3 E3	<10	250	*b*	*a*
Chloroform (μg/L)	2	51	38	<5	36	*b*	*a*
Methylene chloride (μg/L)	5	51	310	<5	160	*b*	*a*
Tetrachloroethene (μg/L)	3	51	7.1 E3	<5	6.1 E3	*b*	*a*
Toluene (μg/L)	1	51	35	<5	35	*b*	*a*
Trichloroethene (μg/L)	1	51	6	<5	6	5	1
$^{125}I + ^{129}I$ (Bq/L)	*a*	2	0.10	0.10	0.10	*b*	*a*
^{234}U (pCi/L)	*a*	18	4.7 E3	–0.43	690	*b*	*a*
^{237}Np (pCi/L)	*a*	8	1.1 E3	0.00	300	*b*	*a*
^{238}U (pCi/L)	*a*	18	1.4 E4	0.00	1.7 E3	*b*	*a*
^{239}Pu (pCi/L)	*a*	2	41	0.00	21	30	1
^{241}Am (pCi/L)	*a*	4	28	0.86	15	*b*	*a*
Gross alpha (pCi/L)	*a*	52	1.5 E4	–11	820	15	9
Gross beta (pCi/L)	*a*	52	7.5 E4	–25	3.5 E3	50	9
Strontium (pCi/L)	*a*	8	240	–9.9	93	8	4
Tritium (pCi/L)	*a*	8	8.4 E4	27	1.3 E4	20,000	1

Table 5.13 (BCHR continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
			Spoil Area I				
Arsenic, total (mg/L)	1	24	0.052	<0.050	0.052	0.05	1
Dissolved solids (mg/L)	24	24	520	180	280	500	1
Nitrate-N (mg/L)	18	24	34	<0.2	6	10	3
1,2-Dichloroethene, total (μg/L)	9	24	140	<5	40	*b*	*a*
Acetone (μg/L)	1	24	22	<10	22	*b*	*a*
Methylene chloride (μg/L)	2	24	17	<5	16	*b*	*a*
Tetrachloroethene (μg/L)	12	24	38	<5	17	*b*	*a*
Trichloroethene (μg/L)	8	24	15	<5	8	5	8
^{234}U (pCi/L)	*a*	2	0.48	0.00	0.24	*b*	*a*
^{238}U (pCi/L)	*a*	2	0.48	0.00	0.24	*b*	*a*
Gross beta (pCi/L)	*a*	24	160	−1.4	19	50	3
			U.S. Geological Survey sites				
Iron, total (mg/L)	6	6	13	0.062	3.7	0.3	3
Manganese, total (mg/L)	6	6	0.13	0.0040	0.041	0.05	1
Zinc, total (mg/L)	6	6	5.1	0.0050	1.2	5	1
Dissolved solids (mg/L)	6	6	1.4 E3	46	530	500	2
pH	*a*	6	7.2	3	5.6	6.5/8.5	4
Sulfate (mg/L)	6	6	1.2 E3	1	360	250	2
Turbidity (NTU)	*a*	6	550	4	130	5	4
			Y-12 Burial grounds				
Arsenic, total (mg/L)	4	186	0.077	<5	0.061	0.05	4
Barium, total (mg/L)	184	186	1.6	<0.10	0.15	1	1
Cadmium, total (mg/L)	16	186	0.058	<0.0020	0.011	0.01	4
Chromium, total (mg/L)	34	186	0.71	<0.010	0.087	0.05	8
Iron, total (mg/L)	184	186	110	<0.0050	3.1	0.3	126
Lead, total (mg/L)	59	186	0.56	<0.0040	0.027	0.05	5
Manganese, total (mg/L)	183	186	1.5	<0.10	0.19	0.05	116
Selenium, total (mg/L)	2	186	0.066	<5	0.062	0.01	2
Chloride (mg/L)	146	186	3.5 E3	<5	130	250	11
Dissolved solids (mg/L)	186	186	5.2 E3	48	460	500	28
Fluoride (mg/L)	123	186	14	<0.1	1	4	10
Nitrate-N (mg/L)	23	186	20	<2	5	10	3
pH	*a*	186	10.8	3	7.3	6.5/8.5	81
Turbidity (NTU)	*a*	186	1.0 E3	0.15	42	5	119
1,1,1-Trichloroethane (μg/L)	10	186	610	<5	170	200	4
1,1-Dichloroethane (μg/L)	26	186	3.2 E3	<5	290	*b*	*a*
1,1-Dichloroethene (μg/L)	9	186	660	<5	140	7	7
1,2-Dichloroethane (μg/L)	1	186	8	<5	8	5	1
1,2-Dichloroethene, total (μg/L)	21	186	800	<5	120	*b*	*a*
Acetone (μg/L)	7	186	130	<10	41	*b*	*a*
Benzene (μg/L)	3	186	420	<5	190	5	3
Carbon tetrachloride (μg/L)	1	186	50	<5	50	5	1
Chloroethane (μg/L)	5	186	33	<10	17	*b*	*a*
Chloroform (μg/L)	3	186	38	<5	16	*b*	*a*
Ethylbenzene (μg/L)	2	186	33	<5	23	*b*	*a*
Methylene chloride (μg/L)	24	186	61	<5	18	*b*	*a*

Table 5.13 (BCHR continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Y-12 Burial grounds (continued)							
Tetrachloroethene (μg/L)	23	186	2.5 E4	<5	2.0 E3	*b*	*a*
Toluene (μg/L)	2	186	670	<5	340	*b*	*a*
Trichloroethene (μg/L)	16	186	1.5 E4	<5	1.8 E3	5	15
Vinyl chloride (μg/L)	8	186	180	<10	59	2	8
Xylenes (μg/L)	2	186	130	<5	91	*b*	*a*
^{234}U (pCi/L)	*a*	34	3.5	–0.44	0.45	*b*	*a*
^{237}Np (pCi/L)	*a*	1	1.3	1.3	1.3	*b*	*a*
^{238}U (pCi/L)	*a*	34	4.5	–0.88	0.29	*b*	*a*
^{241}Am (pCi/L)	*a*	1	0.40	0.40	0.40	*b*	*a*
Gross alpha (pCi/L)	*a*	186	31	–27	2.3	15	5
Gross beta (pCi/L)	*a*	186	83	–35	4.9	50	2
Strontium (pCi/L)	*a*	1	24	24	24	8	1

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

Table 5.14. Constituents in groundwater at the Y-12 Plant site Chestnut Ridge Hydrogeologic Regime (CRHR), 1991

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
			Ash Disposal Basin				
Iron, total (mg/L)	16	16	0.59	0.015	0.16	0.3	1
Turbidity (NTU)	*a*	16	6.7	0.24	2.7	5	2
Methylene chloride (μg/L)	1	16	17	<5	17	*b*	*a*
			Chestnut Ridge Security Pit				
Iron, total (mg/L)	64	68	8.4	<0.0050	0.50	0.3	16
Lead, total (mg/L)	10	68	0.093	<0.0040	0.022	0.05	1
Manganese, total (mg/L)	48	68	0.26	<0.0010	0.020	0.05	4
pH	*a*	68	8.7	6.2	7.3	6.5/8.5	10
Turbidity (NTU)	*a*	68	1.3 E3	0.20	47	5	19
1,1,1-Trichloroethane (μg/L)	35	68	480	<5	120	200	10
1,1-Dichloroethane (μg/L)	25	68	130	<5	53	*b*	*a*
1,1-Dichloroethene (μg/L)	16	68	130	<5	57	7	16
1,2-Dichloroethene, total (μg/L)	6	68	51	<5	21	*b*	*a*
Chloroform (μg/L)	1	68	5	<5	5	*b*	*a*
Tetrachloroethene (μg/L)	34	68	73	<5	23	*b*	*a*
Toluene (μg/L)	1	68	6	<5	6	*b*	*a*
Trichloroethene (μg/L)	2	68	9	<5	8	5	2
^{234}U (pCi/L)	*a*	2	0.44	0.43	0.44	*b*	*a*
^{238}U (pCi/L)	*a*	2	0.44	0.00	0.22	*b*	*a*
			East CR Waste Pile				
Iron, total (mg/L)	16	16	4.8	0.014	0.68	0.3	4
pH	*a*	16	8.2	6.3	7.2	6.5/8.5	4
Turbidity (NTU)	*a*	16	50	0.28	7	5	4
Acetone (μg/L)	1	16	71	<10	71	*b*	*a*
			Kerr Hollow Quarry				
Iron, total (mg/L)	26	27	140	<0.0050	6.4	0.3	13
Lead, total (mg/L)	5	27	0.13	<0.0040	0.032	0.05	1
Manganese, total (mg/L)	23	27	1	<0.0010	0.086	0.05	5
Selenium, total (mg/L)	1	27	0.89	<0.050	0.89	0.01	1
Turbidity (NTU)	*a*	27	100	0.15	16	5	17
Acetone (μg/L)	1	27	11	<10	11	*b*	*a*
Methylene chloride (μg/L)	2	27	17	<5	17	*b*	*a*
Gross alpha (pCi/L)	*a*	27	16	–0.15	5.5	15	1
			Landfill II				
Chromium, total (mg/L)	4	9	0.056	<0.010	0.034	0.05	2
Iron, total (mg/L)	9	9	380	0.019	45	0.3	6
Lead, total (mg/L)	4	9	0.26	<0.0040	0.11	0.05	2
Manganese, total (mg/L)	7	9	13	<0.0010	2.1	0.05	6
Mercury, total (mg/L)	3	9	0.0039	<0.00020	0.0024	0.002	2
Selenium, total (mg/L)	1	9	0.63	<0.050	0.63	0.01	1
Dissolved solids (mg/L)	9	9	590	150	350	500	2
pH	*a*	9	8.8	6.9	7.8	6.5/8.5	2
Turbidity (NTU)	*a*	9	1.3 E4	0.35	2.7 E3	5	6
1,1-Dichloroethane (μg/L)	3	9	35	<5	27	b	*a*
Methylene chloride (μg/L)	1	9	16	<5	16	b	*a*
Tetrachloroethene (μg/L)	1	9	5	<5	5	*b*	*a*
Gross alpha (pCi/L)	*a*	9	26	0.77	7.7	15	2

Table 5.14 (CRHR continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Landfill II Expansion							
Arsenic, total (mg/L)	1	31	0.34	<0.050	0.34	0.05	1
Iron, total (mg/L)	31	31	6.6	0.0090	0.51	0.3	11
Manganese, total (mg/L)	24	31	0.54	<0.0010	0.035	0.05	2
Selenium, total (mg/L)	1	31	0.16	<0.050	0.16	0.01	1
Silver, total (mg/L)	2	31	0.19	<0.0060	0.15	0.05	2
pH	*a*	32	11.7	6.5	7.8	6.5/8.5	3
Turbidity (NTU)	*a*	32	200	0.15	16	5	13
Acetone (μg/L)	1	32	25	<10	25	*b*	*a*
Gross alpha (pCi/L)	*a*	32	35	–0.62	2.8	15	1
Gross beta (pCi/L)	*a*	32	86	0.37	8.5	50	1
Landfill III							
Cadmium, total (mg/L)	1	28	0.030	<0.0020	0.030	0.01	1
Chromium, total (mg/L)	7	28	4	<0.010	0.66	0.05	4
Iron, total (mg/L)	26	28	31	<0.0050	3.9	0.3	15
Lead, total (mg/L)	9	28	6.4	<0.0040	0.77	0.05	3
Manganese, total (mg/L)	21	28	7.8	<0.0010	0.46	0.05	9
Dissolved solids (mg/L)	28	28	680	90	210	500	1
pH	*a*	28	8.3	6	7.2	6.5/8.5	6
Turbidity (NTU)	*a*	28	1.6 E4	0.46	640	5	15
Acetone (μg/L)	3	28	18	<10	14	*b*	*a*
Benzene (μg/L)	1	28	7	<5	7	5	1
Methylene chloride (μg/L)	1	28	16	<5	16	*b*	*a*
^{234}U (pCi/L)	*a*	4	2	0.00	0.72	*b*	*a*
^{238}U (pCi/L)	*a*	4	0.82	–0.41	0.21	*b*	*a*
Gross alpha (pCi/L)	*a*	28	83	–0.050	5.9	15	2
Gross beta (pCi/L)	*a*	28	140	–0.040	13	50	2
Landfill IV							
Arsenic, total (mg/L)	1	20	0.064	<0.050	0.064	0.05	1
Iron, total (mg/L)	18	20	13	<0.0050	1.1	0.3	10
Manganese, total (mg/L)	15	20	0.32	<0.0010	0.039	0.05	2
Turbidity (NTU)	*a*	20	270	0.20	29	5	11
Acetone (μg/L)	3	20	18	<10	17	*b*	*a*
^{234}U (pCi/L)	*a*	10	1.2	–0.46	0.12	*b*	*a*
^{238}U (pCi/L)	*a*	10	1.3	0.00	0.34	*b*	*a*
Rogers Quarry							
Iron, total (mg/L)	8	8	1.3	0.026	0.45	0.3	3
Manganese, total (mg/L)	8	8	0.16	0.0020	0.055	0.05	3
Dissolved solids (mg/L)	8	8	540	240	370	500	2
Turbidity (NTU)	*a*	8	15	0.50	6.5	5	4

Table 5.14 (CRHR continued)

Parameter	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Sediment Disposal Basin							
Arsenic, total (mg/L)	1	31	0.058	<0.050	0.058	0.05	1
Iron, total (mg/L)	31	31	6	0.033	1	0.3	16
Lead, total (mg/L)	7	31	0.30	<0.0040	0.056	0.05	1
Manganese, total (mg/L)	28	31	0.37	<0.0010	0.058	0.05	9
pH	*a*	124	9.7	5.8	7.5	6.5/8.5	32
Turbidity (NTU)	*a*	31	1.2 E3	1.4	68	5	22
Acetone (μg/L)	4	31	77	<10	37	*b*	*a*
Diethylphthalate (μg/L)	1	28	13	<10	13	*b*	*a*
^{234}U (pCi/L)	*a*	2	0.87	0.48	0.68	*b*	*a*
^{238}U (pCi/L)	*a*	2	0.95	–0.44	0.26	*b*	*a*
United Nuclear Site							
Arsenic, total (mg/L)	1	24	0.070	<0.050	0.070	0.05	1
Iron, total (mg/L)	24	24	6.3	0.0080	0.63	0.3	4
Manganese, total (mg/L)	15	24	0.18	<0.0010	0.026	0.05	3
Turbidity (NTU)	*a*	24	110	0.25	10	5	5
Methylene chloride (μg/L)	2	24	16	<5	16	*b*	*a*
^{234}U (pCi/L)	*a*	14	15	–0.43	1.6	*b*	*a*
^{238}U (pCi/L)	*a*	14	20	–0.48	1.3	*b*	*a*

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

Table 5.15. Constituents in Waste Area Grouping (WAG) 1 groundwater at ORNL, March 7–26, 1991

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	23	23	68	1.5	19*	250	0[3]
Fluoride	20	23	3.4	0.10	0.52*	4.0	0[2]
Nitrate	4	23	8.3	1.6	5.4*	10	0[2]
Phosphate	1	23	2.2	2.2	2.2	*e*	[*e*]
Sulfate as SO_4	22	23	110	2.0	36*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	23	23	0.96	0.15	0.42*	*e*	[*e*]
Dissolved oxygen (ppm)	23	23	5.4	0.010	2.0*	*e*	[*e*]
Redox (mV)	23	23	210	–200	50*	*e*	[*e*]
Temperature (°C)	23	23	18	10	14*	31	0[1]
Turbidity (JTU)	23	23	910	110	430*	1.0	23[2]
pH (standard units)	23	23	9.0	6.6	7.3*	(6.5, 8.5)	1[3]
Metals, filtered (mg/L)							
Aluminum	3	23	0.26	0.071	0.15	0.20	1[3]
Barium	23	23	0.43	0.023	0.14*	2.0	0[2]
Beryllium	9	23	0.00092	0.00042	0.00065*	*e*	[*e*]
Boron	1	1	1.0	1.0	1.0	*e*	[*e*]
Calcium	23	23	170	1.3	89*	*e*	[*e*]
Chromium	16	23	0.019	0.0055	0.013*	0.050	0[1]
Iron	11	23	19	0.067	4.8*	0.30	9[3]
Magnesium	23	23	31	0.47	7*	*e*	[*e*]
Manganese	16	23	7.2	0.0019	1.7*	0.050	10[3]
Nickel	4	23	0.0062	0.0043	0.0049*	0.10	0[1]
Potassium	23	23	7.5	0.35	1.8*	*e*	[*e*]
Silicon	1	1	5.6	5.6	5.6	*e*	[*e*]
Silver	2	23	0.0061	0.0054	0.0058*	0.050	0[1]
Sodium	20	23	260	5.8	41*	*e*	[*e*]
Strontium	1	1	1.3	1.3	1.3	*e*	[*e*]
Vanadium	6	23	0.0032	0.0021	0.0027*	*e*	[*e*]
Zinc	11	23	0.019	0.0052	0.0079*	5.0	0[1]
Metals, unfiltered (mg/L)							
Aluminum	6	23	0.29	0.059	0.18*	0.20	3[3]
Barium	23	23	0.33	0.025	0.12*	2.0	0[2]
Beryllium	9	23	0.00082	0.00052	0.00068*	*e*	[*e*]
Calcium	23	23	170	1.5	88*	*e*	[*e*]
Chromium	17	23	0.019	0.0054	0.013*	0.050	0[1]
Iron	18	23	18	0.054	3.0*	0.30	12[3]
Magnesium	23	23	30	0.55	16*	*e*	[*e*]
Manganese	20	23	6.4	0.0017	1.3*	0.050	10[3]
Nickel	5	23	0.0078	0.0040	0.0053*	0.10	0[1]
Potassium	23	23	7.0	0.40	1.7*	*e*	[*e*]
Silver	3	23	0.0068	0.0056	0.0062*	0.050	0[1]
Sodium	20	23	300	5.2	43*	*e*	[*e*]
Vanadium	7	23	0.0038	0.0023	0.0032*	*e*	[*e*]
Zinc	8	23	0.024	0.0054	0.011*	5.0	0[1]

Table 5.15 (WAG 1 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]		
Downgradient wells (continued)							
Others, filtered							
Solids, total dissolved (mg/L)	23	23	720	180	400*	500	6[1]
Others, unfiltered							
Alkalinity (mg/L)	23	23	450	150	300*	*e*	[*e*]
Carbon, total organic (mg/L)	23	23	4.3	0.70	1.9*	*e*	[*e*]
Halides, total organic (µg/L)	12	23	44	5.0	16*	*e*	[*e*]
Nitrogen, total Kjeldahl (mg/L)	13	23	3.1	0.13	0.92*	*e*	[*e*]
Solids, total suspended (mg/L)	12	23	39	5.0	14*	*e*	[*e*]
Sulfide, total (mg/L)	15	23	4.5	0.16	0.68*	*e*	[*e*]
Pesticides and PCBs, unfiltered (µg/L)							
Endosulfan sulfate	2	23	JB 0.040	JB 0.010	0.025	*e*	[*e*]
Heptachlor	2	23	J 0.033	JB 0.010	0.022	*e*	[*e*]
gamma-BHC (Lindane)	1	23	JB 0.030	JB 0.030	0.030	*e*	[*e*]
Radionuclides, filtered (g/L)							
U-Total	1	1	0.000021	0.000021	0.000021	*e*	[*e*]
Radionuclides, unfiltered (g/L)							
U-Total	1	1	0.000031	0.000031	0.000031	*e*	[*e*]
Radionuclides, filtered (pCi/L)							
^{60}Co	2	23	86	46	66	200	0[4]
Gross alpha	9	23	300	1.3	35	15	1[2]
Gross beta	15	23	14,000	3.0	950	50	3[2]
$^{89}Sr + ^{90}Sr$	8	18	6,500	3.2	840	40	5[4]
^{234}U	1	1	300	300	300	20	1[4]
^{235}U	1	1	1.1	1.1	1.1	24	0[4]
^{238}U	1	1	7.0	7.0	7.0	24	0[4]
Radionuclides[f], unfiltered (pCi/L)							
^{60}Co	1	23	57	57	57	200	0[4]
^{137}Cs	1	23	54	54	54	120	0[4]
Gross alpha	11	23	260	1.4	26	15	1[2]
Gross beta	12	23	14,000	3.2	1,200	50	3[2]
^{3}H	14	23	6,500	840	2,400*	80,000	0[4]
$^{89}Sr + ^{99}Sr$	9	17	6,800	3.5	770	40	4[4]
^{234}U	1	1	300	300	300	20	1[4]
^{235}U	1	1	1.6	1.6	1.6	24	0[4]
^{238}U	1	1	10	10	10	24	0[4]
Tentatively identified compounds, unfiltered (µg/L)							
Toluene-solvent in std. solns.-7.07	1	1	JB 470	JB 470	470	*e*	[*e*]
Toluene-solvent in std. solns.-7.08	1	1	JB 490	JB 490	490	*e*	[*e*]
Toluene-solvent in std. solns.-7.09	2	2	JB 230	JB 190	210*	*e*	[*e*]
Toluene-solvent in std. solns.-7.1	2	2	JB 470	JB 270	370	*e*	[*e*]
Toluene-solvent in std. solns.-7.11	1	1	JB 180	JB 180	180	*e*	[*e*]
Unknown-10.3	1	1	J 140	J 140	140	*e*	[*e*]
Unknown-25.16	1	1	J 17	J 17	17	*e*	[*e*]
Unknown-7.95	1	1	J 33	J 33	33	*e*	[*e*]
Unknown-8.16	2	2	J 220	J 13	120	*e*	[*e*]
Unknown-8.17	1	1	J 28	J 28	28	*e*	[*e*]
Unknown-8.9	1	1	J 12	J 12	12	*e*	[*e*]
Unknown-9.1	1	1	J 9.0	J 9.0	9.0	*e*	[*e*]

Table 5.15 (WAG 1 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]		
Downgradient wells (continued)							
Volatile organics, unfiltered (μg/L)							
1,2-Dichloroethene	1	23	J 3.0	J 3.0	3.0	*e*	[*e*]
Carbon disulfide	1	23	J 3.0	J 3.0	3.0	*e*	[*e*]
Carbon tetrachloride	1	23	J 2.0	J 2.0	2.0	5.0	0[2]
Chloroform	3	23	8.0	J 3.0	4.7	100	0[2]
Methylene chloride	2	23	JB 1.0	JB 1.0	1.0	*e*	[*e*]
Trichloroethene	4	23	6.0	J 2.0	3.8*	5.0	1[2]
Upgradient wells							
Anions, unfiltered (mg/L)							
Chloride	3	3	11	2.3	5.8	250	0[3]
Fluoride	3	3	0.60	0.10	0.43	4.0	0[2]
Nitrate	1	3	5.5	5.5	5.5	10	0[2]
Sulfate (as SO_4)	3	3	36	20	27*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	3	3	0.41	0.28	0.33*	*e*	[*e*]
Dissolved oxygen (ppm)	3	3	6.7	0.70	2.7	*e*	[*e*]
Redox (mV)	3	3	200	–200	62	*e*	[*e*]
Temperature (°C)	3	3	15	14	15*	31	0[1]
Turbidity (JTU)	3	3	1,000	140	650	1.0	3[2]
pH (standard units)	3	3	7.8	6.9	7.4*	(6.5, 8.5)	0[3]
Metals, filtered (mg/L)							
Barium	3	3	0.30	0.037	0.17	2.0	0[2]
Calcium	3	3	110	49	84*	*e*	[*e*]
Chromium	3	3	0.018	0.0041	0.012	0.050	0[1]
Cobalt	1	3	0.0047	0.0047	0.0047	*e*	[*e*]
Iron	1	3	0.25	0.25	0.25	0.30	0[3]
Magnesium	3	3	31	7.5	21*	*e*	[*e*]
Manganese	2	3	0.0069	0.0034	0.0052	0.050	0[3]
Potassium	3	3	1.1	0.66	0.88*	*e*	[*e*]
Sodium	2	3	18	5.7	12	*e*	[*e*]
Vanadium	2	3	0.0035	0.0021	0.0028	*e*	[*e*]
Zinc	3	3	0.0087	0.0069	0.0075*	5.0	0[1]
Metals, unfiltered (mg/L)							
Barium	3	3	0.24	0.11	0.18*	2.0	0[2]
Calcium	3	3	110	45	86*	*e*	[*e*]
Chromium	3	3	0.015	0.0052	0.012*	0.050	0[1]
Iron	2	3	0.055	0.054	0.055*	0.30	0[3]
Magnesium	3	3	29	8.0	21*	*e*	[*e*]
Manganese	2	3	0.0058	0.0027	0.0042	0.050	0[3]
Nickel	1	3	0.0042	0.0042	0.0042	0.10	0[1]
Potassium	3	3	1.2	0.68	0.96*	*e*	[*e*]
Sodium	2	3	17	7.9	13	*e*	[*e*]
Zinc	2	3	0.013	0.0060	0.0093	5.0	0[1]

Table 5.15 (WAG 1 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 (continued)							
Others, filtered							
Solids, total dissolved (mg/L)	3	3	400	300	340*	500	0[1]
Others, unfiltered							
Alkalinity (mg/L)	3	3	350	250	280*	*e*	[*e*]
Carbon, total organic (mg/L)	3	3	1.2	0.80	1.0*	*e*	[*e*]
Nitrogen, total Kjeldahl (mg/L)	1	3	0.45	0.45	0.45	*e*	[*e*]
Sulfide, total (mg/L)	2	3	0.64	0.16	0.40	*e*	[*e*]
Pesticides and PCBs, unfiltered (μg/L)							
beta-BHC	1	3	1.7	1.7	1.7	*e*	[*e*]
delta-BHC	1	3	0.29	0.29	0.29	*e*	[*e*]
Radionuclides[f], filtered (pCi/L)							
Gross alpha	1	3	1.8	1.8	1.8	15	0[2]
Gross beta	2	3	3.8	3.5	3.6*	50	0[2]
Radionuclides[f], unfiltered (pCi/L)							
^{60}Co	2	3	68	46	57	200	0[4]
Gross alpha	1	3	2.4	2.4	2.4	15	0[2]
^{3}H	3	3	3,200	1,300	2,400*	80,000	0[4]
$^{89}Sr + {}^{90}Sr$	1	3	3.2	3.2	3.2	40	0[4]
Volatile organics, unfiltered (μg/L)							
Chloroform	1	3	J 1.0	J 1.0	1.0	100	0[2]

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

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

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

1. Rules of Tennessee Department of Environment and Conservation, Bureau of Environment, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, as amended.
2. 40 CFR Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[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 5.16. Constituents in Waste Area Grouping (WAG) 2, groundwater at ORNL, June 7–21, 1991

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	7	8	31	0.80	9.1*	250	0[3]
Fluoride	4	8	2.0	0.10	0.65	4.0	0[2]
Nitrate	2	8	13	4.5	8.6	10	1[2]
Sulfate (as SO_4)	7	8	32	1.0	11*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	8	8	0.59	0.21	0.44*	*e*	[*e*]
Dissolved oxygen (ppm)	8	8	9.3	2.8	4.5*	*e*	[*e*]
Redox (mV)	8	8	200	88	150*	*e*	[*e*]
Temperature (°C)	8	8	17	14	15*	30	0[1]
Turbidity (JTU)	8	8	230	55	190*	1.0	8[2]
pH (standard units)	8	8	9.0	6.1	7.2*	(6.5, 8.5)	3[3]
Metals, filtered (mg/L)							
Aluminum	8	8	0.34	0.075	0.13*	0.20	1[3]
Barium	8	8	0.97	0.023	0.29*	2.0	0[2]
Boron	3	8	1.1	0.14	0.46	*e*	[*e*]
Calcium	8	8	160	0.68	68*	*e*	[*e*]
Chromium	4	8	0.014	0.0046	0.010*	0.050	0[1]
Copper	1	8	0.010	0.010	0.010	1.0	0[1]
Iron	7	8	23	0.15	5.7	0.30	3[3]
Magnesium	8	8	24	0.24	9.7*	*e*	[*e*]
Manganese	8	8	1.2	0.0047	0.23	0.050	4[3]
Nickel	2	8	0.18	0.0092	0.095	0.10	1[1]
Potassium	8	8	6.5	1.5	3.0*	*e*	[*e*]
Silicon	8	8	9.9	3.7	7.0*	*e*	[*e*]
Sodium	8	8	210	6.7	56*	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	8	8	10	0.077	2.6	0.20	4[3]
Barium	8	8	0.95	0.042	0.34*	2.0	0[2]
Beryllium	2	8	0.0018	0.0013	0.0015*	*e*	[*e*]
Boron	3	8	0.95	0.15	0.43	*e*	[*e*]
Calcium	8	8	170	1.3	69*	*e*	[*e*]
Chromium	7	8	0.063	0.0050	0.019*	0.050	1[1]
Cobalt	1	8	0.011	0.011	0.011	*e*	[*e*]
Copper	1	8	0.012	0.012	0.012	1.0	0[1]
Iron	8	8	36	0.068	8.2	0.30	6[3]
Magnesium	8	8	23	0.31	9.8*	*e*	[*e*]
Manganese	8	8	1.4	0.0071	0.27	0.050	5[3]

Table 5.16 (WAG 2 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]		
Downgradient wells (continued)							
Nickel	5	8	0.18	0.0043	0.045	0.10	1[1]
Potassium	8	8	3,000	0.92	380	*e*	[*e*]
Silicon	8	8	26	3.4	11*	*e*	[*e*]
Sodium	7	8	190	11	59*	*e*	[*e*]
Vanadium	3	8	0.021	0.0021	0.0095	*e*	[*e*]
Zinc	4	8	0.045	0.0080	0.034*	5.0	0[1]
Others, filtered							
Alkalinity (mg/L)	8	8	440	110	290*	*e*	[*e*]
Others, unfiltered (mg/L)							
Alkalinity	8	8	440	110	290*	*e*	[*e*]
Ammonia	8	8	11	0.030	1.5	*e*	[*e*]
Carbon, total organic	8	8	4.7	0.50	1.3*	*e*	[*e*]
Cyanide, total	1	8	0.010	0.010	0.010	*e*	[*e*]
Halides, total organic	4	8	6.8	5.3	6.1*	*e*	[*e*]
Solids, total dissolved	7	8	480	91	300*	500	0[1]
Solids, total suspended	3	8	610	33	250	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{60}Co	2	8	59	41	50	200	0[4]
Gross alpha	3	8	3.0	2.5	2.8*	15	0[2]
Gross beta	4	8	1,600	3.2	400	50	1[2]
^{3}H	5	8	180,000	760	71,000	20,000	3[2]
$^{89}Sr + ^{90}Sr$	1	8	760	760	760	8.0	1[2]
Radionuclides,[f] unfiltered (pCi/L)							
Gross alpha	4	8	4.9	1.7	2.8*	15	0[2]
Gross beta	5	8	1,600	3.2	330	50	1[2]
^{3}H	5	8	180,000	780	72,000	20,000	3[2]
$^{89}Sr + ^{90}Sr$	3	8	860	2.1	290	8.0	1[2]
Tentatively identified compounds, unfiltered (µg/L)							
Unknown-6.09	1	1	J 6.0	J 6.0	6.0	*e*	[*e*]
Unknown-6.13	2	2	J 21	J 5.0	13	*e*	[*e*]
Volatile Organics, unfiltered (µg/L)							
Acetone	5	8	J 3.0	JB 2.0	2.6*	*e*	[*e*]
Benzene	1	8	J 1.0	J 1.0	1.0	5.0	0[2]
Carbon disulfide	1	8	J 1.0	J 1.0	1.0	*e*	[*e*]
Vinyl acetate	1	8	J 1.0	J 1.0	1.0	*e*	[*e*]

Table 5.16 (WAG 2 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	10	10	300	1.0	33	250	1[3]
Fluoride	6	10	0.50	0.10	0.25*	4.0	0[2]
Sulfate (as SO_4)	10	10	68	5.3	27*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	10	10	0.51	0.24	0.37*	*e*	[*e*]
Dissolved oxygen (ppm)	10	10	8.9	3.5	5.5*	*e*	[*e*]
Redox (mV)	10	10	190	160	180*	*e*	[*e*]
Temperature (°C)	10	10	15	13	14*	30	0[1]
Turbidity (JTU)	10	10	230	190	220*	1.0	10[2]
pH (standard units)	10	10	8.8	6.3	7.0*	(6.5, 8.5)	2[3]
Metals, filtered (mg/L)							
Aluminum	10	10	0.29	0.055	0.11*	0.20	1[3]
Antimony	2	10	0.0050	0.0050	0.0050	*e*	[*e*]
Barium	10	10	0.61	0.039	0.21*	2.0	0[2]
Boron	4	10	0.84	0.14	0.34	*e*	[*e*]
Calcium	10	10	130	1.1	65*	*e*	[*e*]
Chromium	7	10	0.012	0.0047	0.0088*	0.050	0[1]
Cobalt	1	10	0.0092	0.0092	0.0092	*e*	[*e*]
Copper	1	10	0.014	0.014	0.014	1.0	0[1]
Iron	6	10	9.1	0.14	1.8	0.30	4[3]
Magnesium	10	10	29	0.37	13*	*e*	[*e*]
Manganese	10	10	14	0.0052	1.6	0.050	6[3]
Nickel	5	10	0.019	0.0057	0.0089*	0.10	0[1]
Potassium	10	10	5.3	1.7	3.1*	*e*	[*e*]
Silicon	10	10	9.6	3.5	6.9*	*e*	[*e*]
Sodium	9	10	190	5.6	47*	*e*	[*e*]
Vanadium	1	10	0.0028	0.0028	0.0028	*e*	[*e*]
Zinc	2	10	0.038	0.0070	0.023	5.0	0[1]
Metals, unfiltered (mg/L)							
Aluminum	10	10	0.94	0.066	0.25*	0.20	4[3]
Arsenic	1	10	0.010	0.010	0.010	0.050	0[2]
Barium	10	10	0.62	0.036	0.22*	2.0	0[2]
Boron	4	10	0.84	0.15	0.34	*e*	[*e*]
Calcium	10	10	120	1.5	63*	*e*	[*e*]
Chromium	8	10	0.013	0.0047	0.0088*	0.050	0[1]
Cobalt	1	10	0.0069	0.0069	0.0069	*e*	[*e*]
Copper	1	10	0.0089	0.0089	0.0089	1.0	0[1]
Iron	10	10	8.5	0.17	1.2	0.30	8[3]

Table 5.16 (WAG 2 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 (continued)							
Magnesium	10	10	25	0.55	12*	*e*	[*e*]
Manganese	10	10	12	0.012	1.4	0.050	6[3]
Nickel	9	10	0.017	0.0045	0.0078*	0.10	0[1]
Potassium	10	10	4.2	0.42	2.0*	*e*	[*e*]
Silicon	10	10	9.8	4.0	7.0*	*e*	[*e*]
Sodium	9	10	180	6.3	46*	*e*	[*e*]
Vanadium	1	10	0.0039	0.0039	0.0039	*e*	[*e*]
Zinc	5	10	0.034	0.0052	0.014*	5.0	0[1]
Others, filtered							
Alkalinity (mg/L)	10	10	390	140	270*	*e*	[*e*]
Others, unfiltered (mg/L)							
Alkalinity	10	10	390	140	270*	*e*	[*e*]
Ammonia	10	10	0.74	0.050	0.19*	*e*	[*e*]
Carbon, total organic	8	10	2.0	0.50	0.96*	*e*	[*e*]
Halides, total organic	4	10	12	7.0	9.4*	*e*	[*e*]
Solids, total dissolved	10	10	510	190	340*	500	1[1]
Solids, total suspended	3	10	17	6.0	9.7	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{60}Co	1	10	51	51	51	200	0[4]
^{137}Cs	1	10	59	59	59	120	0[4]
Gross alpha	7	10	19	1.5	6.9*	15	1[2]
Gross beta	10	10	17	3.5	8.8*	50	0[2]
^{3}H	5	10	300,000	570	61,000	20,000	1[2]
$^{89}Sr + ^{90}Sr$	6	10	5.1	2.2	3.9*	8.0	0[2]
Radionuclides,[f] unfiltered (pCi/L)							
^{60}Co	2	10	73	65	69*	200	0[4]
Gross alpha	7	10	14	2.1	6.2*	15	0[2]
Gross beta	8	10	30	5.7	12*	50	0[2]
^{3}H	7	10	270,000	680	40,000	20,000	1[2]
$^{89}Sr + ^{90}Sr$	6	10	9.5	2.1	4.2*	8.0	1[2]
Tentatively identified compounds, unfiltered (μg/L)							
Unknown 6.13	1	1	J 7.0	J 7.0	7.0	*e*	[*e*]

Table 5.16 (WAG 2 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 (continued)							
Volatile organics, unfiltered (μg/L)							
1,1,2,2-Tetrachloroethane	1	10	J 1.0	J 1.0	1.0	*e*	[*e*]
2-Hexanone	1	10	J 2.0	J 2.0	2.0	*e*	[*e*]
4-Methyl-2-pentanone	1	10	J 1.0	J 1.0	1.0	*e*	[*e*]
Acetone	2	10	JB 5.0	JB 4.0	4.5*	*e*	[*e*]
Benzene	2	10	J 2.0	J 2.0	2.0	5.0	0[2]
Carbon disulfide	3	10	13	J 2.0	7.3	*e*	[*e*]

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

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

[c]If a reference limit exists, the source is enclosed in brackets and 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 Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[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 5.17. Constituents in Waste Area Grouping (WAG) 3 groundwater at ORNL, August 5–29, 1991

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	11	11	370	0.65	81*	250	2[3]
Fluoride	10	11	1.3	0.20	0.54*	4.0	0[2]
Nitrate	1	11	5.5	5.5	5.5	10	0[2]
Sulfate (as SO_4)	11	11	150	3.8	43*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	11	11	1.2	0.23	0.60*	*e*	[*e*]
Dissolved oxygen (ppm)	11	11	12	2.9	7.5*	*e*	[*e*]
Redox (mV)	11	11	190	120	160*	*e*	[*e*]
Temperature (°C)	11	11	16	14	15*	30	0[1]
Turbidity (JTU)	11	11	370	59	190*	1.0	11[2]
pH (standard units)	11	11	10	6.6	7.4*	(6.5, 8.5)	1[3]
Metals, filtered (mg/L)							
Aluminum	9	11	0.28	0.056	0.10*	0.20	1[3]
Arsenic	1	11	0.014	0.014	0.014	0.050	0[2]
Barium	11	11	0.77	0.0027	0.18*	2.0	0[2]
Beryllium	1	11	0.0011	0.0011	0.0011	*e*	[*e*]
Boron	8	11	2.7	0.094	0.74*	*e*	[*e*]
Calcium	11	11	180	0.37	110*	*e*	[*e*]
Chromium	9	11	0.022	0.0090	0.013*	0.050	0[1]
Cobalt	1	11	0.0080	0.0080	0.0080	*e*	[*e*]
Copper	5	11	0.032	0.0081	0.016*	1.0	0[1]
Iron	6	11	2.0	0.11	0.72*	0.30	4[3]
Magnesium	11	11	65	0.054	27*	*e*	[*e*]
Manganese	11	11	2.8	0.0014	0.43	0.050	5[3]
Nickel	3	11	0.041	0.0040	0.017	0.10	0[1]
Potassium	11	11	22	2.2	6.9*	*e*	[*e*]
Silicon	11	11	16	5.2	7.4*	*e*	[*e*]
Sodium	11	11	120	7.8	45*	*e*	[*e*]
Vanadium	4	11	0.016	0.0029	0.0092*	*e*	[*e*]
Zinc	1	11	0.036	0.036	0.036	5.0	0[1]
Metals, unfiltered (mg/L)							
Aluminum	9	11	1.3	0.076	0.44*	0.20	4[3]
Arsenic	2	11	0.012	0.010	0.011*	0.050	0[2]
Barium	11	11	0.73	0.013	0.18*	2.0	0[2]
Beryllium	3	11	0.0012	0.0011	0.0011*	*e*	[*e*]
Boron	8	11	2.7	0.091	0.71	*e*	[*e*]
Calcium	11	11	170	1.7	110*	*e*	[*e*]
Chromium	10	11	0.024	0.0059	0.013*	0.050	0[1]
Cobalt	2	11	0.014	0.0041	0.0089	*e*	[*e*]
Copper	4	11	0.028	0.010	0.017*	1.0	0[1]

Table 5.17 (WAG 3 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]		
Downgradient wells (continued)							
Iron	10	11	26	0.055	3.2	0.30	7[3]
Magnesium	11	11	61	0.40	26*	*e*	[*e*]
Manganese	11	11	2.9	0.0061	0.45	0.050	5[3]
Nickel	5	11	0.047	0.0071	0.017*	0.10	0[1]
Potassium	11	11	21	1.4	4.6*	*e*	[*e*]
Selenium	1	11	0.0085	0.0085	0.0085	0.010	0[1]
Silicon	11	11	18	4.8	7.4*	*e*	[*e*]
Sodium	10	11	110	12	46*	*e*	[*e*]
Vanadium	2	11	0.017	0.0087	0.013	*e*	[*e*]
Zinc	4	11	0.076	0.0074	0.029	5.0	0[1]
Others, filtered							
Alkalinity (mg/L)	11	11	430	190	310*	*e*	[*e*]
Solids, total dissolved (mg/L)	11	11	970	280	480*	500	5[1]
Others, unfiltered							
Alkalinity (mg/L)	11	11	420	110	300*	*e*	[*e*]
Carbon, total organic (mg/L)	10	11	3.9	0.50	1.4*	*e*	[*e*]
Halides, total organic (μg/L)	6	11	250	5.3	67	*e*	[*e*]
Solids, total suspended (mg/L)	3	11	21	5.0	14*	*e*	[*e*]
Radionuclides[f], filtered (pCi/L)							
^{60}Co	1	11	49	49	49	200	0[4]
Gross alpha	6	11	11	1.7	4.0*	15	0[2]
Gross beta	11	11	1,200	5.4	210*	50	4[2]
^{3}H	8	11	32,000	840	5,200	20,000	1[2]
$^{89}Sr + ^{90}Sr$	7	11	620	2.2	140	8.0	4[2]
Radionuclides[f], unfiltered (pCi/L)							
Gross alpha	6	11	16	1.4	4.5	15	1[2]
Gross beta	10	11	1,300	7.6	230	50	4[2]
^{3}H	8	11	32,000	890	5,200	20,000	1[2]
$^{89}Sr + ^{90}Sr$	7	11	650	2.6	150	8.0	4[2]
Tentatively identified compounds, unfiltered (μg/L)							
Benzenesulfonamide,n-butyl-22	1	1	J 8.0	J 8.0	8.0	*e*	[*e*]
Benzenesulfonamide,n-butyl-22	1	1	J 9.0	J 9.0	9.0	*e*	[*e*]
Propane,2,2′-oxybis-19.51	1	1	J 780	J 780	780	*e*	[*e*]
Propane,2,2′-oxybis-19.54	1	1	J 22	J 22	22	*e*	[*e*]
Propane,2,2′-oxybis-19.52	1	1	J 50	J 50	50	*e*	[*e*]
Propane,2,2′-oxybis-19.58	1	1	J 24	J 24	24	*e*	[*e*]
Unknown-6.12	1	1	J 7.0	J 7.0	7.0	*e*	[*e*]

Table 5.17 (WAG 3 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]		
Downgradient wells (continued)							
Volatile organics, unfiltered (μg/L)							
1,1,1-Trichloroethane	3	11	B 5.0	JB 4.0	4.7*	200	0[2]
1,2-Dichloroethene	2	11	15	J 2.0	8.5	*e*	[*e*]
Carbon disulfide	1	11	J 1.0	J 1.0	1.0	*e*	[*e*]
Chloroform	1	11	J 3.0	J 3.0	3.0	100	0[2]
Trichloroethene	1	11	18	18	18	5.0	1[2]
Upgradient wells							
Chloride	3	3	6.7	1.4	3.5	250	0[3]
Fluoride	1	3	1.6	1.6	1.6	4.0	0[2]
Sulfate (as SO_4)	3	3	17	6.0	11*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	3	3	0.40	0.14	0.28*	*e*	[*e*]
Dissolved oxygen (ppm)	3	3	5.0	4.4	4.7*	*e*	[*e*]
Redox (mV)	3	3	210	180	190*	*e*	[*e*]
Temperature (°C)	3	3	16	14	14*	30	0[1]
Turbidity (JTU)	3	3	220	32	140	1.0	3[2]
pH (standard units)	3	3	6.9	6.1	6.6*	(6.5, 8.5)	1[3]
Metals, filtered (mg/L)							
Aluminum	3	3	0.099	0.078	0.086*	0.20	0[3]
Barium	3	3	0.061	0.019	0.039*	2.0	0[2]
Calcium	3	3	140	79	110*	*e*	[*e*]
Chromium	1	3	0.0081	0.0081	0.0081	0.050	0[1]
Iron	1	3	0.76	0.76	0.76	0.30	1[3]
Magnesium	3	3	18	4.0	9.0	*e*	[*e*]
Manganese	3	3	0.14	0.0020	0.078	0.050	2[3]
Potassium	3	3	3.8	0.79	2.3	*e*	[*e*]
Silicon	3	3	5.7	2.5	4.6*	*e*	[*e*]
Sodium	1	3	6.7	6.7	6.7	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	3	3	0.64	0.27	0.41*	0.20	3[3]
Barium	3	3	0.058	0.019	0.037*	2.0	0[2]
Calcium	3	3	130	73	100*	*e*	[*e*]
Chromium	1	3	0.0063	0.0063	0.0063	0.050	0[1]
Iron	3	3	1.0	0.28	0.67*	0.30	2[3]
Magnesium	3	3	17	3.6	8.2	*e*	[*e*]
Manganese	3	3	0.14	0.0087	0.078	0.050	2[3]
Potassium	3	3	1.4	0.71	0.99*	*e*	[*e*]
Silicon	3	3	5.6	2.8	4.7*	*e*	[*e*]

Table 5.17 (WAG 3 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 (continued)							
Others, filtered							
Alkalinity (mg/L)	3	3	390	190	290*	*e*	[*e*]
Solids, total dissolved (mg/L)	3	3	420	320	370*	500	0[1]
Others, unfiltered							
Alkalinity (mg/L)	3	3	390	190	290*	*e*	[*e*]
Carbon, total organic (mg/L)	3	3	1.6	0.78	1.1*	*e*	[*e*]
Halides, total organic (μg/L)	1	3	15	15	15	*e*	[*e*]
Solids, total suspended (mg/L)	2	3	64	14	39	*e*	[*e*]
Radionuclides[f], filtered (pCi/L)							
Gross alpha	1	3	3.2	3.2	3.2	15	0[2]
Gross beta	2	3	7.0	6.8	6.9*	50	0[2]
^{3}H	3	3	1,300	950	1,100*	20,000	0[2]
$^{89}Sr + {}^{90}Sr$	3	3	3.2	1.2	2.3*	8.0	0[2]
Radionuclides[f], unfiltered (pCi/L)							
Gross alpha	1	3	4.3	4.3	4.3	15	0[2]
^{3}H	2	3	920	890	910*	20,000	0[2]
$^{89}Sr + {}^{90}Sr$	3	3	2.6	1.8	2.1*	8.0	0[2]
Volatile organics, unfiltered (μg/L)							
Carbon disulfide	2	3	5.0	J 3.0	4.0	*e*	[*e*]
Methylene chloride	1	3	21	21	21	*e*	[*e*]
Tetrachloroethene	1	3	15	15	15	*e*	[*e*]

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

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

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

1. Rules of Tennessee Department of Environment and Conservation, Bureau of Environment, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, as amended.
2. 40 CFR Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[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 5.18. Constituents in Waste Area Grouping (WAG) 4 groundwater at ORNL, March 5–April 8 and November 14–December 19, 1991

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)							
Bromide	3	22	1.4	1.0	1.1*	*e*	[*e*]
Chloride	22	22	240	1.5	53*	250	0[3]
Fluoride	18	22	4.4	0.10	1.0*	4.0	1[2]
Nitrate	3	22	3.0	1.0	1.7	10	0[2]
Sulfate as SO_4	20	22	110	14	46*	250	0[3]
Base/neutral/acid extractable organics, unfiltered (µg/L)							
Diethyl phthalate	1	21	J 3.0	J 3.0	3.0	*e*	[*e*]
Field measurements, unfiltered							
Conductivity (mS/cm)	22	22	1.3	0.14	0.64*	*e*	[*e*]
Dissolved oxygen (ppm)	22	22	12	0.20	4.0*	*e*	[*e*]
Redox (mV)	22	22	160	17	97*	*e*	[*e*]
Temperature (°C)	22	22	16	12	14*	30	0[1]
Turbidity (JTU)	22	22	670	0.36	100*	1.0	21[2]
pH (standard units)	22	22	9.6	6.6	7.8*	(6.5, 8.5)	6[3]
Metals, filtered (mg/L)							
Aluminum	12	22	0.25	0.057	0.12*	0.20	1[3]
Antimony	1	22	0.0065	0.0065	0.0065	*e*	[*e*]
Barium	22	22	0.73	0.022	0.16*	2.0	0[2]
Boron	11	22	0.64	0.081	0.34*	*e*	[*e*]
Calcium	22	22	130	1.4	60*	*e*	[*e*]
Chromium	15	22	0.028	0.0045	0.016*	0.050	0[1]
Copper	3	22	0.0096	0.0081	0.0089*	1.0	0[1]
Iron	12	22	24	0.11	4.6*	0.30	9[3]
Magnesium	22	22	32	0.20	15*	*e*	[*e*]
Manganese	20	22	4.0	0.0020	0.57*	0.050	13[3]
Mercury	1	22	0.000050	0.000050	0.000050	0.00020	0[1]
Nickel	18	22	0.17	0.0040	0.064*	0.10	7[1]
Phosphorus	1	11	0.44	0.44	0.44	*e*	[*e*]
Potassium	22	22	8.2	1.7	4.1*	*e*	[*e*]
Selenium	3	22	0.0067	0.0050	0.0061*	0.010	0[1]
Silicon	22	22	15	3.4	8.3*	*e*	[*e*]
Sodium	22	22	370	9.9	110*	*e*	[*e*]
Strontium	11	11	1.5	0.083	0.60*	*e*	[*e*]
Tin	1	11	0.089	0.089	0.089	*e*	[*e*]
Vanadium	6	22	0.0049	0.0024	0.0032*	*e*	[*e*]
Zinc	2	22	0.011	0.0093	0.010*	5.0	0[1]

Table 5.18 (WAG 4 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]		
Downgradient wells (continued)							
Metals, unfiltered (mg/L)							
Aluminum	18	22	1.1	0.053	0.27*	0.20	6[3]
Arsenic	3	22	0.020	0.017	0.018*	0.050	0[2]
Barium	22	22	0.78	0.026	0.18*	2.0	0[2]
Boron	10	22	0.56	0.092	0.35*	*e*	[*e*]
Calcium	22	22	140	1.5	63*	*e*	[*e*]
Chromium	20	22	0.073	0.0058	0.019*	0.050	1[1]
Iron	22	22	24	0.072	3.0*	0.30	17[3]
Magnesium	22	22	32	0.31	15*	*e*	[*e*]
Manganese	22	22	5.2	0.0055	0.61*	0.050	13[3]
Nickel	15	22	0.17	0.0064	0.084*	0.10	7[1]
Potassium	22	22	6.2	1.5	3.1*	*e*	[*e*]
Selenium	1	22	0.016	0.016	0.016	0.010	1[1]
Silicon	22	22	15	1.8	8.4*	*e*	[*e*]
Sodium	22	22	390	10	110*	*e*	[*e*]
Strontium	11	11	1.4	0.075	0.57*	*e*	[*e*]
Vanadium	8	22	0.0076	0.0032	0.0052*	*e*	[*e*]
Zinc	12	22	0.060	0.0052	0.016*	5.0	0[1]
Others, filtered (mg/L)							
Alkalinity	22	22	590	110	330*	*e*	[*e*]
Solids, total dissolved	22	22	910	220	500*	500	10[1]
Others, unfiltered (mg/L)							
Alkalinity	22	22	590	110	330*	*e*	[*e*]
Carbon, total organic	14	22	10	0.58	2.4*	*e*	[*e*]
Halides, total organic	12	22	1,500	1.2	340*	*e*	[*e*]
Solids, total suspended	11	22	36	6.0	17*	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{60}Co	3	22	46	38	43*	200	0[4]
Gross alpha	10	22	38	2.1	10*	15	1[2]
Gross beta	18	22	1,400	4.1	150*	50	5[2]
^{3}H	16	22	10,000,000	840	2,200,000*	20,000	12[2]
$^{89}Sr + ^{90}Sr$	10	22	590	2.7	120	8.0	5[2]
Radionuclides,[f] unfiltered (pCi/L)							
^{60}Co	2	22	62	54	58*	200	0[4]
^{137}Cs	3	22	62	46	54*	120	0[4]
Gross alpha	16	22	35	2.0	7.7*	15	2[2]
Gross beta	17	22	1,400	5.9	150	50	4[2]
^{3}H	15	22	11,000,000	4,600	2,300,000*	20,000	12[2]
$^{89}Sr + ^{90}Sr$	10	22	540	4.1	110	8.0	4[2]

Table 5.18 (WAG 4 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]		
Downgradient wells (continued)							
Tentatively identified compounds, unfiltered (μg/L)							
Ethane,1,1,'-oxybis—12.73	1	1	J 8.0	J 8.0	8.0	*e*	[*e*]
Toluene-solventinstdsolns-7.11	1	1	JB 9.0	JB 9.0	9.0	*e*	[*e*]
Unknown-17.4	1	1	J 49	J 49	49	*e*	[*e*]
Unknown-17.87	1	1	J 73	J 73	73	*e*	[*e*]
Unknown-18.97	1	1	J 8.0	J 8.0	8.0	*e*	[*e*]
Unknown-19.48	1	1	J 12	J 12	12	*e*	[*e*]
Unknown-19.51	1	1	J 4.0	J 4.0	4.0	*e*	[*e*]
Unknown-20.15	1	1	J 400	J 400	400	*e*	[*e*]
Unknown-20.68	1	1	J 970	J 970	970	*e*	[*e*]
Unknown-21.79	1	1	J 5.0	J 5.0	5.0	*e*	[*e*]
Unknown-22.33	1	1	J 1.0	J 1.0	1.0	*e*	[*e*]
Unknown-22.37	1	1	J 1.0	J 1.0	1.0	*e*	[*e*]
Unknown-22.7	1	1	J 0	J 0	0	*e*	[*e*]
Unknown-23.79	1	1	J 5.0	J 5.0	5.0	*e*	[*e*]
Unknown-25.31	1	1	J 6.0	J 6.0	6.0	*e*	[*e*]
Unknown-4.35	1	1	J 6.0	J 6.0	6.0	*e*	[*e*]
Unknown-6.38	1	1	J 13	J 13	13	*e*	[*e*]
Unknown-7.46	1	1	J 16	J 16	16	*e*	[*e*]
Unknown-8.05	1	1	J 10	J 10	10	*e*	[*e*]
Unknown-8.07	1	1	J 9.0	J 9.0	9.0	*e*	[*e*]
Volatile organics unfiltered (μg/L)							
1,1-Dichloroethene	4	22	24	8.0	14*	7.0	4[2]
1,2-Dichloroethane	2	22	J 5.0	J 4.0	4.5*	5.0	0[2]
1,2-Dichloroethene	4	22	E 1,100	36	530*	*e*	[*e*]
Acetone	4	22	JB 7.0	JB 3.0	4.8*	*e*	[*e*]
Benzene	3	22	J 2.0	J 1.0	1.7*	5.0	0[2]
Carbon disulfide	6	22	7.0	JB 1.0	4.5*	*e*	[*e*]
Chlorobenzene	1	22	J 2.0	J 2.0	2.0	*e*	[*e*]
Styrene	3	22	J 1.0	J 1.0	1.0	*e*	[*e*]
Toluene	1	22	J 2.0	J 2.0	2.0	*e*	[*e*]
Trichloroethene	4	22	170	52	120*	5.0	4[2]
Vinyl chloride	5	22	Y 1,400	J 5.0	430	2.0	22[2]
Xylene, total	1	22	J 1.0	J 1.0	1.0	*e*	[*e*]

Table 5.18 (WAG 4 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	8	8	3.3	1.8	2.3*	250	0[3]
Fluoride	6	8	1.2	0.20	0.47*	4.0	0[2]
Sulfate as SO_4	8	8	65	9.5	26*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	8	8	0.34	0.040	0.19*	*e*	[*e*]
Dissolved oxygen (ppm)	8	8	9.6	0.90	5.1*	*e*	[*e*]
Redox (mV)	8	8	190	16	120*	*e*	[*e*]
Temperature (°C)	8	8	16	14	15*	30	0[1]
Turbidity (JTU)	8	8	850	88	330*	1.0	8[2]
pH (standard units)	8	8	7.7	6.2	7.0*	(6.5, 8.5)	3[3]
Metals, filtered (mg/L)							
Aluminum	4	8	0.19	0.067	0.12*	0.20	0[3]
Barium	8	8	0.28	0.032	0.17*	2.0	0[2]
Calcium	8	8	67	13	37*	*e*	[*e*]
Chromium	8	8	0.016	0.0058	0.010*	0.050	0[1]
Copper	1	8	0.012	0.012	0.012	1.0	0[1]
Iron	6	8	10	0.13	6.1*	0.30	5[3]
Magnesium	8	8	15	7.2	11*	*e*	[*e*]
Manganese	8	8	3.8	0.50	1.9*	0.050	8[3]
Nickel	4	8	0.0066	0.0051	0.0057*	0.10	0[1]
Phosphorus	2	4	0.78	0.65	0.72*	*e*	[*e*]
Potassium	8	8	7.2	1.5	3.7*	*e*	[*e*]
Silicon	8	8	19	12	15*	*e*	[*e*]
Sodium	8	8	22	6.8	12*	*e*	[*e*]
Strontium	4	4	0.59	0.027	0.21	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	6	8	6.0	0.14	1.7	0.20	3[3]
Barium	8	8	0.31	0.055	0.20*	2.0	0[2]
Calcium	8	8	69	13	37*	*e*	[*e*]
Chromium	7	8	0.034	0.0046	0.014*	0.050	0[1]
Cobalt	5	8	0.0061	0.0045	0.0051*	*e*	[*e*]
Copper	1	8	0.014	0.014	0.014	1.0	0[1]
Iron	8	8	13	0.41	7.4*	0.30	8[3]
Magnesium	8	8	15	6.2	11*	*e*	[*e*]
Manganese	8	8	4.3	0.48	2.1*	0.050	8[3]
Nickel	2	8	0.0090	0.0083	0.0087*	0.10	0[1]

Table 5.18 (WAG 4 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 (continued)							
Phosphorus	3	4	0.70	0.30	0.53*	*e*	[*e*]
Potassium	8	8	5.9	1.2	3.3*	*e*	[*e*]
Silicon	8	8	20	13	16*	*e*	[*e*]
Sodium	8	8	20	6.3	11*	*e*	[*e*]
Strontium	4	4	0.55	0.029	0.20	*e*	[*e*]
Titanium	2	4	0.059	0.025	0.042	*e*	[*e*]
Vanadium	3	8	0.0098	0.0032	0.0054	*e*	[*e*]
Zinc	3	8	0.025	0.0078	0.014	5.0	0[1]
Others, filtered (mg/L)							
Alkalinity	8	8	210	69	140*	*e*	[*e*]
Solids, total dissolved	8	8	310	120	200*	500	0[1]
Others, unfiltered (mg/L)							
Alkalinity	8	8	210	64	140*	*e*	[*e*]
Carbon, total organic	2	8	0.60	0.53	0.56*	*e*	[*e*]
Solids, total suspended	6	8	260	6.0	75	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{60}Co	1	8	41	41	41	200	0[4]
^{137}Cs	1	8	3.0	3.0	3.0	120	0[4]
Gross alpha	3	8	8.6	3.2	5.2*	15	0[2]
Gross beta	5	8	46	8.9	18*	50	0[2]
^{3}H	1	8	27,000	27,000	27,000	20,000	1[2]
$^{89}Sr + ^{90}Sr$	2	8	5.4	3.5	4.5	8.0	0[2]
Radionuclides,[f] unfiltered (pCi/L)							
^{137}Cs	2	8	6.2	2.7	4.5	120	0[4]
Gross alpha	7	8	8.1	1.1	3.7*	15	0[2]
Gross beta	6	8	13	5.1	10*	50	0[2]
^{3}H	2	8	25,000	1,400	13,000	20,000	1[2]
$^{89}Sr + ^{90}Sr$	4	8	8.6	3.0	5.7*	8.0	2[2]
Tentatively identified compounds, unfiltered (μg/L)							
Unknown-25.37	1	1	J 9.0	J 9.0	9.0	*e*	[*e*]
Unknown-25.38	1	1	J 6.0	J 6.0	6.0	*e*	[*e*]
Unknown-30.15	1	1	J 7.0	J 7.0	7.0	*e*	[*e*]
Unknown 4.39	1	1	J 11	J 11	11	*e*	[*e*]

Table 5.18 (WAG 4 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 (continued)							
Volatile organics, unfiltered (μg/L)							
Acetone	2	8	JB 5.0	JB 4.0	4.5*	*e*	[*e*]
Styrene	1	8	J 1.0	J 1.0	1.0	*e*	[*e*]

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

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

[c]If a reference limit exists, the source is enclosed in brackets and 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 Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[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 5.19. Constituents in Waste Area Grouping (WAG) 5 groundwater at ORNL, June 27–July 26, 1991

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	41	0.95	13*	250	0[3]
Fluoride	13	20	2.4	0.10	0.41*	4.0	0[2]
Nitrate	1	20	1.8	1.8	1.8	10	0[2]
Sulfate (as SO_4)	19	20	390	3.0	53*	250	2[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	20	20	0.63	0.22	0.42*	*e*	[*e*]
Dissolved oxygen (ppm)	20	20	9.0	0.20	3.9*	*e*	[*e*]
Redox (mV)	20	20	190	−16	140*	*e*	[*e*]
Temperature (°C)	20	20	18	14	15*	30	0[1]
Turbidity (JTU)	20	20	480	82	180*	1.0	20[2]
pH (standard units)	20	20	8.5	6.2	6.9*	(6.5, 8.5)	3[3]
Metals, filtered (mg/L)							
Aluminum	20	20	0.17	0.052	0.11*	0.20	0[3]
Barium	20	20	0.95	0.014	0.29*	2.0	0[2]
Beryllium	1	20	0.0011	0.0011	0.0011	*e*	[*e*]
Boron	6	20	1.9	0.091	0.53	*e*	[*e*]
Calcium	20	20	180	3.4	96*	*e*	[*e*]
Chromium	18	20	0.013	0.0046	0.0085*	0.050	0[1]
Cobalt	1	20	0.0052	0.0052	0.0052	*e*	[*e*]
Copper	11	20	0.023	0.0075	0.011*	1.0	0[1]
Iron	11	20	1.5	0.071	0.73*	0.30	7[3]
Magnesium	20	20	45	1.4	20*	*e*	[*e*]
Manganese	19	20	1.3	0.0041	0.28*	0.050	12[3]
Nickel	9	20	0.028	0.0040	0.012*	0.10	0[1]
Potassium	20	20	11	1.7	4.0*	*e*	[*e*]
Silicon	20	20	14	2.3	8.7*	*e*	[*e*]
Sodium	20	20	140	7.0	26*	*e*	[*e*]
Strontium	1	1	0.19	0.19	0.19	*e*	[*e*]
Vanadium	4	20	0.0080	0.0021	0.0043*	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	19	20	2.8	0.054	0.54*	0.20	9[3]
Barium	20	20	0.87	0.017	0.28*	2.0	0[2]
Beryllium	1	20	0.0010	0.0010	0.0010	*e*	[*e*]
Boron	5	20	1.7	0.17	0.57	*e*	[*e*]
Calcium	20	20	190	4.3	98*	*e*	[*e*]
Chromium	14	20	0.011	0.0041	0.0074*	0.050	0[1]
Cobalt	2	20	0.0079	0.0053	0.0066	*e*	[*e*]
Copper	2	20	0.018	0.013	0.016	1.0	0[1]

Table 5.19 (WAG 5 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]		
Downgradient wells (continued)							
Iron	20	20	2.7	0.058	0.91*	0.30	13[3]
Magnesium	20	20	45	1.9	19*	*e*	[*e*]
Manganese	20	20	1.3	0.0045	0.26*	0.050	13[3]
Nickel	12	20	0.030	0.0043	0.013*	0.10	0[1]
Potassium	20	20	9.1	0.86	2.8*	*e*	[*e*]
Silicon	20	20	13	2.3	8.7*	*e*	[*e*]
Sodium	19	20	130	7.0	24*	*e*	[*e*]
Strontium	1	1	0.20	0.20	0.20	*e*	[*e*]
Vanadium	2	20	0.0064	0.0033	0.0048	*e*	[*e*]
Zinc	2	20	0.014	0.0088	0.011	5.0	0[1]
Others, filtered (mg/L)							
Alkalinity	20	20	550	110	300*	*e*	[*e*]
Solids, total dissolved	20	20	760	210	420*	500	6[1]
Others, unfiltered (mg/L)							
Alkalinity	20	20	560	110	310*	*e*	[*e*]
Carbon, total organic	17	20	4.2	0.39	1.4*	*e*	[*e*]
Halides, total organic	10	20	120	3.8	31*	*e*	[*e*]
Phenolics, total recoverable	1	20	0.011	0.011	0.011	*e*	[*e*]
Solids, total suspended	9	20	53	11	29*	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{60}Co	6	20	78	24	45*	200	0[4]
^{137}Cs	2	20	54	43	49*	120	0[4]
Gross alpha	7	20	150	2.1	32	15	3[2]
Gross beta	14	20	1,200	4.3	140	50	5[2]
^{3}H	16	20	260,000,000	1,100	24,000,000	20,000	12[2]
$^{89}Sr + ^{90}Sr$	12	20	540	2.1	73	8.0	6[2]
Radionuclides,[f] unfiltered (pCi/L)							
^{60}Co	3	20	70	38	50*	200	0[4]
Gross alpha	8	20	150	2.0	28	15	2[2]
Gross beta	16	20	1,000	3.0	130*	50	5[2]
^{3}H	16	20	260,000,000	1,200	23,000,000	20,000	12[2]
$^{89}Sr + ^{90}Sr$	9	20	510	2.7	110*	8.0	7[2]
Tentatively identified compounds, unfiltered (μg/L)							
Methane,dichlorofluoro-6.89	1	1	J 8.0	J 8.0	8.0	*e*	[*e*]
Propane,2,2'-oxybis-19.46	1	1	J 7.0	J 7.0	7.0	*e*	[*e*]
Unknown-11.1	1	1	J 10	J 10	10	*e*	[*e*]

Table 5.19 (WAG 5 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]		
Downgradient wells (continued)							
Volatile organics, unfiltered (µg/L)							
1,1-Dichloroethane	5	20	J 5.0	J 1.0	2.6*	*e*	[*e*]
1,1-Dichloroethene	1	20	6.0	6.0	6.0	7.0	0[2]
1,2-Dichloroethane	1	20	J 1.0	J 1.0	1.0	5.0	0[2]
1,2-Dichloroethene	7	20	Y 2,600	J 2.0	390	*e*	[*e*]
Acetone	11	20	13	JB 5.0	7.0*	*e*	[*e*]
Benzene	1	20	29	29	29	5.0	1[2]
Carbon disulfide	14	20	75	JB 1.0	17*	*e*	[*e*]
Tetrachloroethene	1	20	J 2.0	J 2.0	2.0	*e*	[*e*]
Trichloroethene	4	20	40	J 3.0	20	5.0	2[2]
Vinyl chloride	4	20	Y 4,700	J 8.0	1,200	2.0	20[2]
Upgradient wells							
Anions, unfiltered (mg/L)							
Chloride	2	2	2.7	1.6	2.2	250	0[3]
Fluoride	2	2	0.40	0.10	0.25	4.0	0[2]
Sulfate (as SO_4)	2	2	19	7.2	13	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	2	2	0.29	0.24	0.27*	*e*	[*e*]
Dissolved oxygen (ppm)	2	2	5.5	4.8	5.2*	*e*	[*e*]
Redox (mV)	2	2	170	150	160*	*e*	[*e*]
Temperature (°C)	2	2	14	14	14*	30	0[1]
Turbidity (JTU)	2	2	230	210	220*	1.0	2[2]
pH (standard units)	2	2	7.0	6.5	6.8*	(6.5, 8.5)	0[3]
Metals, filtered (mg/L)							
Aluminum	2	2	0.14	0.14	0.14	0.20	0[3]
Barium	2	2	0.14	0.11	0.12*	2.0	0[2]
Calcium	2	2	69	68	68*	*e*	[*e*]
Chromium	1	2	0.0053	0.0053	0.0053	0.050	0[1]
Copper	1	2	0.011	0.011	0.011	1.0	0[1]
Magnesium	2	2	12	2.8	7.4	*e*	[*e*]
Manganese	2	2	0.018	0.0033	0.010	0.050	0[3]
Potassium	2	2	3.2	0.47	1.8	*e*	[*e*]
Silicon	2	2	12	7.1	9.8	*e*	[*e*]
Sodium	2	2	13	5.9	9.2	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	2	2	2.3	0.11	1.2	0.20	1[3]
Barium	2	2	0.13	0.13	0.13*	2.0	0[2]
Calcium	2	2	75	68	72*	*e*	[*e*]

Table 5.19 (WAG 5 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 (continued)							
Chromium	1	2	0.0076	0.0076	0.0076	0.050	0[1]
Cobalt	1	2	0.0044	0.0044	0.0044	*e*	[*e*]
Iron	1	2	1.6	1.6	1.6	0.30	1[3]
Magnesium	2	2	12	2.7	7.5	*e*	[*e*]
Manganese	2	2	0.066	0.0031	0.035	0.050	1[3]
Potassium	2	2	1.6	0.84	1.2	*e*	[*e*]
Silicon	2	2	11	11	11*	*e*	[*e*]
Sodium	2	2	9.7	6.4	8.1	*e*	[*e*]
Others, filtered (mg/L)							
Alkalinity	2	2	220	180	200*	*e*	[*e*]
Solids, total dissolved	2	2	1,100	240	650	500	1[1]
Others, unfiltered (mg/L)							
Alkalinity (mg/L)	2	2	220	180	200*	*e*	[*e*]
Carbon, total organic (mg/L)	1	2	0.60	0.60	0.60	*e*	[*e*]
Solids, total suspended (mg/L)	1	2	45	45	45	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{60}Co	1	2	46	46	46	200	0[4]
^{3}H	2	2	1,500	1,400	1,500*	20,000	0[2]
Radionuclides,[f] unfiltered (pCi/L)							
Gross alpha	2	2	2.2	1.9	2.0*	15	0[2]
^{3}H	2	2	1,900	1,300	1,600	20,000	0[2]
Volatile organics, unfiltered (μg/L)							
Acetone	2	2	JB 5.0	JB 4.0	4.5*	*e*	[*e*]

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

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

[c]If a reference limit exists, the source is enclosed in brackets and 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 Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[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 5.20. Constituents in Solid Waste Storage Area (SWSA) 6 groundwater at ORNL semi-annual assessment wells, February 14–March 1, September 4–October 14, and December 9–18, 1991

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][c]
			Max[a]	Min[a]	Av[b]		
Downgradient wells							
Field measurements, unfiltered							
Conductivity (mS/cm)	18	18	0.42	0.013	0.20*	*d*	[*d*]
Dissolved oxygen (ppm)	18	18	9.5	0.20	4.4*	*d*	[*d*]
Redox (mV)	18	18	280	160	210*	*d*	[*d*]
Temperature (°C)	18	18	21	12	16*	30	0[1]
Turbidity (JTU)	18	18	420	40	130*	1.0	18[2]
pH (standard units)	18	18	7.7	4.8	6.2*	(6.5, 8.5)	9[3]
Others, unfiltered							
Alkalinity (mg/L)	9	9	250	5.0	120*	*d*	[*d*]
Carbon, total organic (mg/L)	5	9	3.4	0.55	1.2*	*d*	[*d*]
Radionuclides, filtered (pCi/L)[e]							
^{60}Co	2	9	5.4	3.2	4.3	200	0[4]
Gross alpha	3	18	3.5	2.5	2.9*	15	0[2]
Gross beta	6	9	7.3	3.8	5.0*	50	0[2]
^{3}H	12	18	30,000	860	12,000*	20,000	0[2]
$^{89}Sr + {}^{90}Sr$	3	9	9.7	5.9	8.4*	8	0[2]
Volatile organics, unfiltered (µg/L)							
Carbon disulfide	1	9	8.0	8.0	8.0	*d*	[*d*]
Chloroform	1	9	J 2.0	J 2.0	2.0	100	0[2]
Methylene chloride	1	9	J 2.0	J 2.0	2.0	*d*	[*d*]
Tentatively identified compounds, unfiltered (µg/L)							
Ethane,1,1'-oxybis--12.82	1	1	J 300	J 300	300	*d*	[*d*]
Upgradient wells							
Field measurements, unfiltered							
Conductivity (mS/cm)	14	14	0.84	0.023	0.33*	*d*	[*d*]
Dissolved oxygen (ppm)	13	13	11	3.0	6.0*	*d*	[*d*]
Redox (mV)	14	14	280	17	190*	*d*	[*d*]
Temperature (°C)	14	14	16	12	14*	30	0[1]
Turbidity (JTU)	13	13	930	53	180*	1.0	13[2]
pH (standard units)	14	14	8.5	4.9	7.3*	(6.5, 8.5)	3[3]

Table 5.20 (SWSA 6 continued)

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][c]
			Max[a]	Min[a]	Av[b]		
Upgradient wells (continued)							
Others, unfiltered							
Alkalinity (mg/L)	7	7	430	7.5	210*	*d*	[*d*]
Carbon, total organic (mg/L)	3	7	1.1	U 0.73	0.90*	*d*	[*d*]
Halides, total organic (μg/L)	1	7	U 5.9	U 5.9	5.9	*d*	[*d*]
Radionuclides				filtered (pCi/L)[e]			
^{137}Cs	1	7	4.3	4.3	4.3	120	0[4]
Gross alpha	5	14	2.6	2.0	2.3*	15	0[2]
Gross beta	4	7	13	5.7	8.4*	50	0[2]
^{3}H	2	14	1,000	810	910*	20,000	0[2]

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

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

[c]If a reference limit exists, the source is enclosed in brackets and 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 (7-1-1990 edition) Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR (7-1-1990 edition) Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[d]Not applicable.

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

Table 5.21. Constituents in Solid Waste Area (SWSA) 6 groundwater at ORNL quarterly assessment wells, February 14–March 1, September 4–October 14, and December 9–18, 1991

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
Field measurements, unfiltered							
Conductivity (mS/cm)	30	30	0.83	0.10	0.48*	*d*	[*d*]
Dissolved oxygen (ppm)	30	30	12	0.010	4.8*	*d*	[*d*]
Redox (mV)	30	30	660	150	210*	*d*	[*d*]
Temperature (°C)	30	30	16	11	14*	30	0[1]
Turbidity (JTU)	30	30	760	6.3	150*	1.0	30[2]
pH (standard units)	30	30	8.3	5.9	7.3*	(6.5, 8.5)	1[3]
Others, unfiltered							
Alkalinity (mg/L)	30	30	480	30	290*	*d*	[*d*]
Radionuclides, filtered (pCi/L)[e]							
^{60}Co	12	30	970	4.3	340*	200	6[4]
^{137}Cs	1	30	3.2	3.2	3.2	120	0[4]
Gross alpha	12	30	26	1.4	4.8*	15	1[2]
^{3}H	28	30	2,100,000	490	360,000*	20,000	15[2]
$^{89}Sr + {}^{90}Sr$	14	30	54	1.9	13*	8	1[2]
Volatile organics, unfiltered (µg/L)							
1,1,1-Trichloroethane	1	30	J 1.0	J 1.0	1.0	200	0[2]
1,1-Dichloroethane	1	30	J 2.0	J 2.0	2.0	*d*	[*d*]
1,2-Dichloroethane	3	30	19	11	15*	5.0	3[2]
1,2-Dichloroethene	6	30	10	J 4.0	6.7*	*d*	[*d*]
4-Methyl-2-pentanone	1	30	J 5.0	J 5.0	5.0	*d*	[*d*]
Acetone	4	30	JB 5.0	JB 3.0	3.8*	*d*	[*d*]
Benzene	1	30	J 3.0	J 3.0	3.0	5.0	0[2]
Carbon disulfide	2	30	160	B 33	97	*d*	[*d*]
Carbon tetrachloride	3	30	65	40	52*	5.0	3[2]
Chloroform	4	30	60	J 2.0	40*	100	0[2]
Methylene chloride	1	30	J 2.0	J 2.0	2.0	*d*	[*d*]
Styrene	1	30	J 1.0	J 1.0	1.0	*d*	[*d*]
Trichloroethene	6	30	E 330	J 1.0	140*	5.0	4[2]

Table 5.21 (SWSA 6 continued)

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][d]
			Max[a]	Min[a]	Av[b]		
Tentatively identified compounds, unfiltered (μg/L)							
1,2,2-Trifluoro-chloro-7.83	1	1	J 12	J 12	12	*d*	[*d*]
1-Hexanol,2-ethyl-28.66	2	2	J 5.0	J 5.0	5.0	*d*	[*d*]
Ethane,1,1,2-trichloro-7.85	1	1	J 8.0	J 8.0	8.0	*d*	[*d*]
Methane,trichlorofluoro-6.9	1	1	J 7.0	J 7.0	7.0	*d*	[*d*]
Methane,trichlorofluoro-6.91	1	1	J 8.0	J 8.0	8.0	*d*	[*d*]
Methane,trichlorofluoro-6.94	1	1	J 8.0	J 8.0	8.0	*d*	[*d*]
Unknown-18.78	1	1	J 23	J 23	23	*d*	[*d*]
Unknown-22.87	1	1	J 160	J 160	160	*d*	[*d*]
Unknown-25.36	1	1	J 9.0	J 9.0	9.0	*d*	[*d*]
Unknown-25.37	2	2	J 8.0	J 7.0	7.5*	*d*	[*d*]
Unknown-26.64	1	1	J 200	J 200	200	*d*	[*d*]
Unknown-30.12	1	1	J 6.0	J 6.0	6.0	*d*	[*d*]
Unknown-30.13	2	2	J 8.0	J 6.0	7.0*	*d*	[*d*]

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

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

[c]If a reference limit exists, the source is enclosed in brackets and 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 (7-1-1990) Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR (7-1-1990) Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[d]Not applicable.

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

Table 5.22. Summary of constituents detected in Waste Area Grouping (WAG) 7 groundwater at ORNL, April 22–May 15, 1991

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][c]
			Max[a]	Min[a]	Av[b]		
			Downgradient wells				
Anions, unfiltered (mg/L)							
Chloride	12	14	25	1.0	7.3*	250	0[3]
Fluoride	8	14	7.0	0.10	1.5	4.0	1[2]
Nitrate	2	14	1,100	46	560	10	2[2]
Sulfate, as SO_4	14	14	570	8.8	140*	250	3[3]
Base neutral/acid extractable organics, unfiltered (µg/L)							
Phenol	5	14	B 38	B 13	26*	*d*	[*d*]
Unknown-39.78	1	1	J 13	J 13	13	*d*	[*d*]
Unknown-5.5	1	1	J 80	J 80	80	*d*	[*d*]
Unknown-5.51	1	1	B 51	B 51	51	*d*	[*d*]
Unknown-5.52	1	1	B 38	B 38	38	*d*	[*d*]
Unknown-5.54	1	1	B 39	B 39	39	*d*	[*d*]
Unknown-5.58	1	1	B 5.0	B 5.0	5.0	*d*	[*d*]
Unknownhydrocarbon-28.16	1	1	J 23	J 23	23	*d*	[*d*]
Field measurements, unfiltered							
Conductivity (mS/cm)	14	14	2.0	0.29	0.65*	*d*	[*d*]
Dissolved oxygen (ppm)	14	14	4.5	0.10	1.7*	*d*	[*d*]
Redox (mV)	14	14	920	11	220*	*d*	[*d*]
Temperature (°C)	14	14	15	13	14*	30	0[1]
Turbidity (JTU)	14	14	120	46	96*	1.0	14[2]
pH (standard units)	14	14	9.0	7.0	7.7*	(6.5, 8.5)	2[3]
Metals, filtered (mg/L)							
Aluminum	10	14	0.14	0.061	0.079*	0.20	0[3]
Antimony	2	14	0.012	0.0060	0.0090	*d*	[*d*]
Barium	14	14	0.22	0.0097	0.090*	2.0	0[2]
Boron	4	14	0.39	0.15	0.29*	*d*	[*d*]
Calcium	14	14	190	3.0	78*	*d*	[*d*]
Chromium	10	14	0.011	0.0042	0.0078*	0.050	0[1]
Cobalt	2	14	0.050	0.034	0.042	*d*	[*d*]
Iron	4	14	7.0	0.091	2.0	0.30	3[3]
Magnesium	14	14	83	0.74	19*	*d*	[*d*]
Manganese	14	14	1.3	0.0010	0.18*	0.050	4[3]
Nickel	10	14	0.38	0.0053	0.064	0.10	2[1]
Potassium	14	14	7.8	0.76	3.2*	*d*	[*d*]
Silicon	14	14	12	4.3	6.9*	*d*	[*d*]
Sodium	12	14	580	6.4	130*	*d*	[*d*]
Strontium	5	5	1.3	0.22	0.51*	*d*	[*d*]
Vanadium	4	14	0.0065	0.0032	0.0050*	*d*	[*d*]

Table 5.22 (WAG 7 continued)

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][c]
			Max[a]	Min[a]	Av[b]		
Downgradient wells (continued)							
Metals, unfiltered (mg/L)							
Aluminum	14	14	3.9	0.052	0.85*	0.20	8[3]
Barium	14	14	0.22	0.012	0.095*	2.0	0[2]
Beryllium	5	14	0.0012	0.00043	0.00072*	*d*	[*d*]
Boron	4	14	0.39	0.15	0.29*	*d*	[*d*]
Calcium	14	14	190	3.3	77*	*d*	[*d*]
Chromium	9	14	0.019	0.0040	0.0092*	0.050	0[1]
Cobalt	2	14	0.048	0.035	0.041*	*d*	[*d*]
Iron	14	14	8.3	0.076	1.4*	0.30	7[3]
Magnesium	14	14	78	0.75	19*	*d*	[*d*]
Manganese	14	14	1.3	0.0034	0.19*	0.050	6[3]
Nickel	8	14	0.37	0.0070	0.083	0.10	2[1]
Potassium	14	14	7.6	0.68	2.8*	*d*	[*d*]
Silicon	14	14	14	4.2	8.0*	*d*	[*d*]
Sodium	12	14	550	7.2	130*	*d*	[*d*]
Strontium	8	8	2.4	0.031	0.63*	*d*	[*d*]
Titanium	1	8	0.034	0.034	0.034	*d*	[*d*]
Vanadium	6	14	0.0079	0.0029	0.0051*	*d*	[*d*]
Zinc	3	14	0.026	0.0054	0.013	5.0	0[1]
Others, filtered (mg/L)							
Alkalinity	14	14	590	15	290*	*d*	[*d*]
Solids, total dissolved	14	14	2,200	260	650*	500	6[1]
Others, unfiltered (mg/L)							
Alkalinity	14	14	590	15	280*	*d*	[*d*]
Carbon, total organic	13	14	2.4	0.50	1.0*	*d*	[*d*]
Halides, total organic	13	14	41	3.3	22*	*d*	[*d*]
Solids, total suspended	7	14	210	11	62*	*d*	[*d*]
Radionuclides, filtered (pCi/L)[e]							
^{60}Co	5	14	680	46	200	200	1[4]
Gross alpha	6	14	43	1.6	10	15	1[2]
Gross beta	11	14	4,100	5.4	450	50	4[2]
^{3}H	10	14	1,100,000	1,300	180,000	20,000	4[2]
$^{89}Sr + {}^{90}Sr$	5	14	5.1	2.7	3.8*	8.0	0[2]

Table 5.22 (WAG 7 continued)

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][c]
			Max[a]	Min[a]	Av[b]		
Downgradient wells (continued)							
Radionuclides, unfiltered (pCi/L)[e]							
^{60}Co	3	14	760	43	320	200	1[4]
Gross alpha	7	14	41	3.2	10*	15	1[2]
Gross beta	13	14	3,800	3.2	360	50	5[2]
^{3}H	10	14	1,000,000	1,500	170,000	20,000	4[2]
$^{89}Sr + ^{90}Sr$	4	14	7.0	3.2	4.9*	8.0	0[2]
Upgradient wells							
Anions, unfiltered (mg/L)							
Chloride	2	2	3.6	0.92	2.3	250	0[3]
Fluoride	1	2	0.20	0.20	0.20	4.0	0[2]
Sulfate, as SO_4	2	2	100	8.5	55	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	2	2	0.37	0.090	0.23	*d*	[*d*]
Dissolved oxygen (ppm)	2	2	6.1	2.4	4.3	*d*	[*d*]
Redox (mV)	2	2	200	170	190*	*d*	[*d*]
Temperature (°C)	2	2	14	14	14*	30	0[1]
Turbidity (JTU)	2	2	120	69	96	1.0	2[2]
pH (standard units)	2	2	7.8	5.8	6.8*	(6.5, 8.5)	1[3]
Metals, filtered (mg/L)							
Aluminum	1	2	0.052	0.052	0.052	0.20	0[3]
Antimony	1	2	0.028	0.028	0.028	*d*	[*d*]
Barium	2	2	0.059	0.030	0.045	2.0	0[2]
Calcium	2	2	29	2.0	15	*d*	[*d*]
Magnesium	2	2	6.5	3.0	4.8	*d*	[*d*]
Manganese	2	2	0.33	0.066	0.20	0.050	2[3]
Nickel	1	2	0.014	0.014	0.014	0.10	0[1]
Potassium	2	2	6.6	0.87	3.7	*d*	[*d*]
Silicon	2	2	11	11	11*	*d*	[*d*]
Sodium	1	2	110	110	110	*d*	[*d*]
Strontium	2	2	0.71	0.015	0.36	*d*	[*d*]
Tin	1	2	0.050	0.050	0.050	*d*	[*d*]
Metals, unfiltered (mg/L)							
Aluminum	2	2	2.1	0.14	1.1	0.20	1[3]
Barium	2	2	0.085	0.030	0.058	2.0	0[2]
Beryllium	2	2	0.00042	0.00038	0.00040*	*d*	[*d*]
Boron	1	2	0.097	0.097	0.097	*d*	[*d*]
Calcium	2	2	27	2.1	15	*d*	[*d*]

Table 5.22 (WAG 7 continued)

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][c]
			Max[a]	Min[a]	Av[b]		
Upgradient wells (continued)							
Chromium	1	2	0.0053	0.0053	0.0053	0.050	0[1]
Cobalt	1	2	0.0078	0.0078	0.0078	*d*	[*d*]
Iron	2	2	2.3	0.088	1.2	0.30	1[3]
Magnesium	2	2	6.5	3.2	4.9	*d*	[*d*]
Manganese	2	2	0.32	0.083	0.20	0.050	2[3]
Nickel	1	2	0.014	0.014	0.014	0.10	0[1]
Potassium	2	2	4.8	1.4	3.1	*d*	[*d*]
Silicon	2	2	12	11	11*	*d*	[*d*]
Sodium	1	2	110	110	110	*d*	[*d*]
Strontium	2	2	0.68	0.017	0.35	*d*	[*d*]
Titanium	1	2	0.023	0.023	0.023	*d*	[*d*]
Vanadium	2	2	0.0044	0.0034	0.0039*	*d*	[*d*]
Others, filtered (mg/L)							
Alkalinity	2	2	210	13	110	*d*	[*d*]
Solids, total dissolved	2	2	370	55	210	500	0[1]
Others, unfiltered (mg/L)							
Alkalinity	2	2	210	11	110	*d*	[*d*]
Halides, total organic	2	2	25	16	20	*d*	[*d*]
Solids, total suspended	1	2	120	120	120	*d*	[*d*]
Radionuclides, filtered (pCi/L)[e]							
^{60}Co	1	2	38	38	38	200	0[4]
Gross alpha	1	2	2.1	2.1	2.1	15	0[2]
Gross beta	2	2	8.9	5.1	7.0	50	0[2]
^{3}H	1	2	1,000	1,000	1,000	20,000	0[2]
Radionuclides, unfiltered (pCi/L)[e]							
^{60}Co	1	2	41	41	41	200	0[4]
Gross alpha	1	2	3.2	3.2	3.2	15	0[2]
Gross beta	2	2	8.4	5.7	7.0	50	0[2]

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

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

[c]If a reference limit exists, the source is enclosed in brackets and 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 (7-1-1990) Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR (7-1-1990) Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[d]Not applicable.

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

Table 5.23. Constituents in Waste Area Groupings (WAGs) 8 and 9 groundwater at ORNL, May 22–June 3, 1991

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)							
Bromide	1	9	4.6	4.6	4.6	*e*	[*e*]
Chloride	9	9	12	3.5	6.2*	250	0[3]
Fluoride	8	9	1.4	0.20	0.40*	4.0	0[2]
Nitrate	2	9	4.6	1.5	3.1	10	0[2]
Sulfate (as SO_4)	9	9	270	9.1	59*	250	1[3]
Base neutral/acid extractable organics, unfiltered (μg/L)							
Phenol	9	9	B 13	JB 9.0	11*	*e*	[*e*]
Field Measurements, unfiltered							
Conductivity (mS/cm)	9	9	0.62	0.16	0.35*	*e*	[*e*]
Dissolved oxygen (ppm)	9	9	12	2.9	5.8*	*e*	[*e*]
Redox (mV)	9	9	190	90	160*	*e*	[*e*]
Temperature (°C)	9	9	17	14	15*	31	0[1]
Turbidity (JTU)	9	9	220	130	200*	1.0	9[2]
pH (standard units)	9	9	8.9	6.0	7.0*	(6.5, 8.5)	3[3]
Metals, filtered (mg/L)							
Aluminum	8	9	0.27	0.053	0.094*	0.20	1[3]
Barium	9	9	0.20	0.028	0.10*	2.0	0[2]
Boron	3	9	0.57	0.12	0.30	*e*	[*e*]
Calcium	9	9	120	1.3	51*	*e*	[*e*]
Chromium	6	9	0.010	0.0041	0.0073*	0.050	0[1]
Cobalt	1	9	0.018	0.018	0.018	*e*	[*e*]
Iron	8	9	26	0.056	3.9	0.30	3[3]
Magnesium	9	9	25	0.17	14*	*e*	[*e*]
Manganese	9	9	3.4	0.0010	0.76*	0.050	6[3]
Nickel	8	9	0.013	0.0043	0.0080*	0.10	0[1]
Potassium	9	9	4.5	1.7	2.7*	*e*	[*e*]
Silicon	9	9	16	2.4	7.5*	*e*	[*e*]
Sodium	8	9	160	5.9	48*	*e*	[*e*]
Strontium	1	1	0.16	0.16	0.16	*e*	[*e*]
Vanadium	3	9	0.0038	0.0021	0.0028*	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	8	9	3.5	0.050	0.71	0.20	3[3]
Barium	9	9	0.19	0.026	0.11*	2.0	0[2]
Boron	3	9	0.57	0.11	0.29	*e*	[*e*]
Calcium	9	9	110	1.3	48*	*e*	[*e*]
Chromium	5	9	0.014	0.0048	0.0089*	0.050	0[1]
Cobalt	1	9	0.017	0.017	0.017	*e*	[*e*]
Iron	9	9	25	0.054	4.3	0.30	5[3]
Magnesium	9	9	22	0.14	13*	*e*	[*e*]
Manganese	9	9	3.8	0.0074	0.80*	0.050	6[3]
Nickel	3	9	0.0066	0.0043	0.0055*	0.10	0[1]
Potassium	9	9	4.7	1.5	2.7*	*e*	[*e*]
Silicon	9	9	20	2.8	8.1*	*e*	[*e*]
Sodium	8	9	160	5.9	46*	*e*	[*e*]
Vanadium	3	9	0.0052	0.0024	0.0041*	*e*	[*e*]
Zinc	1	9	0.0059	0.0059	0.0059	5.0	0[1]

Table 5.23 (WAGs 8 and 9 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]		
Downgradient wells (continued)							
Others, filtered							
Alkalinity (mg/L)	9	9	340	100	190*	*e*	[*e*]
Solids, total dissolved (mg/L)	8	9	610	140	330*	500	2[1]
Others, unfiltered							
Alkalinity (mg/L)	9	9	340	100	190*	*e*	[*e*]
Carbon, total organic (mg/L)	6	9	1.8	0.50	0.87*	*e*	[*e*]
Halides, total organic (μg/L)	3	9	12	2.7	6.2	*e*	[*e*]
Solids, total suspended (mg/L)	4	9	62	12	38*	*e*	[*e*]
Radionuclides[f], filtered (pCi/L)							
^{60}Co	1	9	41	41	41	200	0[4]
Gross alpha	4	9	7.0	1.4	4.1*	15	0[2]
Gross beta	8	9	1,300	4.1	440*	50	3[2]
^{3}H	4	9	68,000	650	18,000	20,000	1[2]
$^{89}Sr + ^{90}Sr$	5	9	810	7.8	420*	8.0	4[2]
Radionuclides[f], unfiltered (pCi/L)							
^{137}Cs	1	9	59	59	59	120	0[4]
Gross alpha	5	9	9.5	2.2	4.1*	15	0[2]
Gross beta	8	9	1,300	3.8	440*	50	3[2]
^{3}H	4	9	68,000	680	18,000	20,000	1[2]
$^{89}Sr + ^{90}Sr$	4	9	700	6.2	510*	8.0	3[2]
Tentatively identified compounds, unfiltered (μg/L)							
Ethanethiol-8.02	1	1	J 11	J 11	11	*e*	[*e*]
Ethanethiol-8.04	1	1	J 6.0	J 6.0	6.0	*e*	[*e*]
Methanethiol-3.56	1	1	J 18	J 18	18	*e*	[*e*]
Methanethiol-3.58	1	1	J 26	J 26	26	*e*	[*e*]
Sulfur dioxide-2.81	1	1	J 190	J 190	190	*e*	[*e*]
Unknown-5.55	1	1	J 46	J 46	46	*e*	[*e*]
Unknown-5.58	1	1	J 65	J 65	65	*e*	[*e*]
Volatile organics, unfiltered (μg/L)							
1,2-Dichloroethene	1	9	5.0	5.0	5.0	*e*	[*e*]
Carbon disulfide	5	9	18	J 3.0	12*	*e*	[*e*]
Trichloroethene	1	9	6.0	6.0	6.0	5.0	1[2]
Upgradient wells							
Anions, unfiltered (mg/L)							
Chloride	2	2	5.1	3.2	4.2	250	0[3]
Fluoride	1	2	0.20	0.20	0.20	4.0	0[2]
Sulfate as SO_4	2	2	110	26	69	250	0[3]
Base neutral/acid extractable organics, unfiltered (μg/L)							
Phenol	2	2	B 16	B 11	14	*e*	[*e*]
Field measurements, unfiltered							
Conductivity (mS/cm)	2	2	0.34	0.31	0.33*	*e*	[*e*]
Dissolved oxygen (ppm)	2	2	5.1	4.0	4.6*	*e*	[*e*]
Redox (mV)	2	2	170	120	140*	*e*	[*e*]
Temperature (°C)	2	2	14	13	14*	31	0[1]
Turbidity (JTU)	2	2	210	190	200*	1.0	2[2]
pH (standard units)	2	2	8.1	6.4	7.3*	(6.5, 8.5)	1[3]

Table 5.23 (WAGs 8 and 9 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 (continued)							
Metals, filtered (mg/L)							
Aluminum	1	2	0.075	0.075	0.075	0.20	0[3]
Barium	2	2	0.10	0.032	0.067	2.0	0[2]
Boron	1	2	0.32	0.32	0.32	*e*	[*e*]
Calcium	2	2	52	19	36	*e*	[*e*]
Chromium	1	2	0.012	0.012	0.012	0.050	0[1]
Cobalt	1	2	0.0045	0.0045	0.0045	*e*	[*e*]
Iron	1	2	3.0	3.0	3.0	0.30	1[3]
Magnesium	2	2	23	4.3	13	*e*	[*e*]
Manganese	2	2	4.4	0.049	2.2	0.050	1[3]
Nickel	2	2	0.013	0.0068	0.0099	0.10	0[1]
Potassium	2	2	3.9	2.9	3.4*	*e*	[*e*]
Silicon	2	2	13	6.1	9.6	*e*	[*e*]
Sodium	2	2	67	10	39	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	1	2	0.97	0.97	0.97	0.20	1[3]
Barium	2	2	0.093	0.051	0.072	2.0	0[2]
Boron	1	2	0.31	0.31	0.31	*e*	[*e*]
Calcium	2	2	51	17	34	*e*	[*e*]
Chromium	1	2	0.011	0.011	0.011	0.050	0[1]
Iron	1	2	6.1	6.1	6.1	0.30	1[3]
Magnesium	2	2	22	4.0	13	*e*	[*e*]
Manganese	2	2	4.8	0.047	2.4	0.050	1[3]
Nickel	1	2	0.0082	0.0082	0.0082	0.10	0[1]
Potassium	2	2	3.7	3.0	3.4*	*e*	[*e*]
Silicon	2	2	14	6.0	10	*e*	[*e*]
Sodium	2	2	65	10	37	*e*	[*e*]
Others, filtered							
Alkalinity (mg/L)	2	2	170	110	140	*e*	[*e*]
Solids, total dissolved (mg/L)	2	2	330	240	280*	500	0[1]
Others, unfiltered							
Alkalinity (mg/L)	2	2	170	110	140	*e*	[*e*]
Halides, total organic (μg/L)	2	2	5.8	3.6	4.7	*e*	[*e*]
Solids, total suspended (mg/L)	1	2	33	33	33	*e*	[*e*]
Radionuclides[f], filtered (pCi/L)							
Gross alpha	2	2	3.2	1.9	2.6	15	0[2]
$^{89}Sr + ^{90}Sr$	2	2	9.5	7.8	8.6*	8.0	1[2]

Table 5.23 (WAGs 8 and 9 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 (continued)							
Radionuclides[f], unfiltered (pCi/L)							
^{60}Co	1	2	51	51	51	200	0[4]
Gross alpha	2	2	3.0	2.0	2.5	15	0[2]
Gross beta	1	2	4.3	4.3	4.3	50	0[2]
$^{89}Sr + ^{90}Sr$	2	2	9.2	3.2	6.2	8.0	1[2]

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

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

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

1. Rules of Tennessee Department of Environment and Conservation, Bureau of Environment, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, as amended.
2. 40 CFR Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[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 5.24. Constituents in Waste Area Grouping (WAG) 11 groundwater at ORNL, October 24–November 8, 1991

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	4	5	2.1	0.60	1.3*	250	0[3]
Fluoride	2	5	0.90	0.20	0.55	4.0	0[2]
Nitrate	3	5	1.7	1.0	1.5*	10	0[2]
Sulfate (as SO_4)	5	5	15	2.3	5.8*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	5	5	0.25	0.20	0.22*	*e*	[*e*]
Dissolved oxygen (ppm)	5	5	9.9	4.9	7.6*	*e*	[*e*]
Redox (mV)	5	5	210	180	200*	*e*	[*e*]
Temperature (°C)	5	5	13	12	12*	30	0[1]
Turbidity (JTU)	5	5	620	280	440*	1.0	5[2]
pH (standard units)	5	5	9.0	7.5	8.0*	(6.5, 8.5)	1[3]
Metals, filtered (mg/L)							
Aluminum	5	5	0.092	0.058	0.074*	0.20	0[3]
Barium	5	5	0.12	0.019	0.059*	2.0	0[2]
Calcium	5	5	66	13	42*	*e*	[*e*]
Chromium	3	5	0.014	0.0073	0.0096*	0.050	0[1]
Copper	4	5	0.012	0.0075	0.0092*	1.0	0[1]
Magnesium	5	5	20	1.8	12*	*e*	[*e*]
Manganese	4	5	0.0065	0.0010	0.0026	0.050	0[3]
Potassium	5	5	9.1	0.86	4.2*	*e*	[*e*]
Silicon	5	5	9.2	2.5	5.5*	*e*	[*e*]
Sodium	1	5	13	13	13	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	5	5	55	0.091	11	0.20	3[3]
Barium	5	5	0.26	0.024	0.12*	2.0	0[2]
Beryllium	1	5	0.0061	0.0061	0.0061	*e*	[*e*]
Cadmium	1	5	0.011	0.011	0.011	0.010	1[1]
Calcium	5	5	71	14	45*	*e*	[*e*]
Chromium	4	5	0.078	0.0084	0.030	0.050	1[1]
Cobalt	1	5	0.026	0.026	0.026	*e*	[*e*]
Copper	1	5	0.056	0.056	0.056	1.0	0[1]
Iron	5	5	89	0.090	18	0.30	2[3]
Magnesium	5	5	20	4.2	14*	*e*	[*e*]
Manganese	5	5	1.8	0.0019	0.39	0.050	2[3]
Mercury	1	5	0.00030	0.00030	0.00030	0.00020	1[1]
Nickel	2	5	0.092	0.0041	0.048	0.10	0[1]
Potassium	5	5	13	1.6	5.3*	*e*	[*e*]

Table 5.24 (WAG 11 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]		
Downgradient wells (continued)							
Silicon	5	5	57	5.2	17	*e*	[*e*]
Sodium	1	5	9.4	9.4	9.4	*e*	[*e*]
Vanadium	2	5	0.082	0.0027	0.042	*e*	[*e*]
Zinc	5	5	0.24	0.0053	0.054	5.0	0[1]
Others, filtered (mg/L)							
Alkalinity	5	5	200	55	140*	*e*	[*e*]
Solids, total dissolved	5	5	220	100	170*	500	0[1]
Others, unfiltered (mg/L)							
Alkalinity	5	5	200	55	140*	*e*	[*e*]
Halides, total organic	3	5	99	54	69*	*e*	[*e*]
Solids, total suspended	3	5	1,400	13	490	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
Gross alpha	5	5	11	3.8	6.9*	15	0[2]
Gross beta	5	5	27	6.8	14*	50	0[2]
^{3}H	1	5	59,000	59,000	59,000	20,000	1[2]
$^{89}Sr + {}^{90}Sr$	1	5	5.1	5.1	5.1	8.0	0[2]
Radionuclides[f] unfiltered (pCi/L)							
Gross alpha	4	5	21	4.1	9.9*	15	1[2]
Gross beta	5	5	41	7.8	19*	50	0[2]
^{3}H	2	5	43,000	2,400	23,000	20,000	1[2]
Tentatively identified compounds, unfiltered (μg/L)							
1,1,2-Trichloro-1,2,2-trifluoro-ethane-7.81	1	1	J 11	J 11	11	*e*	[*e*]
Benzene,1,2,4-trimethyl–28.27	1	1	J 8.0	J 8.0	8.0	*e*	[*e*]
Unknown-25.36	1	1	J 14	J 14	14	*e*	[*e*]
Unknown-30.13	1	1	J 16	J 16	16	*e*	[*e*]
Volatile organics, unfiltered (μg/L)							
2-Butanone	1	5	JB 7.0	JB 7.0	7.0	*e*	[*e*]
2-Hexanone	1	5	J 3.0	J 3.0	3.0	*e*	[*e*]
4-Methyl-2-pentanone	2	5	J 2.0	J 1.0	1.5	*e*	[*e*]
Acetone	2	5	JB 9.0	JB 5.0	7.0	*e*	[*e*]
Trichloroethene	2	5	32	15	24	5.0	2[2]

Table 5.24 (WAG 11 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	6	6	1.6	0.80	1.1*	250	0[3]
Fluoride	4	6	0.60	0.10	0.35*	4.0	0[2]
Nitrate	3	6	4.6	1.0	2.2	10	0[2]
Phosphate	1	6	1.5	1.5	1.5	*e*	[*e*]
Sulfate (as SO_4)	6	6	3.6	2.0	2.9*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	6	6	0.36	0.26	0.30*	*e*	[*e*]
Dissolved oxygen (ppm)	6	6	10	4.3	6.3*	*e*	[*e*]
Redox (mV)	6	6	190	170	180*	*e*	[*e*]
Temperature (°C)	6	6	16	13	14*	30	0[1]
Turbidity (JTU)	6	6	500	320	400*	1.0	6[2]
pH (standard units)	6	6	7.9	7.3	7.6*	(6.5, 8.5)	0[3]
Metals, filtered (mg/L)							
Aluminum	5	6	0.11	0.057	0.093*	0.20	0[3]
Barium	6	6	0.21	0.020	0.092*	2.0	0[2]
Calcium	6	6	76	25	56*	*e*	[*e*]
Chromium	3	6	0.014	0.0064	0.0094*	0.050	0[1]
Copper	3	6	0.040	0.014	0.025*	1.0	0[1]
Iron	2	6	0.38	0.26	0.32	0.30	1[3]
Magnesium	6	6	18	2.2	11*	*e*	[*e*]
Manganese	5	6	0.42	0.0010	0.16	0.050	2[3]
Potassium	6	6	6.4	2.8	4.8*	*e*	[*e*]
Silicon	6	6	10	6.7	7.7*	*e*	[*e*]
Sodium	2	6	8.9	5.0	6.9	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	6	6	0.57	0.052	0.21*	0.20	2[3]
Barium	6	6	0.20	0.023	0.091*	2.0	0[2]
Calcium	6	6	76	28	56*	*e*	[*e*]
Chromium	5	6	0.0098	0.0043	0.0062*	0.050	0[1]
Iron	5	6	0.60	0.079	0.33*	0.30	3[3]
Magnesium	6	6	17	2.2	11*	*e*	[*e*]
Manganese	6	6	0.37	0.0011	0.12	0.050	2[3]
Potassium	6	6	3.7	1.9	2.8*	*e*	[*e*]
Silicon	6	6	10	6.4	7.6*	*e*	[*e*]
Zinc	5	6	0.016	0.0059	0.010*	5.0	0[1]

Table 5.24 (WAG 11 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 (continued)							
Others, filtered (mg/L)							
Alkalinity	6	6	260	120	180*	*e*	[*e*]
Solids, total dissolved	6	6	270	27	160*	500	0[1]
Others, unfiltered (mg/L)							
Alkalinity	6	6	250	120	180*	*e*	[*e*]
Carbon, total organic	2	6	0.83	0.65	0.74*	*e*	[*e*]
Phenolics, total recoverable	1	6	0.0060	0.0060	0.0060	*e*	[*e*]
Solids, total suspended	2	6	8.0	7.0	7.5*	*e*	[*e*]
Radionuclides,[f] filtered (pCi/L)							
^{60}Co	1	6	49	49	49	200	0[4]
Gross alpha	5	6	7.0	2.0	4.2*	15	0[2]
Gross beta	6	6	18	4.6	8.4*	50	0[2]
^{3}H	2	6	1,300	1,200	1,200*	20,000	0[2]
$^{89}Sr + ^{90}Sr$	3	6	11	3.0	6.1	8.0	1[2]
Radionuclides,[f] unfiltered (pCi/L)							
Gross alpha	5	6	13	1.4	4.4	15	0[2]
Gross beta	6	6	5.9	4.1	5.1*	50	0[2]
$^{89}Sr + ^{90}Sr$	1	6	4.1	4.1	4.1	8.0	0[2]
Tentatively identified compounds, unfiltered (μg/L)							
2-Fluorophenol-7.82	1	1	J 34	J 34	34	*e*	[*e*]
Unknown-27.9	1	1	J 5.0	J 5.0	5.0	*e*	[*e*]
Unknown-4.39	2	2	J 8.0	J 7.0	7.5*	*e*	[*e*]
Unknown-7.59	1	1	J 4.0	J 4.0	4.0	*e*	[*e*]
Unknown-7.61	3	3	J 5.0	J 4.0	4.7*	*e*	[*e*]
Volatile organics, unfiltered (μg/L)							
Methylene chloride	2	6	JB 2.0	JB 2.0	2.0	*e*	[*e*]

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

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

[c]If a reference limit exists, the source is enclosed in brackets and 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 Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[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 5.25. Constituents in Waste Area Grouping (WAG) 17 groundwater at ORNL, April 11–17, 1991

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	4	4	18	5.9	12*	250	0[3]
Fluoride	4	4	0.70	0.20	0.35*	4.0	0[2]
Nitrate	1	4	3.5	3.5	3.5	10	0[2]
Sulfate (as SO_4)	4	4	51	28	40*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	4	4	0.55	0.22	0.42*	*e*	[*e*]
Dissolved oxygen (ppm)	4	4	2.0	0.50	0.98*	*e*	[*e*]
Redox (mV)	4	4	200	110	160*	*e*	[*e*]
Temperature (°C)	4	4	18	14	15*	31	0[1]
Turbidity (JTU)	4	4	130	120	120*	1.0	4[2]
pH (standard units)	4	4	7.5	6.8	7.1*	(6.5, 8.5)	0[3]
Metals, filtered (mg/L)							
Aluminum	1	4	0.061	0.061	0.061	0.20	0[3]
Antimony	1	4	0.0060	0.0060	0.0060	*e*	[*e*]
Barium	4	4	0.18	0.021	0.096	2.0	0[2]
Calcium	4	4	120	57	100*	*e*	[*e*]
Chromium	3	4	0.011	0.0092	0.010*	0.050	0[1]
Iron	1	4	0.32	0.32	0.32	0.30	1[3]
Magnesium	4	4	39	8.1	25*	*e*	[*e*]
Manganese	4	4	0.16	0.0015	0.060	0.050	2[3]
Nickel	1	4	0.013	0.013	0.013	0.10	0[1]
Potassium	4	4	2.5	0.84	1.8*	*e*	[*e*]
Silicon	4	4	6.6	2.4	4.7*	*e*	[*e*]
Sodium	4	4	12	5.9	9.1*	*e*	[*e*]
Strontium	4	4	1.2	0.14	0.56*	*e*	[*e*]
Vanadium	1	4	0.0024	0.0024	0.0024	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	4	4	0.77	0.28	0.42*	0.20	4[3]
Barium	4	4	0.19	0.024	0.099	2.0	0[2]
Boron	1	4	0.084	0.084	0.084	*e*	[*e*]
Calcium	4	4	130	53	100*	*e*	[*e*]
Chromium	3	4	0.011	0.010	0.011*	0.050	0[1]
Iron	2	4	0.44	0.39	0.41*	0.30	2[3]
Magnesium	4	4	40	7.6	25*	*e*	[*e*]
Manganese	4	4	0.16	0.0057	0.062	0.050	2[3]
Nickel	1	4	0.018	0.018	0.018	0.10	0[1]
Potassium	4	4	2.3	1.2	1.8*	*e*	[*e*]
Silicon	4	4	6.6	2.9	4.8*	*e*	[*e*]
Sodium	3	4	12	6.8	9.8*	*e*	[*e*]
Strontium	4	4	1.3	0.13	0.58	*e*	[*e*]

Table 5.25 (WAG 17 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]		
Downgradient wells (continued)							
Others, filtered							
Alkalinity (mg/L)	4	4	430	130	310*	*e*	[*e*]
Solids, total dissolved (mg/L)	4	4	490	220	400*	500	0[1]
Others, unfiltered							
Alkalinity (mg/L)	4	4	430	130	310*	*e*	[*e*]
Carbon, total organic (mg/L)	4	4	1.5	1.0	1.3*	*e*	[*e*]
Halides, total organic (µg/L)	2	4	210	2.7	100	*e*	[*e*]
Radionuclides[f], filtered (pCi/L)							
Gross alpha	1	4	5.1	5.1	5.1	15	0[2]
Gross beta	2	4	11	9.2	10*	50	0[2]
^{3}H	2	4	7,300	2,700	5,000	20,000	0[2]
Radionuclides[f], unfiltered (pCi/L)							
Gross alpha	2	4	13	3.8	8.5	15	0[2]
Gross beta	4	4	20	4.9	8.9*	50	0[2]
^{3}H	2	4	6,800	3,200	5,000	20,000	0[2]
Volatile organics, unfiltered (µg/L)							
1,1-Dichloroethane	1	4	J 2.0	J 2.0	2.0	*e*	[*e*]
1,1-Dichloroethene	1	4	25	25	25	7.0	1[2]
1,2-Dichloroethene	2	4	E 700	J 1.0	350	*e*	[*e*]
2-Butanone	1	4	29	29	29	*e*	[*e*]
Acetone	2	4	E 230	J 9.0	120	*e*	[*e*]
Benzene	1	4	21	21	21	5.0	1[2]
Bromodichloromethane	1	4	J 3.0	J 3.0	3.0	100	0[2]
Chloroform	1	4	17	17	17	100	0[2]
Tetrachloroethene	1	4	32	32	32	*e*	[*e*]
Toluene	1	4	J 1.0	J 1.0	1.0	*e*	[*e*]
Trichloroethene	2	4	E 1,200	13	610	5.0	2[2]
Vinyl chloride	1	4	99	99	99	2.0	4[2]
Upgradient wells							
Anions, unfiltered (mg/L)							
Chloride	4	4	8.8	1.5	4.3*	250	0[3]
Fluoride	2	4	0.30	0.30	0.30	4.0	0[2]
Nitrate	2	4	1.4	1.1	1.3*	10	0[2]
Sulfate (as SO_4)	4	4	67	14	33*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	4	4	0.46	0.28	0.37*	*e*	[*e*]
Dissolved oxygen (ppm)	4	4	2.5	1.4	1.8*	*e*	[*e*]
Redox (mV)	4	4	180	95	150*	*e*	[*e*]
Temperature (°C)	4	4	16	13	15*	31	0[1]
Turbidity (JTU)	4	4	120	25	96*	1.0	4[2]
pH (standard units)	4	4	7.6	6.8	7.3*	(6.5, 8.5)	0[3]

Table 5.25 (WAG 17 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 (continued)							
Metals, filtered (mg/L)							
Aluminum	1	4	0.053	0.053	0.053	0.20	0[3]
Antimony	1	4	0.0070	0.0070	0.0070	*e*	[*e*]
Barium	4	4	0.11	0.021	0.058*	2.0	0[2]
Boron	2	4	0.17	0.081	0.13	*e*	[*e*]
Calcium	4	4	120	51	93*	*e*	[*e*]
Chromium	3	4	0.0091	0.0077	0.0083*	0.050	0[1]
Iron	2	4	0.073	0.073	0.073*	0.30	0[3]
Magnesium	4	4	37	4.1	23*	*e*	[*e*]
Manganese	4	4	0.0085	0.0024	0.0059*	0.050	0[3]
Nickel	1	4	0.0083	0.0083	0.0083	0.10	0[1]
Potassium	4	4	3.4	0.52	2.1*	*e*	[*e*]
Silicon	4	4	8.5	3.9	6.0*	*e*	[*e*]
Sodium	3	4	7.6	5.6	6.9*	*e*	[*e*]
Strontium	4	4	1.8	0.15	0.80	*e*	[*e*]
Vanadium	1	4	0.0021	0.0021	0.0021	*e*	[*e*]
Metals, unfiltered (mg/L)							
Aluminum	4	4	2.0	0.23	0.72	0.20	4[3]
Barium	4	4	0.10	0.024	0.060*	2.0	0[2]
Boron	2	4	0.20	0.10	0.15	*e*	[*e*]
Calcium	4	4	120	53	94*	*e*	[*e*]
Chromium	3	4	0.011	0.0068	0.0090*	0.050	0[1]
Iron	3	4	2.0	0.11	0.73	0.30	1[3]
Magnesium	4	4	36	4.3	23*	*e*	[*e*]
Manganese	4	4	0.040	0.0026	0.014	0.050	0[3]
Nickel	1	4	0.0055	0.0055	0.0055	0.10	0[1]
Potassium	4	4	3.4	0.65	2.1*	*e*	[*e*]
Silicon	4	4	7.9	3.9	6.5*	*e*	[*e*]
Sodium	2	4	7.8	6.9	7.3*	*e*	[*e*]
Strontium	4	4	1.8	0.15	0.81	*e*	[*e*]
Zinc	2	4	0.014	0.0077	0.011	5.0	0[1]
Others, filtered							
Alkalinity (mg/L)	4	4	360	250	300*	*e*	[*e*]
Solids, total dissolved (mg/L)	4	4	420	270	360*	500	0[1]
Others, unfiltered							
Alkalinity (mg/L)	4	4	370	250	300*	*e*	[*e*]
Carbon, total organic (mg/L)	4	4	1.0	0.58	0.74*	*e*	[*e*]
Solids, total suspended (mg/L)	1	4	130	130	130	*e*	[*e*]
Radionuclides[f], filtered (pCi/L)							
^{60}Co	1	4	38	38	38	200	0[4]
Gross alpha	4	4	24	2.7	9.3	15	1[2]
Gross beta	3	4	14	5.9	8.9*	50	0[2]
^{3}H	4	4	15,000	1,200	6,800	20,000	0[2]
$^{89}Sr + ^{90}Sr$	2	4	4.9	4.6	4.7*	8.0	0[2]

Table 5.25 (WAG 17 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 (continued)							
Radionuclides[f], unfiltered (pCi/L)							
^{60}Co	1	4	30	30	30	200	0[4]
Gross alpha	3	4	12	3.2	6.7	15	0[2]
Gross beta	4	4	11	5.4	7.0*	50	0[2]
^{3}H	4	4	15,000	1,400	6,900	20,000	0[2]
$^{89}Sr + ^{90}Sr$	2	4	6.8	3.8	5.3	8.0	0[2]
Tentatively identified compounds, unfiltered (µg/L)							
Unknown-6.16	1	1	J 8.0	J 8.0	8.0	*e*	[*e*]
Unknown-6.17	1	1	J 7.0	J 7.0	7.0	*e*	[*e*]
Volatile organics, unfiltered (µg/L)							
Acetone	2	4	JB 9.0	JB 6.0	7.5	*e*	[*e*]
Carbon disulfide	1	4	J 2.0	J 2.0	2.0	*e*	[*e*]

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

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

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

1. Rules of Tennessee Department of Environment and Conservation, Bureau of Environment, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, as amended.
2. 40 CFR Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[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 5.26. Constituents in the Waste Area Grouping (WAG) 1 groundwater at the K-25 Site, 1991

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
1,1,1-Trichloroethane, µg/L	4	45	120	3	44.75	0.20 mg/L[c]	0
1,1,2-Trichloroethane, µg/L	1	45	1	1	1	*c*	*d*
1,1-Dichloroethane, µg/L	13	45	2,200	1	175.77	*c*	*d*
1,1-Dichloroethene, µg/L	19	45	1,400	1	82.32	0.007 mg/L[c]	6
1,1-Dichloroethene (Total), µg/L	2	45	3,000	2,800	2,900	*c*	*d*
1,2-Dichloroethene (Total), µg/L	26	45	3,700	1	487.65	*c*	*d*
1,2,3-Trimethylbenzene, µg/L	1	45	97	97	97	*c*	*d*
1,2-Dichloroethane, µg/L	1	45	8	8	8	*c*	*d*
1,2-Dichloro-1,1,2-Trifluoro, µg/L	6	45	780	14	223.5	*c*	*d*
1,4-Diethylbenzene, µg/L	1	45	5.1	5.1	5.1	*c*	*d*
1,4-Dimethyl-2-ethylbenzene, µg/L	1	45	8.6	8.6	8.6	*c*	*d*
2-Butanone, µg/L	6	45	91	1	31.67	*c*	*d*
4-Methyl-2-Pentanone, µg/L	1	45	1	1	1	*c*	*d*
7-Oxabicyclo 4.1.0 Heptane, µg/L	1	45	38	38	38	*c*	*d*
Acetone, µg/L	27	45	60	2	17.89	*c*	*d*
Carbon dioxide, µg/L	4	45	450	5.1	118.03	0.005 mg/L[b]	4
Chloroethane, µg/L	2	45	7	5	6	0.20 mg/L[b]	0
Chloroethene, µg/L	1	45	96	96	96	*c*	*d*
Chloroform, µg/L	6	45	24	3	8.33	0.1 mg/L[b]	0
Conductivity, µmhos/cm		189	1,338	132	546.24	*c*	*d*
Freon 113, µg/L	6	45	9,200	21	1,895	*c*	*d*
Furan, Tetrahydro–2,2–Dimeth, µg/L	1	45	54	54	54	*c*	*d*
Gross alpha (Total), pCi/L	36	45	53.2 ± 12.5	–0.59 ± 1.18		15 pCi/L[b]	
Gross alpha (Dis), pCi/L	41	45	49.9 ± 11.4	–1.07 ± 1.52		15 pCi/L[b]	
Gross beta (Total), pCi/L	36	45	675 ± 69	0.1 ± 3.24		50 pCi/L[b]	7
Gross beta (Dis), pCi/L	41	45	197 ± 22	–0.94 ± 3.42		50 pCi/L[b]	
Methylene Chloride, µg/L	24	45	16	1	4.92	*c*	*d*
m-Ethyltoluene, µg/L	1	45	16	16	16	*c, d*	
n-Methyl-Methanamine, µg/L	1	45	5.1	5.1	5.1	*c*	*d*
pH		189	10.04	4.96	6.96	6.5–8.5[e]	66
^{99}Tc (Dis), pCi/L	4	45	228 ± 30	75.9 ± 14.9		4,000 pCi/L[f]	0
^{99}Tc (Total), pCi/L	12	45	265 ± 34	–1.58 ± 0.13		4,000 pCi/L[f]	0
Tetrachloroethene, µg/L	15	45	4,300	1	299.13	*c*	*d*

Table 5.26 (WAG 1 continued)

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Toluene, µg/L	1	45	5	5	5	*c*	*d*
Total Xylenes, µg/L	1	45	10	10	10	*c*	*d*
Trichloroethene	30	45	42,000	2	2,230.8	0.0050 mg/L[b]	27
Trichlorofluoromethane, µg/L	2	45	75	75	75	*c*	*d*
Unknown	1	45	22	22	22	*c*	*d*
Unknown C_6H_{10}	2	45	370	16	193	*c*	*d*
^{234}U (Dis), pCi/L	4	45	38.1 ± 4.3	11.7 ± 1.6		20 pCi/L[f]	1
^{234}U (Total), pCi/L	8	45	35.2 ± 4.2	0.54 ± 0.27		20 pCi/L[f]	1
$^{235,236}U$ (Dis), pCi/L	4	45	12.5 ± 1.7	0.56 ± 0.24		20 pCi/L[f]	0
$^{235,236}U$ (Total), pCi/L	8	45	2.11 ± 0.46	0 ± 0.15		20 pCi/L[f]	0
^{238}U (Dis), pCi/L	4	45	17.8 ± 2.2	2.82 ± 0.56		24 pCi/L[f]	0
^{238}U (Total), pCi/L	8	45	7.99 ± 1.19	0.23 ± 0.21		24 pCi/L[f]	0
Vinyl chloride, µg/L	21	45	490	2	144.71	0.002 mg/L[b]	21
			K1407-B and K-1407-C ponds				
1,1,1–Trichloroethane, µg/L	3	43	110	20	76.66	0.20 mg/L[b]	0
1,1-Dichloroethane, µg/L	18	43	1,000	4	314.28	*c*	*d*
1,1-Dichloroethene, µg/L	19	43	560	7	198.63	0.007 mg/L[b]	19
1,2-Dichloroethane, µg/L	1	43	2	2	2	*c*	*d*
1,2-Dichloroethene (Total), µg/L	19	43	3,000	2	1,203.63	*c*	*d*
1-Propanol, µg/L	1	43	11	11	11	*c*	*d*
Acetone, µg/L	3	43	180	26	79.33	*c*	*d*
Aluminum (Dis), µg/L	19	26	160	22	83.09	0.1 mg/L[e]	7
Aluminum (Total), µg/L	21	26	15,100	27	2,347.90	0.1 mg/L[e]	18
Antimony (Dis), µg/L	4	26	50.3	32	41.43	*c*	*d*
Antimony (Total), µg/L	4	26	59	35.2	47.25	*c*	*d*
Arsenic (Dis), µg/L	3	26	10	3	7.43	0.05 mg/L[b]	0
Arsenic (Total), µg/L	8	26	30	3	9.50	0.05 mg/L[b]	0
Barium (Dis), µg/L	22	26	434	16	96.16	2.0 mg/L[b]	0
Barium (Total), µg/L	22	26	444	17	116.29	2.0 mg/L[b]	0
Boron (Dis), µg/L	14	26	1,200	6.2	133.75	*c*	*d*
Boron (Total), µg/L	11	26	1,400	17	160.55	*c*	*d*

Table 5.26 (WAG 1 continued)

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
K1407-B and K-1407-C ponds (continued)							
Cadmium (Dis), µg/L	9	26	6	2.6	4.22	0.01 mg/L[b]	0
Cadmium (Total), µg/L	13	26	9.2	2.8	5.54	0.01 mg/L[b]	0
Calcium (Dis), µg/L	23	26	230,000	20,000	112,308.70	*c*	*d*
Calcium (Total), µg/L	22	26	230,000	19,000	114,004.55	*c*	*d*
^{137}Cs, pCi/L	2	13	–3.1 ± 30.7	–9.46 ± 31.5		120 pCi/L[f]	0
Chloride IC, µg/L	27	26	476,000	460	109,354.07	250 mg/L[e]	6
Chloroform, µg/L	9	43	10	0.8	2.03	0.1 mg/L[b]	0
Chromium (Dis), µg/L	12	26	53.6	12	30.8	0.05 mg/L[b]	2
Chromium (Total), µg/L	13	26	59.4	10.2	34.75	0.05 mg/L[b]	4
Cobalt (Dis), µg/L	5	26	45.9	5.8	20.32	*c*	*d*
Cobalt (Total), µg/L	8	26	45.9	5.6	24.18	*c*	*d*
Conductivity, µmhos/cm		96	2,121	140	927.61	*c*	*d*
Copper (Dis), µg/L	8	26	15.4	6	11.45	1.0 mg/L[e]	0
Copper (Total), µg/L	8	26	22	13.7	17.11	1.0 mg/L[e]	0
Cyclohexane, µg/L	2	43	550	13	281.5	*c*	*d*
Ethyl Ether, µg/L	4	43	6	5	5.25	*c*	*d*
Fluoride, µg/L	2	26	200	130	165	2 mg/L[e]	1
Freon-113, µg/L	17	43	3,400	20	1,216.47	*c*	*d*
Gross alpha, pCi/L		13	14.55 ± 2.9	–1.14 ± 1.2		15 pCi/L[b]	0
Gross beta, pCi/L		13	431.3 ± 13.2	2.52 ± 3		50 pCi/L[b]	1
Hexane, 3-Methoxy-, µg/L	1	43	87	87	87	*c*	*d*
Iron (Dis), µg/L	21	26	20,000	7.2	2,038.91	0.3 mg/L[e]	10
Iron (Total), µg/L	21	26	70,600	27	10,546.39	0.3 mg/L[e]	17
Lead (Dis), µg/L	3	26	55.6	47.9	50.7	0.05 mg/L[e]	1
Lead (Total), µg/L	6	26	79	46.3	58.05	0.05 mg/L[e]	4
Lead (Dis) AAS, µg/L	6	26	7	2	3.83	0.05 mg/L[e]	0
Lead (Total) AAS, µg/L	8	26	39	2	13.83	0.05 mg/L[e]	0
Lithium (Dis), µg/L	1	26	5.6	5.6	5.6	*c*	*d*
Lithium (Total), µg/L	2	26	6.5	5	5.75	*c*	*d*
Magnesium (Dis), µg/L	22	26	33,000	3,600	1,590.81	*c*	*d*
Magnesium (Total), µg/L	21	26	32,000	3,600	16,210.48	*c*	*d*
Manganese (Dis), µg/L	22	26	20,000	4.3	6,117.91	0.05 mg/L[e]	18
Manganese (Total), µg/L	22	26	20,000	7.1	5,562.53	0.05 mg/L[e]	19
Methylene chloride, µg/L	8	26	1,700	16	399.86	*c*	*d*
Molybdenum (Dis), µg/L	3	26	12	10.2	11.07	*c*	*d*
Molybdenum (Total), µg/L	6	26	20.9	11.4	15.33	*c*	*d*

Table 5.26 (WAG 1 continued)

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
K1407-B and K-1407-C Ponds (continued)							
Nickel (Dis), µg/L	4	26	34	12	26.9	0.10 mg/L[f]	4
Nickel (Total), µg/L	9	26	53.4	13	31.31	0.10 mg/L[f]	9
Niobium (Dis), µg/L	1	13	8.2	8.2	8.2	*c*	*d*
Niobium (Total), µg/L	1	13	16	16	16	*c*	*d*
Nitrate, µg/L	2	13	6,130	2,020	4,075	10 mg/L[b]	0
pH		100	7.5	6.04	6.72	6.5–8.5[e]	18
Phenol (Total), µg/L	3	26	40	20	26.67	*c*	*d*
Phosphorous (Total), µg/L	1	26	250	250	250	*c*	*d*
Potassium (Dis), µg/L	23	26	4,400	1,500	2,643.91	*c*	*d*
Potassium (Total), µg/L	23	26	7,080	1,700	2,975.65	*c*	*d*
Propane, 2-Methyl-1-Prop, µg/L	2	43	75	69	72	*c*	*d*
Silicon (Dis), µg/L	13	13	7,200	1,700	4,269.23	*c*	*d*
Silicon (Total), µg/L	13	13	6,900	1,900	43,307.69	*c*	*d*
Silver (Dis), µg/L	12	26	42.6	12.1	20.08	0.05 mg/L[f]	12
Silver (Total), µg/L	13	26	43	7.3	24.09	0.05 mg/L[f]	13
Sodium (Dis), µg/L	21	26	140,000	1,320	53,066.19	*c*	*d*
Sodium (Total), µg/L	22	26	140,000	1,260	45,250	*c*	*d*
Strontium (Dis), µg/L	12	13	490	35	213.58	*c*	*d*
Strontium (Total), µg/L	12	13	490	37	212.67	*c*	*d*
Sulfate, µg/L	14	26	283,000	3,020	87,580	250 mg/L[e]	1
Total dissolved solids, µg/L	12	13	1,400,000	118,000	648,666.67	500 mg/L[e]	7
Total suspended solids, µg/L	11	13	73,000	7,000	25,727.27	*c*	*d*
^{99}Tc, pCi/L	2	13	–5.25 ± 1600	–251 ± .0016		4,000 pCi/L[f]	0
Tetrachloroethene, µg/L	10	43	680	2	411.50	*c*	*d*
Thallium (Dis), µg/L	3	26	3	3	3	*c*	*d*
Thallium (Total), µg/L	3	26	3	3	3	*c*	*d*
Titanium (Dis), µg/L	8	26	6	3.4	4.56	*c*	*d*
Titanium (Total), µg/L	10	26	17	5.4	14.27	*c*	*d*
TOC, µg/L		100	49,500	1,100	5,379.21	*c*	*d*
Toluene, µg/L	1	43	4	4	4	1 mg/L[b]	0
TOX, µg/L		111	12,830	12	1,441.77	*c*	*d*
Trichloroethene, µg/L	21	43	11,000	2	2,931.67	0.005 mg/L[b]	20
Turbidity, NTU		11	95	1.6	21.06	*c*	*d*

Table 5.26 (WAG 1 continued)

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
K1407-B and K-1407-C Ponds (continued)							
Unknown, µg/L	31		89	9	30.74	*c*	*d*
Unknown Hydrocarbon, µg/L	1	43	72	72	72	*c*	*d*
Uranium fluorometric (Dis), µg/L	1	13	2	2	2	*c*	*d*
Uranium fluorometric (Total), µg/L	2	13	4	2	3	*c*	*d*
^{234}U, pCi/L	1	13	0.91 ± 1.8	0.91 ± 1.8		20 pCi/L[f]	0
^{235}U, pCi/L	2	13	1.68 ± 0.04	0.46 ± 0.9		24 pCi/L[f]	0
^{238}U, pCi/L	1	13	98.32			24 pCi/L[f]	1
Vanadium (Dis), µg/L	10	26	28.8	5.8	16.93	*c*	*d*
Vanadium (Total), µg/L	10	26	40.2	12.8	27	*c*	*d*
Vinyl chloride, µg/L	13	43	440	40	223.08	0.002 mg/L[b]	13
Zinc (Dis), µg/L	22	26	54	5.0	13.4	5 mg/L[e]	0
Zinc (Total), µg/L	20	26	101	3.8	22.46	5 mg/L[e]	0

[a]For radionuclides and metals Total = unfiltered sample (soluable + suspended) and Dis (dissolved) = filtered sample (soluable only). For organics Total = total detected for that particular species.

[b]Federal Primary Drinking Water Standards 40 CFR (7-1-1990 Edition) Part 141—National Primary Drinking Water Regulations, Subpart B-Maximum Contaminant Levels.

[c]No reference

[d]Not applicable

[e]Federal Secondary Drinking Water Standards 40 CFR (7-1-1990 Edition) Part 143—National Secondary Drinking Water Regulations.

[f]DOE Guidelines for Radionuclides: DOE Order 5400.5, February 8, 1990. Chapter III, Derived Concentration Guides for Air and Water, which is 4% of the DCG (equivalent to 4 mrem).

Table 5.27. Constituents in the Waste Area Grouping (WAG) 2 groundwater at the K-25 Site, 1991

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
1,1,1-Trichloroethane, µg/L	6	44	638	0.5	135.42	0.20 mg/L[b]	1
1,1,2,2-Tetrachloroethane, µg/L	2	44	1	1	1	*c*	*d*
1,1,2,2-Tetrafluoroethane, µg/L	3	40	260	27	114.67	*c*	*d*
1,1,2-Trichloroethane, µg/L	2	44	8.4	5	6.7	*c*	*d*
1,1-Dichloroethane, µg/L	17	44	1,480	1	198.74	*c*	*d*
1,1-Dichloroethene, µg/L	5	44	490	2	118.40	0.007 mg/L[b]	4
1,1-Difluoroethane, µg/L	3	40	480	43	196.67	*c*	*d*
1,2,3-Trimethylbenzene, µg/L	1	40	19	19	19	*c*	*d*
1,2-Dichloroethene (total), µg/L	18	40	340	1	50.83	*c*	*d*
1,2,3-Trimethylbenzene, µg/L	1	40	97	97	97	*c*	*d*
1,2-Dichloroethane, µg/L	4	44	32.2	3	12.8	*c*	*d*
1,2-Dichloro-1,1,2-Trifluoro, µg/L	11	40	3,100	12	435.45	*c*	*d*
1,2-Dimethyl-cis-Cyclopr, µg/L	2	40	110	100	105	*c*	*d*
1,3-Dimethyl-5-Ethylbenzene, µg/L	1	40	7.8	7.8	7.8	*c*	*d*
1,3-Epoxy-4-Methylpentan, µg/L	1	40	14	14	14	*c*	*d*
1-Ethyl-2-Methyl-Benzene, µg/L	1	40	560	560	560	*c*	*d*
1-Methyl-2-Ethylbenzene, µg/L	1	40	23	23	23	*c*	*d*
1-Methyl-4-Ethylbenzene, µg/L	1	40	88	88	88	*c*	*d*
1-Methyl-Cyclopentene, µg/L	1	40	62	62	62	*c*	*d*
2,2,3,4-Tetramethylpentan, µg/L	1	40	13	13	13	*c*	*d*
2,2,3-Trimethylhexane, µg/L	1	40	100	100	100	*c*	*d*
2,2-Dimethyloxetane, µg/L	1	40	70	70	70	*c*	*d*
2,3-Dimethylbutane, µg/L	1	40	40	40	40	*c*	*d*
2-Methylnapthalene, µg/L	1	40	1	1	1	*c*	*d*
2-Azido-2,3,3-Trimethylbut, µg/L	1	40	120	120	120	*c*	*d*
2-Butanone, µg/L	13	40	81	1	10.38	*c*	*d*
2-Butene, µg/L	2	40	160	15	87.5	*c*	*d*
2-Chloro-1,1,1,3,4,4,4-Hept, µg/L	1	40	28	28	28	*c*	*d*
2-Chloro-1,1,1-Trifluoroe, µg/L	4	40	70	9.2	34.8	*c*	*d*
2-Hexanone, µg/L	10	40	140	2	31.53	*c*	*d*
2-Hexene (Z), µg/L	1	40	110	110	110	*c*	*d*
2-Methyl, 2-Butanol, µg/L	1	40	87	87	87	*c*	*d*
2-Methyl, 2-Butene, µg/L	1	40	520	520	520	*c*	*d*
2-Methylnaphthalene, µg/L	3	40	12,000	24	7341.33	*c*	*d*
2-Methylpropane, µg/L	1	40	610	610	610	*c*	*d*

Table 5.27 (WAG 2 continued)

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
2-Methyl-1-Nitropropane, µg/L	2	40	1,800	95	947.5	*c*	*d*
2-Pentene (E), µg/L	1	40	150	150	150	*c*	*d*
2-Pentene (Z), µg/L	2	40	120	31	75.5	*c*	*d*
2-Propenyl-Benzene, µg/L	1	40	100	100	100	*c*	*d*
3-Furanol, Tetrahydro, µg/L	1	40	6.5	6.5	6.5	*c*	*d*
3-Hexene (Z), µg/L	1	40	450	450	450	*c*	*d*
3-Methylpentane, µg/L	1	40	20	20	20	*c*	*d*
3-Methyl-1-Butene, µg/L	1	40	99	99	99	*c*	*d*
3-Methyl-2-Pentene (Z), µg/L	2	40	110	21	65.5	*c*	*d*
3-Octane, µg/L	1	40	16	16	16	*c*	*d*
3-Octanone, µg/L	1	40	12	12	12	*c*	*d*
4-Methyl-2-Pentanone, µg/L	4	40	62	1	24.75	*c*	*d*
Acenaphthene, µg/L	2	40	460	1	230.5	*c*	*d*
Acetone, µg/L	26	40	200	2	25.54	*c*	*d*
Ammonia Nitrogen, mg/L	10	18	3.25	0.27	0.818	*c*	*d*
Aroclor, µg/L	1	1	9.3	9.3	9.3	0.0005 mg/L[b]	1
Benzene, µg/L	17	58	1,000	0.6	211.95	0.005 mg/L[b]	14
Benzene, Diethyl-Isomer, µg/L	2	40	19,000	29	9514.5	*c*	*d*
Benzene, Dimethyl-Isomer, µg/L	1	40	50	50	50	*c*	*d*
Benzene, Ethyl-Methyl-Isomer, µg/L	2	40	19,000	48	9,524	*c*	*d*
Benzene, Methyl-Propyl-Isomer, µg/L	2	40	16,000	17	8008.5	*c*	*d*
Benzene, Tetramethyl Isomer, µg/L	1	40	15	15	15	*c*	*d*
Bis(1,1-Dimethylethl) Nitro, µg/L	1	40	93	93	93	*c*	*d*
Bis(2-Ethylhexyl) Phthala, µg/L	1	40	2,400	2,400	2,400	*c*	*d*
Bromoform, µg/L	1	44	1	1	1	*c*	*d*
Carbon Dioxide, µg/L	6	40	2,700	12	461.5	0.005 mg/L[b]	6
Chlorine Oxide, µg/L	5	40	140	7.7	41.08	*c*	*d*
Chlorobenzene, µg/L	2	44	2	2	2	*c*	*d*
Chloroethane, µg/L	3	44	280	3	110	0.20 mg/L[b]	1
Chloroform, µg/L	5	44	17	1	6.92	0.1 mg/L[b]	0
Conductivity, µmhos/cm		156	7,280	6.83	960.34	*c*	*d*
Cumene, µg/L	1	40	24	24	24	*c*	*d*
Cyclobutanol, µg/L	1	40	5.9	5.9	5.9	*c*	*d*
Cyclohexane, µg/L	1	40	140	140	140	*c*	*d*
Cyclopentane, µg/L	1	40	120	120	120	*c*	*d*
Decane, Trimethyl-Isomer, µg/L	1	40	17,000	17,000	17,000	*c*	*d*
Dibutyl Carbitol, µg/L	5	40	180	9.1	141.82	*c*	*d*

Table 5.27 (WAG 2 continued)

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Dimethylamine, µg/L	1	40	44	44	44	*c*	*d*
Di-N-Octyl Phthalate, µg/L	1	40	10	10	10	*c*	*d*
Ethanol, 2-(Phenylmethyl)AM	2	40	28	9.8	18.9	*c*	*d*
Ethylbenzene, µg/L	13	58	320	0.5	80.52	*c*	*d*
Fluorene, µg/L	3	40	760	1	493.67	*c*	*d*
Freon 113, µg/L	11	40	7,700	5.4	1371.31	*c*	*d*
Furan, Tetrahydro-2,2-Dimeth, µg/L	1	40	20	20	20	*c*	*d*
Gross alpha (total), pCi/L	20	40	9.82 ± 6.35	–0.57 ± 3.41		15 pCi/L[b]	0
Gross alpha (Dis), pCi/L	20	40	9.01 ± 6.37	–0.63 ± 1.27		15 pCi/L[b]	0
Gross beta (total), pCi/L	19	40	36.5 ± 6.3	1.36 ± 3.49		50 pCi/L[b]	0
Gross beta (Dis), pCi/L	19	40	35.5 ± 6.6	0.46 ± 2.9		50 pCi/L[b]	0
Heptane, µg/L	1	40	13	13	13	*c*	*d*
Hexanal, µg/L	1	40	5.3	5.3	5.3	*c*	*d*
Hexanoic acid, 2-Ethyl, µg/L	1	40	25	25	25	*c*	*d*
Isobutane, µg/L	1	40	41	41	41	*c*	*d*
Isobutyl chloride, µg/L	1	40	160	160	160	*c*	*d*
Methylcyclopentane, µg/L	4	40	240	52	105.75	*c*	*d*
Methylene chloride, µg/L	25	44	290	1	23.63	*c*	*d*
m-Ethyltoluene, µg/L	1	40	9.5	9.5	9.5	*c*	*d*
m & p-Xylenes, mg/L	7	18	2.14	0.0005	0.32	*c*	*d*
Napthalene, µg/L	4	40	5,100	10	1999.6	*c*	*d*
Napthalene, Dimethyl-Iso, µg/L	1	40	7,800	7,800	7,800	*c*	*d*
Napthalene, Methyl, µg/L	3	40	11,000	14	6704.67	*c*	*d*
o-Xylene, µg/L	6	18	1,030	1.3	205.92	*c*	*d*
o-(2-Methylpropyl)-Hydro, µg/L	1	40	740	740	740	*c*	*d*
Pentanal, µg/L	1	40	5.3	5.3	5.3	*c*	*d*
Pentane, µg/L	3	40	580	310	430	*c*	*d*
pH		166	12.64	5.86	6.96	6.5–8.5[e]	43
Phenanthrene, µg/L	2	40	1,600	1	800.5	*c*	*d*
^{90}Sr (total), pCi/L	3	40	0.89 ± 0.88	–0.25 ± 0.73		8 pCi/L[d]	
^{90}Sr (Dis), pCi/L	2	40	0.081 ± 0.72	–0.51 ± 0.68		8 pCi/L[d]	
Srene, µg/L	1	40	1	1	1	*c*	*d*
^{99}Tc (Dis), pCi/L	5	40	12.1 ± 14.1	2.5 ± 10.1		4,000 pCi/L[f]	0
^{99}Tc (total), pCi/L	6	40	3.66 ± 0.13	–7.9 ± 7.8		4,000 pCi/L[f]	0
Tert-Butyl Methyl Ether, µg/L	1	40	16	16	16	*c*	*d*
Tetrachloroethene, µg/L	8	44	49	0.7	12.81	*c*	*d*

Table 5.27 (WAG 2 continued)

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Tetradecane, µg/L	1	40	8,200	8,200	8,200	*c*	*d*
Toluene, µg/L	20	58	4,200	0.6	450.81	*c*	*d*
Total Xylenes, µg/L	10	40	3,200	30	546.90	*c*	*d*
TPH, High, mg/L	12	18	13	0.1	1.78	*c*	*d*
TPH, Low, mg/L	8	18	8.3	0.1	2.65	*c*	*d*
Trans-1,2-Dichloroethyle, µg/L	1	40	0.0196	0.0196	0.0196	*c*	*d*
Trans-1,3-Dichloropropen, µg/L	2	40	69	10	39.5	*c*	*d*
Trichloroethene, µg/L	17	44	340	1	35.21	0.0050 mg/L[b]	7
Trichlorofluoromethane, µg/L	2	44	1.76	0.177	0.97	*c*	*d*
Tricyclo[3,2,1,02]Oct-6-ene, µg/L	2	40	150	27	88.5	*c*	*d*
Unknown, µg/L	5	40	8,600	20	2118.40	*c*	*d*
Unknown C_6H_{10}, µg/L	1	40	32	32	32	*c*	*d*
Unknown $C_{10}H_{12}$, µg/L	2	40	7,600	27	3813.5	*c*	*d*
Unknown $C_{10}H_{14}$, µg/L	1	40	26	26	26	*c*	*d*
Unknown $C_{16}H_{34}$, µg/L	1	40	8,800	8,800	8,800	*c*	*d*
Unknown $C_{19}H_{40}$, µg/L	1	40	270	270	270	*c*	*d*
Unknown $C_{43}H_{88}$, µg/L	1	40	670	670	670	*c*	*d*
Unknown C_6H_{10}, µg/L	3	40	18	6	13	*c*	*d*
Unknown C_7H_8, µg/L	1	40	94	94	94	*c*	*d*
Unknown C_8H_{10}, µg/L	1	40	150	150	150	*c*	*d*
Unknown C_9H_{12}, µg/L	2	40	28,000	110	14,055	*c*	*d*
Unknown Hexadecane, µg/L	1	40	6,800	6,800	6,800	*c*	*d*
Unknown Hydrocarbon, µg/L	3	40	12,000	1,900	7533.33	*c*	*d*
^{234}U (total), pCi/L	2	40	1.18 ± 0.28	0.52 ± 0.27		20 pCi/L[f]	0
^{234}U (Dis), pCi/L	1	40	0.545 ± 0.19	0.545 ± 0.19		20 pCi/L[f]	0
$^{235/236}U$ (total), pCi/L	1	40	0.31 ± 0.23	0.31 ± 0.23		20 pCi/L[f]	0
^{238}U (Dis), pCi/L	1	40	0.38 ± 0.16	0.38 ± 0.16		24 pCi/L[f]	0
^{238}U (total), pCi/L	2	40	1.33 ± 0.3	0.33 ± 0.23		24 pCi/L[f]	0
Vinyl Acetate, µg/L	3	40	37	6	22.67	*c*	*d*
Vinyl Chloride, µg/L	9	44	255	12	99.94	0.002 mg/L[b]	9
Beta-Methyl-, Benzeneet, µg/L	1	40	5.8	5.8	5.8	*c*	*d*

[a]For radionuclides and metals Total = unfiltered sample (soluable + suspended) and Dis (dissolved) = filtered sample (soluable only). For organics Total = total detected for that particular species.

[b]Federal Primary Drinking Water Standards 40 CFR (7-1-1990 Edition) Part 141—National Primary Drinking Water Regulations, Subpart B-Maximum Contaminant Levels.

[c]No reference

[d]Not applicable

[e]Federal Secondary Drinking Water Standards 40 CFR (7-1-1990 Edition) Part 143—National Secondary Drinking Water Regulations.

[f]DOE Guidelines for Radionuclides: DOE Order 5400.5, February 8, 1990. Chapter III, Derived Concentration Guides for Air and Water, which is 4% of the DCG (equivalent to 4 mrem).

Table 5.28. Constituents in the Waste Area Grouping (WAG) 3 groundwater at the K-25 Site, 1991

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Acetone, µg/L	1	1	4	4	4	*b*	*c*
Conductivity, µmhos/cm		4	690	670	681.75	*b*	*c*
Gross alpha (Total), pCi/L		1	29.1 ± 9.3	29.1 ± 9.3		15 pCi/L[d]	1
Gross alpha (Dis), pCi/L		1	26.8 ± 8.2	26.8 ± 8.2		15 pCi/L[d]	1
Gross beta (Total), pCi/L		1	4.16 ± 3.05	4.16 ± 3.05		50 pCi/L[d]	0
Gross beta (Dis), pCi/L		1	8.87 ± 3.17	8.87 ± 3.17		50 pCi/L[d]	0
Methylene chloride, µg/L	1	1	1	1	1	*b*	*c*
pH		4	7.5	7.5	7.5	6.5–8.5	0
^{234}U (Dis), pCi/L	1	1	16.1 ± 2	16.1 ± 2		20 pCi/L[e]	0
^{234}U (Total), pCi/L	1	1	15.8 ± 1.9	15.8 ± 1.9		20 pCi/L[e]	0
^{235,236}U (Dis), pCi/L	1	1	1.12 ± 0.3	1.12 ± 0.3		20 pCi/L[e]	0
^{235,236}U (Total), pCi/L	1	1	1.03 ± 0.27	1.03 ± 0.27		20 pCi/L[e]	0
^{238}U (Dis), pCi/L	1	1	8.09 ± 1.14	8.09 ± 1.14		24 pCi/L[e]	0
^{238}U (Total), pCi/L	1	1	7.53 ± 1.01	7.53 ± 1.01		24 pCi/L[e]	0

[a]For radionuclides and metals Total = unfiltered sample (soluable + suspended) and Dis (dissolved) = filtered sample (soluable only). For organics Total = total detected for that particular species.

[b]No reference

[c]Not applicable

[d]Federal Primary Drinking Water Standards 40 CFR (7-1-1990 Edition) Part 141—National Primary Drinking Water Regulations, Subpart B-Maximum Contaminant Levels.

[e]DOE Guidelines for Radionuclides: DOE Order 5400.5, February 8, 1990. Chapter III, Derived Concentration Guides for Air and Water, which is 4% of the DCG (equivalent to 4 mrem).

Table 5.29. Constituents in the Waste Area Grouping (WAG) 4 groundwater at the K-25 Site, 1991

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
1,1,1-Trichloroethane, µg/L	4	14	21	8	15.25	0.20 mg/L[b]	0
1,1,2-Trichloroethane, µg/L	2	14	4	2	3	[c]	[d]
1,1-Dichloroethane, µg/L	4	14	17	2	6.75	[c]	[d]
1,1-Dichloroethene, µg/L	3	14	4	3	3.33	0.007 mg/L[d]	0
1,2-Dichloroethene (Total), µg/L	2	14	4	4	4	[c]	[d]
2-Butanone, µg/L	5	14	2	1	1.6	[c]	[d]
4-Methyl-2-pentanone, µg/L	2	14	2	1	1.5	[c]	[d]
Acetone, µg/L	11	14	18	4	8.45	[c]	[d]
Benzene, µg/L	1	14	4	4	4	0.005 mg/L[d]	0
Carbon dioxide, µg/L	4	14	25	13	19.75	0.005 mg/L[d]	4
Carbon tetrachloride, µg/L	1	14	4	4	4	0.005 mg/L[d]	0
Chloroform, µg/L	4	14	36	3	19	0.10 mg/L[d]	0
Conductivity, µmhos/cm		56	1,056	388	741.91	[c]	[d]
Gross alpha (Total), pCi/L		14	72.4 ± 16.4	0 ± 0.044		15 pCi/L[d]	6
Gross alpha (Dis), pCi/L		14	52.8 ± 13.5	0 ± 0.0472		15 pCi/L[d]	5
Gross beta (Total), pCi/L		14	49 ± 7.6	4.08 ± 2.82		50 pCi/L[d]	0
Gross beta (Dis), pCi/L		14	47.4 ± 7.3	2.29 ± 2.91		50 pCi/L[d]	0
Methylene chloride, µg/L	6	14	35	1	7.33	[c]	[d]
pH		56	10.1	6.73	7.39	6.5–8.5[e]	5
^{90}Sr (Dis), pCi/L	3	14	0.74 ± 0.87	0.18 ± 0.81		8.0 pCi/L[b]	0
^{90}Sr (Total), pCi/L	3	14	1.29 ± 0.92	1.07 ± 0.97		8.0 pCi/L[b]	0
^{99}Tc (Dis), pCi/L	3	14	47.6 ± 15.2	5 ± 11		4,000 pCi/L[f]	0
^{99}Tc (Total), pCi/L	3	14	60.8 ± 16.3	12.2 ± 12.8		4,000 pCi/L[f]	0
Tetrachloroethene, µg/L	2	14	2	2	2	[c]	[d]
Trichloroethene, µg/L	3	14	11	1	7.33	0.0050 mg/L[d]	2
^{234}U (Dis), pCi/L	4	14	45.3 ± 5.7	2.37 ± 0.28		20 pCi/L[f]	1
^{234}U (Total), pCi/L	7	14	46.6 ± 5.3	8.32 ± 1.08		20 pCi/L[f]	3
^{235,236}U (Dis), pCi/L	4	14	2.64 ± 0.68	0.87 ± 0.26		20 pCi/L[f]	0
^{235,236}U (Total), pCi/L	6	14	2.25 ± 0.44	0.83 ± 0.23		20 pCi/L[f]	0
^{238}U (Dis), pCi/L	4	14	40.2 ± 5.1	10.5 ± 1.4		24 pCi/L[f]	1
^{238}U (Total), pCi/L	6	14	38.9 ± 4.4	4.92 ± 0.71		24 pCi/L[f]	1
Vinyl chloride, µg/L	21	45	490	2	144.71	0.002 mg/L[d]	21

[a]For radionuclides and metals Total = unfiltered sample (soluable + suspended) and Dis (dissolved) = filtered sample (soluable only). For organics Total = total detected for that particular species.

[b]Federal Primary Drinking Water Standards 40 CFR (7-1-1990 Edition) Part 141—National Primary Drinking Water Regulations, Subpart B-Maximum Contaminant Levels.

[c]No reference

[d]Not applicable

[e]Federal Secondary Drinking Water Standards 40 CFR (7-1-1990 Edition) Part 143—National Secondary Drinking Water Regulations.

[f]DOE Guidelines for Radionuclides: DOE Order 5400.5, February 8, 1990. Chapter III, Derived Concentration Guides for Air and Water, which is 4% of the DCG (equivalent to 4 mrem).

Table 5.30. Constituents in the Waste Area Grouping (WAG) 10 groundwater at the K-25 Site, 1991

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
1,1,1-Trichloroethane, µg/L	7	21	2,200	6	390.57	0.20 mg/L[b]	2
1,1,2-Trichloroethane, µg/L	4	21	10	1	3.5	*c*	*d*
1,1-Dichloroethane, µg/L	3	21	40	1	15.33	*c*	*d*
1,1-Dichloroethene, µg/L	7	21	1,200	6	213.57	0.007 mg/L[b]	6
1,2-Dichloroethene (Total), µg/L	9	21	22	1	34.44	*c*	*d*
2-Butanone, µg/L	5	21	10	1	3.4	*c*	*d*
2-Hexanone, µg/L	2	21	2	1	1.5	*c*	*d*
7-Oxabicyclo 4.1.0 Heptane, µg/L	1	21	12	12	12	*c*	*d*
Acetone, µg/L	25	21	11	1	5.76	*c*	*d*
Aluminum (Dis), µg/L	6	21	108	60	89.93	0.1 mg/L[e]	2
Aluminum (Total), µg/L	6	21	3,710	92.4	792.4	0.1 mg/L[e]	5
Barium (Dis), µg/L	6	21	82.9	24.1	41.83	2.0 mg/L[b]	0
Barium (Total), µg/L	6	21	82.1	24.2	42.6	2.0 mg/L[b]	0
Cadmium (Dis), µg/L	1	21	3.6	3.6	3.6	0.01 mg/L[b]	0
Cadmium (Total), µg/L	1	21	3.5	3.5	3.5	0.01 mg/L[b]	0
Calcium (Dis), µg/L	6	21	96,600	42,400	73,466.67	*c*	*d*
Calcium (Total), µg/L	6	21	97,000	46,100	74,816.67	*c*	*d*
Carbon tetrachloride, µg/L	6	21	250	6	59.17	0.005 mg/L[b]	6
Chloroethane, µg/L	9	21	17	1	3.78	0.20 mg/L[b]	0
Chloroform, µg/L	8	21	46	4	9.25	0.1 mg/L[b]	0
Chromium (Dis), µg/L	5	21	20.2	11.5	17.8	0.05 mg/L[b]	0
Chromium (Total), µg/L	6	21	23.2	13.1	19.7	0.05 mg/L[b]	0
Copper (Dis), µg/L	1	21	12.6	12.6	12.6	1.0 mg/L[e]	0
Copper (Total), µg/L	2	21	17.2	10.9	14.05	1.0 mg/L[e]	0
Ethane, 1,1,2-Trichloro-1,2	3	21	75	43	55.67	*c*	*d*
Ethanol, 2-(2-Methoxyethoxy)	1	21	28	28	28	*c*	*d*
Fluoride, mg/L	10	21	1.7	0.1	0.41	2 mg/L[e]	0
Gross alpha (Total), pCi/L		21	23.6 ± 8.2	−1.02 ± 2.5		15 pCi/L[f]	5
Gross alpha (Dis), pCi/L		21	21.1 ± 7.4	−1.06 ± 3.35		15 pCi/L[f]	3
Gross beta (Total), pCi/L		21	675 ± 69	0.1 ± 3.24		50 pCi/L[f]	7
Gross beta (Dis), pCi/L		21	429 ± 45	0.1 ± 3.37		50 pCi/L[f]	4
Iron (Dis), µg/L	6	21	598	15.8	130.68	0.30 mg/L[e]	1
Iron (Total), µg/L	6	21	5,550	57.1	1,220.08	0.30 mg/L[e]	2
Lead (Total) µg/L	1	21	8.8	8.8	8.8	0.05 mg/L[b]	0

Table 5.30 (WAG 10 continued)

Analyte[a]	Number detected	Number of samples	Values above detection limit			Reference value	Number of values exceeding reference
			Max	Min	Av		
Magnesium (Dis), µg/L	6	21	22,600	5,110	9,521.67	[c]	[d]
Magnesium (Total), µg/L	6	21	25,000	5,160	10,066.67	[c]	[d]
Manganese (Dis), µg/L	6	21	1,070	33.9	566.82	0.05 mg/L[e]	5
Manganese (Total), µg/L	6	21	1,130	189	639.33	0.05 mg/L[e]	6
Methylene Chloride, µg/L	23	21	27	1	7.09	[c]	[d]
Nickel (Total), µg/L	1	21	38.2	38.2	38.2	0.10 mg/L[g]	0
n-Butylbenzenesulphonamide	1	21	18	18	18	[c]	[d]
pH		88	8.45	6.31	7.25	6.5–8.5[e]	12
Potassium (Dis), µg/L	6	21	3,050	517	1,454.5	[c]	[d]
Potassium (Total), µg/L	6	21	4,720	537	1,932.83	[c]	[d]
Silver (Dis), µg/L	6	21	22.8	10.1	17.92	0.05 mg/L[g]	0
Silver (Total), µg/L	6	21	23	12.4	18.58	0.05 mg/L[g]	0
Sodium (Dis), µg/L	6	21	7,200	466	3,366	[c]	[d]
Sodium (Total), µg/L	6	21	7,130	710	3,498.33	[c]	[d]
Conductivity, µmhos/cm		89	527	190	357.93	[c]	[d]
^{99}Tc (Dis), pCi/L	21	21	708 ± 80	–3.9 ± 10.1		4,000 pCi/L[f]	0
^{99}Tc (Total), pCi/L	20	21	1,100 ± 120	–2.4 ± 11.3		4,000 pCi/L[f]	0
Tetrachloroethene	6	21	34	1	8.5	[c]	[d]
Trichloroethene	12	21	3,100	3	571.58	0.0050 mg/L[b]	10
Unknown	2	21	8.4	8.1	8.25	[c]	[d]
Unknown C_6H_{10}	4	21	920	750	850	[c]	[d]
Total Uranium (Dis), µg/L	21	21	4.68 ± 0.49	0.077 ± 0.01		[c]	[d]
Total Uranium (Total), µg/L	20	21	5.27 ± 0.57	0.098 ± 0.011		[c]	[d]
Vanadium (Dis), µg/L	4	21	12.7	10.9	11.83	[c]	[d]
Vanadium (Total), µg/L	5	21	19.4	10.8	13.34	[c]	[d]
Zinc (Dis), µg/L	4	21	13.8	5.6	8.8	5 mg/L[e]	0
Zinc (Total), µg/L	5	21	79.7	5.3	22.28	5 mg/L[e]	0

[a]For radionuclides and metals Total = unfiltered sample (soluable + suspended) and Dis (dissolved) = filtered sample (soluable only). For organics Total = total detected for that particular species.

[b]Federal Primary Drinking Water Standards 40 CFR (7-1-1990 Edition) Part 141—National Primary Drinking Water Regulations, Subpart B-Maximum Contaminant Levels.

[c]No reference

[d]Not applicable

[e]Federal Secondary Drinking Water Standards 40 CFR (7-1-1990 Edition) Part 143—National Secondary Drinking Water Regulations.

[f]DOE Guidelines for Radionuclides: DOE Order 5400.5, February 8, 1990. Chapter III, Derived Concentration Guides for Air and Water, which is 4% of the DCG (equivalent to 4 mrem.

[g]State of Tennessee General Water Quality Criteria: 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.

Table 5.31. Summary of constituents detected in off-site groundwater during 1991

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][c]
			Max[a]	Min[a]	Av[b]		
Anions (mg/L), unfiltered							
Chloride	38	42	77	1.0	6.2*	250	0[3]
Fluoride	9	42	6.9	0.10	1.6	4.0	2[2]
Nitrate	22	42	14	1.0	4.1*	10	2[2]
Sulfate, as SO_4	41	42	52	1.0	11*	250	0[3]
Field measurements, unfiltered							
Conductivity (mS/cm)	42	42	1.9	0.073	0.77*	*d*	[*d*]
Temperature (°C)	42	42	26	7.9	16*	30	0[1]
pH (standard units)	42	42	8.7	6.9	7.6*	(6.5, 8.5)	2[3]
Metals (mg/L), unfiltered							
Barium	42	42	0.39	0.0010	0.079*	2.0	0[2]
Calcium	42	42	100	0.44	41*	*d*	[*d*]
Chromium	17	42	0.022	0.0044	0.011*	0.050	0[1]
Cobalt	1	42	0.0054	0.0054	0.0054	*d*	[*d*]
Copper	25	42	0.10	0.0044	0.028*	1.0	0[1]
Iron	29	42	30	0.0059	2.7*	0.30	8[3]
Lead	6	42	0.023	0.0050	0.0093*	0.050	0[1]
Magnesium	42	42	28	0.19	14*	*d*	[*d*]
Manganese	23	42	1.4	0.0011	0.13*	0.050	6[3]
Nickel	13	42	0.013	0.0044	0.0078*	0.10	0[1]
Sodium	32	42	420	0.56	44*	*d*	[*d*]
Uranium, total	23	42	0.0025	0.00020	0.00084*	*d*	[*d*]
Vanadium	4	42	0.0036	0.0027	0.0032*	*d*	[*d*]
Zinc	40	42	0.65	0.0046	0.13*	5.0	0[1]
Radionuclides (pCi/L),[e] unfiltered							
^{60}Co	3	42	59	3.0	22	200	0[4]
^{137}Cs	3	42	62	14	46	120	0[4]
Gross alpha	42	42	13	−1.4	1.5*	15	0[2]
Gross beta	42	42	43	−0.81	6.9*	50	0[2]
^{3}H	2	42	1,200	950	1,100*	20,000	0[2]
$^{89}Sr + ^{90}Sr$	42	42	8.6	−2.0	2.1*	8.0	2[2]
^{99}Tc	7	42	22	4.3	11*	4,000	0[4]
Uranium, total (pCi/L)[f]	23	42	1.7	0.13	0.56*	24	0[4]

Table 5.31 (continued)

Analyte	Number detected	Number of samples	Detected values			Reference value[c]	Number of values exceeding reference [ref][c]
			Max[a]	Min[a]	Av[b]		
Tentatively identified compounds (µg/L), unfiltered							
Acetic acid, methyl ester	2	42	J 140	J 30	85	*d*	[*d*]
Cyclohexane	3	42	JB 10	JB 9.0	9.7*	*d*	[*d*]
Freon 113	1	42	J 9.0	J 9.0	9.0	*d*	[*d*]
Furan,tetrahydro—11.68	1	42	J 8.0	J 8.0	8.0	*d*	[*d*]
Unknown (acetic acid ester)	3	42	J 34	J 7.0	17	*d*	[*d*]
Unknown acid ester	1	42	J 9.0	J 9.0	9.0	*d*	[*d*]
		42					
Volatile organics (µg/L), unfiltered							
1,2-Dichloroethane	7	42	J 1.0	J 0.50	0.81*	5.0	0[2]
Acetone	4	42	30	4.0	20*	*d*	[*d*]
Benzene	2	42	J 1.0	J 0.30	0.65	5.0	0[2]
Carbon disulfide	8	42	4.0	J 0.50	1.2*	*d*	[*d*]
Chloroform	3	42	9.0	J 0.50	3.8	100	0[2]
Toluene	1	42	E 56	E 56	56	*d*	[*d*]

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

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

[c]If a reference limit exists, the source is enclosed in brackets and coded as:

1. Rules of Tennessee Department of Environment and Conservation, Bureau of Environment, Division of Water Pollution Control, Chapter 1200-4-3, General Water Quality Criteria, as amended.
2. 40 CFR Part 141—National Primary Drinking Water Regulations, Subparts B and G, as amended.
3. 40 CFR Part 143—National Secondary Drinking Water Regulations, as amended.
4. DOE Order 5400.5, Chapter III, Derived Concentration Guides for Air and Water, as amended.

[d]Not applicable.

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

[f]Calculated activity, assuming natural abundance.

6. BIOLOGICAL MONITORING

Table 6.1. 1991 ORNL concentrations of ^{131}I in raw milk

Station[a]	Number of samples	Concentration (pCi/L)			
		Max	Min	Av[b]	Standard error[c]
		Immediate environs			
1	10	1.1	–2.2	–0.16	0.35
2	12	1.4	–0.38	0.29*	0.16
3	12	1.3	–0.81	–0.025	0.18
4	12	1.4	–1.1	–0.11	0.20
8	4	0.81	–0.54	0.027	0.32
Network summary	50	1.4	–2.2	0.0065	0.10

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

[b]An asterisk (*) indicates that the average is significantly greater than zero at the 95% confidence level.

[c]Standard error of the mean.

Table 6.2. 1991 ORNL 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	6.8	1.3	2.8*	0.57
2	12	7.0	0.81	3.2*	0.51
3	12	11	1.2	4.3*	0.81
4	12	9.2	1.5	4.0*	0.62
8	4	4.9	0.86	3.7*	0.95
Network summary	50	11	0.81	3.6*	0.31

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

[b]An asterisk (*) indicates that the average is significantly greater than zero at the 95% confidence level.

[c]Standard error of the mean.

Table 6.3. 1991 mercury concentrations in Clinch River bluegill

Location[a]	Number of fish sampled	Concentration (μg/g wet wt)			
		Max	Min	Av	Standard error[b]
CRK 8.0	12	0.15	0.050	0.11	0.0081
CRK 33.3	12	0.070	0.024	0.039	0.0041
CRK 40.0	12	0.067	0.023	0.043	0.0046

[a]See Fig. 6.2 in Vol. 1.
[b]Standard error of the mean.

Table 6.4. 1991 total PCB concentrations in Clinch River bluegill

Location[a]	Number of fish sampled	Concentration (μg/g wet wt)			
		Max	Min	Av	Standard error[b]
CRK 8.0	12	<1.3	~0.028	<0.50	0.14
CRK 33.3	12	<1.2	~0.012	<0.50	0.14
CRK 40.0	12	<1.5	JB0.015	<0.44	0.14

[a]See Fig. 6.2 in Vol 1.
[b]Standard error of the mean.

Table 6.5. 1991 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	0.16	–0.24	–0.022	0.058
CRK 8.0	^{137}Cs	6	6.7	4.8	5.8*	0.30
CRK 8.0	Total Sr[e]	6	0.91	0.029	0.39*	0.15
CRK 33.3	^{60}Co	6	0.35	–0.10	0.18*	0.068
CRK 33.3	^{137}Cs	6	21	6.7	14*	2.2
CRK 33.3	Total Sr[e]	6	5.6	0.24	2.3*	0.89
CRK 40.0	^{60}Co	6	0.10	–0.13	–0.022	0.043
CRK 40.0	^{137}Cs	6	0.91	0.32	0.52*	0.090
CRK 40.0	Total Sr[e]	6	0.29	–0.054	0.11*	0.050
		Concentration (pCi/g wet wt)				
CRK 8.0	^{60}Co	6	0.0019	–0.0031	0.00033	0.00073
CRK 8.0	^{137}Cs	6	0.087	0.060	0.074*	0.0050
CRK 8.0	Total Sr[e]	6	0.012	0.00035	0.0051*	0.0021
CRK 33.3	^{60}Co	6	0.0039	–0.0013	0.0022*	0.00081
CRK 33.3	^{137}Cs	6	0.25	0.077	0.17*	0.025
CRK 33.3	Total Sr[e]	6	0.057	0.0030	0.026*	0.0096
CRK 40.0	^{60}Co	6	0.0014	–0.0016	–0.00026	0.00055
CRK 40.0	^{137}Cs	6	0.011	0.0039	0.0065*	0.0010
CRK 40.0	Total Sr[e]	6	0.0039	–0.00065	0.0015*	0.00066

[a]See Fig. 6.2 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 (^{89}Sr and ^{90}Sr).

7. SOIL AND SEDIMENT MONITORING

ection limit		Reference value[c]	Number of values exceeding reference [ref][d]
	Av[b]		
	12*	*e*	[*e*]
	1.4	0.050	6[3]
	0.0078*	0.10	0[1]
	2.0*	*e*	[*e*]
	7.0*	*e*	[*e*]
	46*	*e*	[*e*]
	0.0039	*e*	[*e*]
	0.014*	5.0	0[1]
	270*	*e*	[*e*]
	270*	*e*	[*e*]
	0.19*	*e*	[*e*]
	0.96*	*e*	[*e*]
	9.4*	*e*	[*e*]
	340*	500	1[1]
	9.7	*e*	[*e*]
	51	200	0[4]
	59	120	0[4]
	6.9*	15	1[2]
	8.8*	50	0[2]
	61,000	20,000	1[2]
	3.9*	8.0	0[2]
	69*	200	0[4]
	6.2*	15	0[2]
	12*	50	0[2]
	40,000	20,000	1[2]
	4.2*	8.0	1[2]
	7.0	*e*	[*e*]

Table 5.16 (WAG 2 continued)

Analyte	Number detected	Number of samples	Values above the de	
			Max[a]	Min[a]
			Downgradient wells (continued)	
Nickel	5	8	0.18	0.004
Potassium	8	8	3,000	0.92
Silicon	8	8	26	3.4
Sodium	7	8	190	11
Vanadium	3	8	0.021	0.002
Zinc	4	8	0.045	0.008
Others, filtered				
Alkalinity (mg/L)	8	8	440	110
Others, unfiltered (mg/L)				
Alkalinity	8	8	440	110
Ammonia	8	8	11	0.030
Carbon, total organic	8	8	4.7	0.50
Cyanide, total	1	8	0.010	0.010
Halides, total organic	4	8	6.8	5.3
Solids, total dissolved	7	8	480	91
Solids, total suspended	3	8	610	33
Radionuclides,[f] filtered (pCi/L)				
^{60}Co	2	8	59	41
Gross alpha	3	8	3.0	2.5
Gross beta	4	8	1,600	3.2
^{3}H	5	8	180,000	760
$^{89}Sr + {}^{90}Sr$	1	8	760	760
Radionuclides,[f] unfiltered (pCi/L)				
Gross alpha	4	8	4.9	1.7
Gross beta	5	8	1,600	3.2
^{3}H	5	8	180,000	780
$^{89}Sr + {}^{90}Sr$	3	8	860	2.1
Tentatively identified compounds, unfiltered (µg/L)				
Unknown-6.09	1	1	J 6.0	J 6.0
Unknown-6.13	2	2	J 21	J 5.0
Volatile Organics, unfiltered (µg/L)				
Acetone	5	8	J 3.0	JB 2.0
Benzene	1	8	J 1.0	J 1.0
Carbon disulfide	1	8	J 1.0	J 1.0
Vinyl acetate	1	8	J 1.0	J 1.0

Table 7.1. 1991 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	60	<0.52	<6.3	4.1
Al	15	24,000	7,900	16,000	1,300
As	15	18	<5.2	<8.6	1.2
B	15	<10	<8.3	<9.5	0.13
Ba	15	540	23	150	31
Be	15	1.7	0.59	1.2	0.081
Ca	15	85,000	2,100	19,000	6,200
Cd	15	8.1	1.5	2.8	0.40
Co	15	55	9.0	19	2.9
Cr	15	37	20	27	1.4
Cu	15	54	4.7	24	3.7
Fe	15	37,000	18,000	30,000	1,500
Hg	15	0.27	0.040	0.099	0.016
Li	15	<2,000	<1,600	<1,800	30
Mg	15	36,000	550	5,600	2,200
Mn	15	6,900	500	1,700	440
Mo	15	<5.2	<4.1	<4.8	0.073
Na	15	<650	<520	<600	9.3
Ni	15	47	8.1	26	3.1
P	15	520	120	340	33
Pb	15	85	<5.2	<27	5.8
Sb	15	6.5	<5.2	<6.0	0.099
Se	15	8.3	<5.2	<6.1	0.18
Si	15	1,800	1,000	1,500	53
Sn	15	<6.5	<5.2	<6.0	0.093
Sr	15	61	7.5	22	4.4
Ti	15	210	61	130	14
V	15	59	21	34	2.9
Zn	15	4,000	13	350	260
Zr	15	17	4.3	9.8	0.90

[a]See Fig. 3.19 in Vol. 1.
[b]Standard error of the mean.

Table 7.2. 1991 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	19	<0.53	<3.1	2.0
Al	9	23,000	14,000	20,000	1,200
As	9	13	<5.3	<6.7	0.84
B	9	<10	<8.5	<9.1	0.16
Ba	9	160	59	110	12
Be	9	1.3	0.66	1.0	0.068
Ca	9	36,000	820	11,000	4,600
Cd	9	3.1	1.2	1.9	0.21
Co	9	36	12	19	2.3
Cr	9	36	22	27	1.5
Cu	9	31	7.9	20	3.0
Fe	9	35,000	20,000	26,000	1,600
Hg	9	5.1	0.070	1.2	0.66
Li	9	<1,900	<1,600	<1,700	36
Mg	9	7,100	1,000	3,200	850
Mn	9	2,400	570	1,100	180
Mo	9	<5.0	<4.3	<4.6	0.080
Na	9	<620	<530	<570	9.7
Ni	9	36	9.4	21	3.1
P	9	930	100	340	82
Pb	9	62	14	38	6.3
Sb	9	<6.2	<5.3	<5.7	0.095
Se	9	<6.2	<5.3	<5.7	0.095
Si	9	2,400	1,100	1,800	130
Sn	9	<6.2	<5.3	<5.7	0.095
Sr	9	42	5.9	17	4.7
Ti	9	430	120	210	30
V	9	49	25	36	2.7
Zn	9	130	32	66	12
Zr	9	14	4.0	8.1	1.1

[a]See Fig. 3.19 in Vol. 1.
[b]Standard error of the mean.

Table 7.3. Analysis of soil at ORNL air station 3, 1991[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av[b]	Standard error[c]
		Metals (mg/kg dry wt)			
Ag	3	60	<0.65	<22	19
Al	3	12,000	10,000	11,000	580
As	3	14	<6.2	<8.8	2.6
B	3	<10	<9.9	<10	0.033
Ba	3	170	67	110	31
Be	3	1.1	0.79	1.0	0.10
Ca	3	85,000	12,000	49,000	21,000
Cd	3	2.6	2.2	2.4	0.12
Co	3	13	9.3	12	1.2
Cr	3	27	20	23	2.0
Cu	3	31	14	22	4.9
Fe	3	32,000	22,000	28,000	3,000
Hg	3	0.27	0.040	0.16	0.067
Li	3	<2,000	<1,900	<1,900	33
Mg	3	36,000	1,600	15,000	11,000
Mn	3	930	500	730	120
Mo	3	<5.2	<4.9	<5.0	0.088
Na	3	<650	<620	<630	8.8
Ni	3	24	14	19	2.9
P	3	450	160	290	86
Pb	3	34	21	28	3.8
Sb	3	<6.5	<6.2	<6.3	0.088
Se	3	<6.5	<6.2	<6.3	0.088
Si	3	1,800	1,500	1,600	88
Sn	3	<6.5	<6.2	<6.3	0.088
Sr	3	61	15	45	15
Ti	3	86	69	76	5.1
V	3	40	21	28	5.9
Zn	3	170	54	100	35
Zr	3	11	8.1	10	0.97
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.089	–0.0027	0.028	0.031
^{137}Cs	3	4.1	0.92	2.2	0.96
G-Alpha	3	8.9	6.5	8.1*	0.81
G-Beta	3	19	14	17*	1.9
^{40}K	3	13	8.1	9.8*	1.6
^{238}Pu	3	0.046	–0.011	0.010	0.018
^{239}Pu	3	0.084	0.011	0.053	0.022
^{228}Th	3	0.81	0.49	0.67*	0.095
^{230}Th	3	0.65	0.25	0.39*	0.13
^{232}Th	3	0.51	0.30	0.42*	0.065
Total-Sr	3	1.8	0.81	1.2*	0.29
^{234}U	3	0.95	0.30	0.61*	0.19
^{235}U	3	0.059	0.024	0.042*	0.010
^{238}U	3	0.76	0.19	0.42	0.17

[a]See Fig. 3.19 in Vol. 1.

[b]Averages of radionuclides significantly greater than zero are identified by an asterisk (*).

[c]Standard error of the mean.

Table 7.4. Analysis of soil at ORNL air station 7, 1991[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av[b]	Standard error[c]
		Metals (mg/kg dry wt)			
Ag	3	21	<0.56	<7.6	6.7
Al	3	21,000	19,000	20,000	670
As	3	<6.5	<5.6	<6.0	0.26
B	3	<10	<9.0	<9.5	0.29
Ba	3	170	87	120	25
Be	3	1.7	1.2	1.5	0.15
Ca	3	22,000	5,300	11,000	5,500
Cd	3	2.6	2.0	2.2	0.20
Co	3	19	15	17	1.2
Cr	3	27	24	25	0.88
Cu	3	19	17	18	0.58
Fe	3	32,000	28,000	30,000	1,200
Hg	3	0.070	0.060	0.067	0.0033
Li	3	<2,000	<1,700	<1,800	88
Mg	3	3,700	2,800	3,200	270
Mn	3	1,300	1,200	1,300	33
Mo	3	<5.2	<4.5	<4.8	0.21
Na	3	<650	<560	<600	26
Ni	3	26	21	24	1.5
P	3	510	340	440	51
Pb	3	21	17	19	1.2
Sb	3	<6.5	<5.6	<6.0	0.26
Se	3	<6.5	<5.6	<6.0	0.26
Si	3	1,700	1,500	1,600	58
Sn	3	<6.5	<5.6	<6.0	0.26
Sr	3	24	12	16	4.0
Ti	3	120	98	110	7.0
V	3	30	27	29	1.0
Zn	3	95	58	77	11
Zr	3	12	9.2	11	0.82
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.078	0.014	0.035	0.022
^{137}Cs	3	1.5	0.32	0.80	0.34
G-Alpha	3	8.1	5.1	6.9*	0.91
G-Beta	3	27	14	20*	3.9
^{40}K	3	20	16	18*	1.2
^{238}Pu	3	0.022	–0.016	0.0080	0.012
^{239}Pu	3	0.17	–0.018	0.060	0.056
^{228}Th	3	0.84	0.65	0.77*	0.059
^{230}Th	3	0.41	0.25	0.31*	0.048
^{232}Th	3	0.59	0.35	0.50*	0.077
Total-Sr	3	0.57	0.51	0.53*	0.018
^{234}U	3	0.51	0.35	0.46*	0.054
^{235}U	3	0.032	0.018	0.025*	0.0042
^{238}U	3	0.32	0.30	0.32*	0.0090

[a]See Fig. 3.19 in Vol. 1.

[b]Averages of radionuclides significantly greater than zero are identified by an asterisk (*).

[c]Standard error of the mean.

Table 7.5. Analysis of soil at ORNL air station 9, 1991[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av[b]	Standard error[c]
		Metals (mg/kg dry wt)			
Ag	3	0.74	<0.59	<0.65	0.046
Al	3	19,000	7,900	13,000	3,200
As	3	<6.2	<5.8	<6.0	0.12
B	3	<9.9	<9.4	<9.6	0.17
Ba	3	180	60	110	36
Be	3	1.4	0.59	0.89	0.25
Ca	3	44,000	2,100	16,000	14,000
Cd	3	3.1	1.5	2.1	0.49
Co	3	25	9.0	18	4.8
Cr	3	32	21	25	3.5
Cu	3	13	4.7	8.8	2.4
Fe	3	37,000	18,000	25,000	5,900
Hg	3	0.11	0.050	0.083	0.018
Li	3	<1,900	<1,800	<1,800	33
Mg	3	6,900	550	2,900	2,000
Mn	3	4,000	760	2,300	940
Mo	3	<4.9	<4.7	<4.8	0.067
Na	3	<620	<580	<600	12
Ni	3	12	8.1	9.8	1.1
P	3	470	120	310	100
Pb	3	37	24	30	3.8
Sb	3	<6.2	<5.8	<6.0	0.12
Se	3	<6.2	<5.8	<6.0	0.12
Si	3	1,500	1,000	1,300	150
Sn	3	<6.2	<5.8	<6.0	0.12
Sr	3	37	7.5	17	9.8
Ti	3	120	61	100	20
V	3	41	27	33	4.2
Zn	3	28	13	21	4.4
Zr	3	17	8.2	12	2.6
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.019	–0.014	–0.0027	0.011
^{137}Cs	3	1.1	0.41	0.77*	0.20
G-Alpha	3	7.8	3.2	6.3*	1.5
G-Beta	3	17	4.3	11*	3.7
^{40}K	3	13	5.1	8.4*	2.4
^{238}Pu	3	0.0054	–0.020	–0.0040	0.0081
^{239}Pu	3	0.046	–0.0073	0.012	0.017
^{228}Th	3	1.0	0.59	0.81*	0.12
^{230}Th	3	0.43	0.30	0.37*	0.039
^{232}Th	3	0.73	0.41	0.56*	0.094
Total-Sr	3	0.57	0.38	0.44*	0.063
^{234}U	3	0.49	0.41	0.45*	0.024
^{235}U	3	0.049	0.0027	0.028	0.013
^{238}U	3	0.35	0.19	0.29*	0.051

[a]See Fig. 3.19 in Vol. 1.

[b]Averages of radionuclides significantly greater than zero are identified by an asterisk (*).

[c]Standard error of the mean.

Table 7.6. Analysis of soil at ORNL air station 20, 1991[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av[b]	Standard error[c]
		Metals (mg/kg dry wt)			
Ag	3	<0.62	<0.52	<0.57	0.029
Al	3	24,000	20,000	22,000	1,200
As	3	<6.2	<5.2	<5.7	0.29
B	3	<9.9	<8.3	<9.1	0.46
Ba	3	180	160	170	6.7
Be	3	1.3	1.2	1.3	0.033
Ca	3	5,200	2,700	3,800	740
Cd	3	2.5	2.3	2.4	0.058
Co	3	19	18	18	0.33
Cr	3	37	32	35	1.7
Cu	3	26	22	24	1.2
Fe	3	37,000	34,000	36,000	1,000
Hg	3	0.070	0.040	0.053	0.0088
Li	3	<1,900	<1,600	<1,700	88
Mg	3	4,500	4,100	4,300	120
Mn	3	870	550	670	100
Mo	3	<4.9	<4.1	<4.5	0.23
Na	3	<620	<520	<570	29
Ni	3	36	33	34	0.88
P	3	360	190	270	50
Pb	3	8.3	<5.2	<6.6	0.91
Sb	3	<6.2	<5.2	<5.7	0.29
Se	3	<6.2	<5.2	<5.7	0.29
Si	3	1,700	1,200	1,500	150
Sn	3	<6.2	<5.2	<5.7	0.29
Sr	3	14	11	12	0.88
Ti	3	210	200	210	3.3
V	3	30	27	29	1.0
Zn	3	65	62	64	0.88
Zr	3	6.5	4.3	5.4	0.64
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.073	0.024	0.044*	0.015
^{137}Cs	3	0.57	0.14	0.36*	0.12
G-Alpha	3	5.1	4.1	4.7*	0.32
G-Beta	3	15	14	14*	0.45
^{40}K	3	26	18	22*	2.5
^{238}Pu	3	0.0068	–0.0025	0.0029	0.0028
^{239}Pu	3	0.0086	0.00027	0.0036	0.0026
^{228}Th	3	0.51	0.30	0.41*	0.063
^{230}Th	3	0.14	0.092	0.12*	0.015
^{232}Th	3	0.46	0.23	0.35*	0.068
Total-Sr	3	0.38	0.19	0.26*	0.059
^{234}U	3	0.35	0.16	0.24*	0.057
^{235}U	3	0.19	0.022	0.11	0.048
^{238}U	3	0.20	0.097	0.15*	0.030

[a]See Fig. 3.19 in Vol. 1.

[b]Averages of radionuclides significantly greater than zero are identified by an asterisk (*).

[c]Standard error of the mean.

Table 7.7. Analysis of soil at ORNL air station 21, 1991[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av[b]	Standard error[c]
		Metals (mg/kg dry wt)			
Ag	3	<0.60	<0.57	<0.59	0.0088
Al	3	19,000	12,000	14,000	2,300
As	3	18	13	16	1.7
B	3	<9.6	<9.2	<9.4	0.12
Ba	3	540	23	240	160
Be	3	1.4	1.2	1.3	0.067
Ca	3	23,000	4,300	13,000	5,400
Cd	3	8.1	2.6	4.7	1.7
Co	3	55	10	28	14
Cr	3	25	25	25	0
Cu	3	54	37	48	5.4
Fe	3	35,000	30,000	33,000	1,500
Hg	3	0.17	0.11	0.13	0.020
Li	3	<1,800	<1,700	<1,800	33
Mg	3	4,300	930	2,400	990
Mn	3	6,900	810	3,300	1,800
Mo	3	<4.8	<4.6	<4.7	0.058
Na	3	<600	<570	<590	8.8
Ni	3	47	31	41	4.9
P	3	520	330	420	55
Pb	3	85	<6.0	<52	24
Sb	3	6.5	<5.7	<6.1	0.23
Se	3	8.3	<5.7	<6.7	0.82
Si	3	1,500	1,400	1,500	33
Sn	3	6.1	<5.7	<5.9	0.12
Sr	3	25	12	18	3.8
Ti	3	210	96	140	35
V	3	59	45	53	4.1
Zn	3	4,000	250	1,500	1,200
Zr	3	15	6.6	11	2.4
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.027	–0.0054	0.012	0.0094
^{137}Cs	3	1.4	–0.011	0.52	0.45
G-Alpha	3	7.0	4.6	5.9*	0.70
G-Beta	3	9.7	7.0	8.0*	0.86
^{40}K	3	5.1	4.1	4.6*	0.31
^{238}Pu	3	0.0038	0.00081	0.0022	0.00087
^{239}Pu	3	0.027	–0.000081	0.012	0.0079
^{228}Th	3	0.46	0.43	0.44*	0.0090
^{230}Th	3	0.76	0.41	0.56*	0.10
^{232}Th	3	0.38	0.32	0.36*	0.018
Total-Sr	3	0.32	0.027	0.17	0.086
^{234}U	3	0.81	0.46	0.60*	0.11
^{235}U	3	0.032	0.022	0.028*	0.0032
^{238}U	3	0.43	0.30	0.35*	0.041

[a]See Fig. 3.19 in Vol. 1.

[b]Averages of radionuclides significantly greater than zero are identified by an asterisk (*).

[c]Standard error of the mean.

Table 7.8. Analysis of soil at ORR air station 40, 1991[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av[b]	Standard error[c]
		Metals (mg/kg dry wt)			
Ag	3	19	<0.53	<6.7	6.1
Al	3	22,000	15,000	18,000	2,000
As	3	<5.8	<5.3	<5.6	0.17
B	3	<9.4	<8.5	<9.1	0.28
Ba	3	160	140	150	6.7
Be	3	1.3	1.1	1.2	0.067
Ca	3	36,000	4,900	24,000	9,600
Cd	3	3.1	2.2	2.6	0.27
Co	3	19	15	17	1.2
Cr	3	36	28	31	2.4
Cu	3	26	26	26	0
Fe	3	35,000	29,000	31,000	1,900
Hg	3	5.1	0.10	3.1	1.5
Li	3	<1,800	<1,600	<1,700	67
Mg	3	7,100	5,500	6,400	480
Mn	3	1,100	850	940	80
Mo	3	<4.7	<4.3	<4.6	0.13
Na	3	<590	<530	<570	19
Ni	3	36	26	30	3.2
P	3	930	390	580	180
Pb	3	28	18	22	3.2
Sb	3	<5.8	<5.3	<5.6	0.17
Se	3	<5.8	<5.3	<5.6	0.17
Si	3	1,600	1,100	1,400	170
Sn	3	<5.8	<5.3	<5.6	0.17
Sr	3	42	12	31	9.4
Ti	3	430	210	300	67
V	3	33	25	28	2.5
Zn	3	110	59	77	17
Zr	3	14	7.0	10	2.1
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.016	–0.0054	0.0063	0.0063
^{137}Cs	3	0.78	0.11	0.37	0.21
G-Alpha	3	2.2	1.4	1.7*	0.23
G-Beta	3	3.0	1.9	2.5*	0.33
^{40}K	3	21	17	19*	1.1
^{238}Pu	3	0.0081	–0.0089	0.00063	0.0050
^{239}Pu	3	–0.0035	–0.0057	–0.0042	0.00072
^{228}Th	3	0.20	0.092	0.13*	0.036
^{230}Th	3	0.11	0.049	0.068*	0.019
^{232}Th	3	0.15	0.049	0.087	0.030
Total-Sr	3	0.054	0.011	0.034	0.013
^{234}U	3	0.81	0.43	0.59*	0.12
^{235}U	3	0.043	0.020	0.033*	0.0069
^{238}U	3	0.54	0.21	0.34*	0.10

[a]See Fig. 3.19 in Vol. 1.
[b]Averages of radionuclides significantly greater than zero are identified by an asterisk (*).
[c]Standard error of the mean.

Table 7.9. Analysis of soil at ORR air station 45, 1991[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av[b]	Standard error[c]
		Metals (mg/kg dry wt)			
Ag	3	5.3	<0.59	<2.2	1.6
Al	3	23,000	14,000	18,000	2,600
As	3	13	<5.9	<9.0	2.1
B	3	<10	<9.1	<9.5	0.26
Ba	3	88	59	72	8.5
Be	3	1.2	0.93	1.0	0.084
Ca	3	16,000	1,700	7,500	4,400
Cd	3	2.1	1.9	2.0	0.067
Co	3	36	16	24	6.2
Cr	3	29	22	27	2.3
Cu	3	31	18	26	3.9
Fe	3	28,000	25,000	27,000	880
Hg	3	0.86	0.18	0.44	0.21
Li	3	<1,900	<1,700	<1,800	58
Mg	3	3,100	1,000	1,900	620
Mn	3	1,200	570	870	180
Mo	3	<5.0	<4.5	<4.7	0.15
Na	3	<620	<570	<590	15
Ni	3	26	19	24	2.3
P	3	320	190	270	42
Pb	3	62	37	51	7.4
Sb	3	<6.2	<5.7	<5.9	0.15
Se	3	<6.2	<5.7	<5.9	0.15
Si	3	2,100	1,800	1,900	100
Sn	3	<6.2	<5.7	<5.9	0.15
Sr	3	23	6.9	13	5.1
Ti	3	180	120	150	18
V	3	49	38	44	3.3
Zn	3	130	52	88	23
Zr	3	10	4.0	7.9	1.9
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.0054	–0.051	–0.029	0.017
^{137}Cs	3	0.97	0.13	0.48	0.25
G-Alpha	3	2.0	0.95	1.5*	0.32
G-Beta	3	2.2	1.3	1.6*	0.30
^{40}K	3	11	6.8	8.5*	1.3
^{238}Pu	3	0.0062	–0.012	–0.0026	0.0053
^{239}Pu	3	0.0030	–0.0027	0.00036	0.0017
^{228}Th	3	0.10	0.059	0.081*	0.012
^{230}Th	3	0.073	0.043	0.057*	0.0087
^{232}Th	3	0.065	0.062	0.063*	0.00090
Total-Sr	3	0.049	–0.0027	0.023	0.015
^{234}U	3	0.49	0.15	0.31*	0.096
^{235}U	3	0.035	0.0073	0.019	0.0083
^{238}U	3	0.59	0.12	0.33	0.14

[a]See Fig. 3.19 in Vol. 1.

[b]Averages of radionuclides significantly greater than zero are identified by an asterisk (*).

[c]Standard error of the mean.

Table 7.10. Analysis of soil at ORR air station 46, 1991[a]

Analyte	Number of samples	Concentration			
		Max	Min	Av[b]	Standard error[c]
		Metals (mg/kg dry wt)			
Ag	3	<0.57	<0.54	<0.55	0.010
Al	3	23,000	20,000	22,000	1,000
As	3	<5.7	<5.4	<5.5	0.10
B	3	<9.1	<8.6	<8.8	0.17
Ba	3	140	93	110	15
Be	3	1.0	0.66	0.80	0.10
Ca	3	1,400	820	1,200	180
Cd	3	1.3	1.2	1.2	0.033
Co	3	20	12	17	2.4
Cr	3	26	22	24	1.2
Cu	3	10	7.9	9.0	0.61
Fe	3	24,000	20,000	21,000	1,300
Hg	3	0.090	0.070	0.080	0.0058
Li	3	<1,700	<1,600	<1,600	33
Mg	3	1,400	1,100	1,300	88
Mn	3	2,400	980	1,600	410
Mo	3	<4.5	<4.3	<4.4	0.067
Na	3	<570	<540	<550	10
Ni	3	11	9.4	10	0.48
P	3	200	100	160	31
Pb	3	59	14	40	13
Sb	3	<5.7	<5.4	<5.5	0.10
Se	3	<5.7	<5.4	<5.5	0.10
Si	3	2,400	2,000	2,200	120
Sn	3	<5.7	<5.4	<5.5	0.10
Sr	3	7.3	5.9	6.6	0.41
Ti	3	200	180	190	6.7
V	3	38	36	37	0.58
Zn	3	37	32	34	1.5
Zr	3	8.5	4.4	6.2	1.2
		Radionuclides (pCi/g dry wt)			
^{60}Co	3	0.062	0.0081	0.034	0.016
^{137}Cs	3	0.49	0.14	0.36*	0.11
G-Alpha	3	1.5	1.1	1.4*	0.11
G-Beta	3	1.8	1.6	1.7*	0.048
^{40}K	3	15	11	13*	1.1
^{238}Pu	3	0.0022	–0.0011	0.0011	0.0011
^{239}Pu	3	0.0022	0.00027	0.00090	0.00063
^{228}Th	3	0.12	0.092	0.11*	0.0087
^{230}Th	3	0.070	0.059	0.064*	0.0032
^{232}Th	3	0.092	0.078	0.084*	0.0041
Total-Sr	3	0.043	0.027	0.036*	0.0048
^{234}U	3	0.26	0.12	0.19*	0.040
^{235}U	3	0.020	0.010	0.014*	0.0031
^{238}U	3	0.16	0.076	0.11*	0.025

[a]See Fig. 3.19 in Vol. 1.
[b]Averages of radionuclides significantly greater than zero are identified by an asterisk (*).
[c]Standard error of the mean.

Table 7.11. 1991 total uranium and fluoride in soil from the K-25 Site perimeter[a]

Analyte	Number of samples	Concentration (μg/g dry wt)			
		Max	Min	Av	Standard error[b]
Total uranium	12	11.4	2.1	4.64	2.78
Fluoride	12	76	<12	29.17	27.95

[a]See Fig. 7.1 in Vol. 1.
[b]Standard error of the mean.

Table 7.12. ORNL 1991 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	<810	<140	<320	160
	Aroclor-1221	4	<810	<140	<320	160
	Aroclor-1232	4	<810	<140	<320	160
	Aroclor-1242	4	<810	<140	<320	160
	Aroclor-1248	4	<810	<140	<320	160
	Aroclor-1254	4	~790	<180	~470	130
	Aroclor-1260	4	~880	~160	~390	170
WOC 10	Aroclor-1016	4	<630	<120	<380	140
	Aroclor-1221	4	<630	<120	<380	140
	Aroclor-1232	4	<630	<120	<380	140
	Aroclor-1242	4	<630	<120	<380	140
	Aroclor-1248	4	<630	<120	<380	140
	Aroclor-1254	4	~780	~42	~400	160
	Aroclor-1260	4	<310	~8.0	~220	71
WOC 14	Aroclor-1016	4	<150	<100	<130	14
	Aroclor-1221	4	<150	<100	<130	14
	Aroclor-1232	4	<150	<100	<130	14
	Aroclor-1242	4	<150	<100	<130	14
	Aroclor-1248	4	<150	<100	<130	14
	Aroclor-1254	4	<310	~4.0	~180	64
	Aroclor-1260	4	<290	~69	~190	46
WOD 13	Aroclor-1016	4	<130	<110	<120	3.4
	Aroclor-1221	4	<130	<110	<120	3.4
	Aroclor-1232	4	<130	<110	<120	3.4
	Aroclor-1242	4	<130	<110	<120	3.4
	Aroclor-1248	4	<130	<110	<120	3.4
	Aroclor-1254	4	<250	~23	~180	54
	Aroclor-1260	4	<250	<220	<230	6.7
MB 07	Aroclor-1016	4	<130	<100	<120	6.5
	Aroclor-1221	4	<130	<100	<120	6.5
	Aroclor-1232	4	<130	<100	<120	6.5
	Aroclor-1242	4	<130	<100	<120	6.5
	Aroclor-1248	4	<130	<100	<120	6.5
	Aroclor-1254	4	<260	<210	<230	13
	Aroclor-1260	4	<260	<210	<230	13
CR 08	Aroclor-1016	4	<120	<110	<110	0.99
	Aroclor-1221	4	<120	<110	<110	0.99
	Aroclor-1232	4	<120	<110	<110	0.99
	Aroclor-1242	4	<120	<110	<110	0.99
	Aroclor-1248	4	<120	<110	<110	0.99
	Aroclor-1254	4	<230	<230	<230	1.8
	Aroclor-1260	4	<230	<230	<230	1.8

Table 7.12 (continued)

Location[a]	Analysis	Number of samples	Concentration (μg/kg)			
			Max	Min	Av	Standard error[b]
CR 09	Aroclor-1016	4	<130	<110	<120	4.9
	Aroclor-1221	4	<130	<110	<120	4.9
	Aroclor-1232	4	<130	<110	<120	4.9
	Aroclor-1242	4	<130	<110	<120	4.9
	Aroclor-1248	4	<130	<110	<120	4.9
	Aroclor-1254	4	<260	<220	<240	9.8
	Aroclor-1260	4	<260	<220	<240	9.8
CR 11	Aroclor-1016	4	<140	<120	<130	3.9
	Aroclor-1221	4	<140	<120	<130	3.9
	Aroclor-1232	4	<140	<120	<130	3.9
	Aroclor-1242	4	<140	<120	<130	3.9
	Aroclor-1248	4	<140	<120	<130	3.9
	Aroclor-1254	4	<270	~25	~200	60
	Aroclor-1260	4	<270	<240	<260	7.5
CR 12	Aroclor-1016	4	<120	<100	<110	3.4
	Aroclor-1221	4	<120	<100	<110	3.4
	Aroclor-1232	4	<120	<100	<110	3.4
	Aroclor-1242	4	<120	<100	<110	3.4
	Aroclor-1248	4	<120	<100	<110	3.4
	Aroclor-1254	4	<240	~8.0	~120	61
	Aroclor-1260	4	<240	<210	<230	6.8

[a]See Fig. 4.10 in Vol. 1.
[b]Standard error of the mean.

8. SPECIAL STUDIES

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

9. SOLID WASTE MANAGEMENT PROGRAM

Table 9.1. Y-12 Plant on-site waste treatment data for 1991

Waste	Quantity treated (kg)	Treatment method	Residue
	Liquids		
Nonhazardous	1,293,192[a]	*b*	Sludge
Hazardous	775,790	*c*	Sludge
Low-level aqueous	929,029	*b,d*	Sludge
Mixed	2,915,754	*b*	Sludge
	Solids		
Low-level solids	137,434	Compaction	Solid

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

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

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

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

Table 9.2. ORNL waste treatment data for 1991

Waste	Quantity treated (kg)	Treatment method	Residue
Hazardous	0	Detonation	None
Hazardous	1,269.70	Neutralization	None

Table 9.3. Y-12 Plant on-site waste disposal during 1991

Waste	Disposal method	Quantity (kg)
Sanitary/industrial		15,765,451[a,b]
Solid/low-level		1,469,957[a,b]
Classified		23,539

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

Table 9.4. ORNL on-site waste disposal during 1991

Waste	Disposal method	Quantity
Hazardous, kg	Released to air	442.79
Sanitary		
Radiological, m^3	Buried, SWSA 6	17.58
Nonradiological, m^3	Buried, SWSA 6	NA[a]
Asbestos		
Radiological, kg	Buried, SWSA 6	5,014.8
Scrap metal		
Radiological, kg	Buried, SWSA 6	31,012.8

[a] Not available.

Table 9.5. Y-12 Plant off-site waste disposal for 1991

Waste	Disposal method	Quantity (kg)
PCB/RCRA liquid	Incineration	338,346
PCB/RCRA solids	Incineration	23,272
PCB liquid	Incineration	33,348
PCB solid	Landfill burial	18,402
RCRA liquid	Incineration	134,221
Mercury	Landfill burial	342,468
RCRA	Incineration	11,859
Scrap metal (clean)	Public sale	454,725

Table 9.6. ORNL off-site waste disposal for 1991

Waste	Disposal method	Quantity (kg)	Location
Asbestos	Landfilling	19,229	Y-12 Sanitary Landfill, Oak Ridge, Tenn.
Hazardous	Incineration	14,840	Baton Rouge, La.
Hazardous	Incineration	68,933	El Dorado, Ark.
Hazardous	Chemical stabilization/ landfill	417	Emelle, Ala.

Table 9.7. K-25 Site off-site waste disposal activities during 1991

Waste	Quantity	Ultimate disposal
Asbestos (nonrad)	88 m^3	Y-12 landfill
Batteries (solid)	256 batteries	Sold to public (for recycle)
Brass	3,753 kg	Sold to public
Film (solid)	164.25 kg	Sold to public (for recovery)
Hazardous waste	38,045 kg	Commercial disposal facility
Lead	3,105 kg	Sold to public
Nonhazardous	13,136 m^3	Y-12 landfill
Office furniture	20,000 units	Sold to public
PCBs	794.035 kg	Commercial disposal facility
Scrap metal— nonradiological	148 tons	Sold to public
Tires	777 tires	Sold to public

Table 9.8. Waste placed in storage on-site at the Y-12 Plant in 1991

Waste	Quantity (kg)
Low-level	343,286
Mixed	340,643[a]
PCB	131,130
PCB/uranium	28,434
RCRA	109,972
Scrap metal	
Clean	854,882
Uranium-contaminated	950,080

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

Table 9.9. Total waste in storage at the Y-12 Plant at the end of 1991

Waste	Quantity (kg)
Low-level	884,103
Mixed	7,979,572
Hazardous	176,030
PCB	262,479
PCB/uranium	3,743,087
Noncontaminated oils/ solvents	351,476
Roofing materials	3,109,000
Scrap metal	
Clean	854,882
Uranium-contaminated	3,075,408

Table 9.10. Waste placed in storage at ORNL during 1991

Waste	Quantity
Hazardous, kg	65,898.24
Mixed, kg	19,273.08
PCB, kg	
Radiological	7,193.61
Nonradiological	14,694.00
Transuranic, kg	
Contact handled	3,358.8
Remote handled	1,270.0
Low-level, m^3	3.82 (1,739.9 kg)
Asbestos (kg)	
Nonradiological	0
Radiological	0
Scrap metal, kg	
Nonradiological	Not applicable
Radiological	31,012.8
Miscellaneous	
Radiological, m^3	0

Table 9.11. Total waste in storage at ORNL at the end of 1991

Waste	Quantity
Hazardous, kg	102,035.88
Mixed, kg	101,382.11
PCB, kg	
Radiological	13,130.50
Nonradiological	18,445.83
Transuranic, m^3	
Contact handled	NA[a]
Remote handled	NA[a]
Low level, m^3	
Scrap metal radiological (units)	

[a]Not available.

Table 9.12. K-25 Site waste placed in on-site storage during 1991

Waste	Quantity (kg)	Type storage[a]		Ultimate disposal
		Short-term	Long-term	
Scrap metal (noncompacted) (m^3)	654		X	Under review
CNF centrifuge sludge	93,949		X	Under review
Waste oils and waste oils contaminated with PCBS and/or solvents	104,760	X		TSCA Incinerator
Laboratory acids (BMP)	35,933	X		Under review
Laboratory bases (BMP)	3,971	X		Under review
Laboratory organics (BMP)	11,220	X		Under review
Laboratory sludges (BMP)	598	X		Under review
Photographic solutions	7,628	X		ORNL for silver recovery
Paint waste	11,798	X		TSCA Incinerator
Aerosal cans	1,033	X		To be punctured, segregated, nonhazardous to landfill, off-site.
TSCA ash	7,297		X	Under review
TSCA and IWS sludge	79,034		X	Under review
Gas cylinders	61		X	Under review
Metallic mercury	583	X		Off-site recycle
Solvent-contaminated rags	3,348	X		TSCA Incinerator
Low-level radioactive waste (m^3)	361		X	Under review
Flammable liquids (lab packs)	429	X		Off-site
Flammable liquids (bulk)	9,868	X		Off-site
Flammable solids (lab packs)	20	X		Off -ite
Flammable solids (bulk)	58	X		Off-site
Flammable corrosive liquids	3	X		Off-site
Corrosive liquids (lab packs)	166	X		Off-site
Corrosive liquids (bulk)	6,894	X		Off-site
Corrosive solids (lab packs)	161	X		Off-site
Corrosive solids (bulk)	12,374	X		Off-site
Poisonous solids (lab packs)	4	X		Off-site
Poisonous liquids (lab packs)	5	X		Off-site
Oxidizing acidic liquids	1,422	X		Off-site
Oxidizers, liquid (bulk)	142	X		
Oxidizers, solid (bulk)	45	X		
Combustible liquids	90	X		Off-site
PCB/RCRA liquids	313,448		X	Under review
PCB/RCRA solids	102,292		X	Under review
Hazardous wastes solids	17,825	X		Off-site
Hazardous waste liquids	35,919	X		Off-site
Hazardous wastes (lab packs)	53	X		Off-site

[a]Short-term storage is for periods less than 5 years; long-term storage is for periods greater than 5 years.

Table 9.13. Waste placed in storage at the K-25 Site from other DOE facilities during 1991

Waste	Quantity[a]	Type storage[b]		Ultimate disposal
		Short-term	Long-term	
Metal sludges and activated carbon (kg)	67,576			Under review
LLW (m^3)	112			Under review
Acetonitrile (kg)	4,136	X		Blended, TSCA incinerated
Hazardous waste radioactive materials, mixed (kg)	443,679		X	Under review
Hazardous waste contaminated soils (kg)	3,864		X	Under review

[a]Numbers are liters unless otherwise noted.

[b]Short-term storage is for periods less than 5 years; long-term storage is for periods greater than 5 years.

Table 9.14. Total waste in storage at the K-25 Site at the end of 1991

Waste	Quantity	Ultimate disposal
K-25 low-level waste (m^3)	1,048	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)	556,755	Incineration
Paint waste (kg)	52,667	Incineration
K-1232 spent carbon filter agent (mixed) (kg)	25,284	Under review
Portsmouth PCB contaminated soil (m^3)	1,832	Under review
Incineration ash (kg)	110,903	Under review
Incineration sludge (kg)	181,106	Under review
K-1407B/C pond sludge (mixed) (kg)	35,305,441	To be dewatered or decanted
RMI lead contaminated liquid (mixed) (kg)	23,843	Under review
WMCO hazardous waste liquid (mixed) (kg)	917	Incineration
WMCO hazardous waste solid (mixed) (m^3)	77	Under review
Y-12 LLW (m^3)	3,514	Under review
X-10 LLW (m^3)	835	Under review
Y-12 hazardous liquids (kg)	11,698	Under review
PORTS hazardous solids (kg)	7,845	Under review
PORTS hazardous liquids (kg)	24,149	Under review
RMI spent solvents (mixed) (kg)	1,245	Under review
X-10 hazardous liquids (L)	440	Under review
Lab pack chemicals (kg)	1,347	Incineration
Centrifuge epoxies/resins (kg)	7,691	Under review
CNF centrifuge sludge (kg)	689,444	Under review
Laboratory BMP solutions (kg)	192,224	Under review
Photo wastes (kg)	3,507	Off-site
Metallic mercury (kg)	1,760	Under review
Rags contaminated with solvents (kg)	5,757	Under review
Test burn materials (kg)	32,081	Under review
Metal shavings/lead (kg)	27,881	Under review
Hazardous waste liquids (kg)	76,541	Under review
Asbestos covered lead pipe (kg)	2,318	Under review
Hazardous waste solids (kg)	72,004	Under review
Gases/cylinders (kg)	579	Under review
TSCA + IWS sludge (kg)	181,106	Under review
Laundry sludge (kg)	35,193	Under review
Waste from treatment of WMCO hazardous waste liquid (kg)	5,658	Under review

10. QUALITY ASSURANCE

Table 10.1. Example of inorganic QC results for sampling GW-115

Y-12 Plant, 1991

Parameter	GW-115	Field replicate	Field blank
Concentration (mg/L)			
As	<0.050	<0.0059	*a*
Ba	0.25	0.25	*a*
Cd	<0.002	<0.002	*a*
Cr	<0.01	<0.01	*a*
Pb	<0.004	<0.004	*a*
Se	<0.050	<0.050	*a*
Ag	<0.01	0.01	*a*
Hg	<0.0002	<0.0060	*a*
pH (standard units)	7.4	7.5	*a*
Activity (pCi/L)[b]			
Alpha	1.45 ± 1.1	1.63 ± 1.1	*a*
Beta	6.79 ± 3.3	4.52 ± 3.2	*a*
Suspended solids (mg/L)	1.0	<1.0	*a*
U Fluorometric (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	217	216	*a*

[a]Not applicable.

[b]The confidence interval is reported per DOE/EH-0173T, Chapter 7, Section 7.1, Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance.

Table 10.2. Example of organic QC data at GW-115

Y-12 Plant, 1991

Parameter	GW-115	Field duplicate	Field blank	Field blank duplicate
		Volatile organic compounds (µg/L)		
Chloromethane	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U
Methylene chloride	5 U	5 U	5 U	5 U
Acetone	10 U	10 U	10 U	10 U
Carbon disulfide	5 U	5 U	5 U	5 U
1,1-dichloroethene	5 U	5 U	5 U	5 U
1,1-dichloroethane	5 U	5 U	5 U	5 U
Chloroform	5 U	0.8 JB	5 U	0.8 JB
1,2-dichloroethane	5 U	5 U	5 U	5 U
2-butanone	10 U	10 U	10 U	10 U
1,1,1-trichloroethane	5 U	5 U	5 U	5 U
Carbon tetrachloride	5 U	5 U	5 U	5 U
Vinyl acetate	10 U	10 U	10 U	10 U
Bromodichloromethane	5 U	5 U	5 U	5 U
1,1,2,2-tetrachloroethane	5 U	5 U	5 U	5 U
1,2-dichloropropane	5 U	5 U	5 U	5 U
Trans-1,3-dichloropropene	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U
1,1,2-trichloroethane	5 U	5 U	5 U	5 U
Benzene	5 U	5 U	5 U	5 U
Cis-1,3-dichloropropene	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U
2-hexanone	10 U	10 U	10 U	10 U
4-methyl-2-pentanone	10 U	10 U	10 U	10 U
Tetrachloroethene	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U
Xylenes	5 U	5 U	5 U	5 U
		Surrogate recovery (%)		
Toluene-D8	101.4	104.9	100.4	102.4
Bromofluorobenzene	101.9	106.3	99.8	104.6
1,2-dichloroethane D-4	104.1	113.1	96.3	104.4

U = compound analyzed for but not detected.

J = indicates an estimated value.

B = Analyte found in blank as well as sample.

Table 10.3. K-25 Site environmental analysis procedures for NPDES

Parameter	Regulatory method	Lowest concentration reported[a]
Alkalinity, $CaCO_3$ (mg/L)	EPA-310.1	1
Gross alpha activity (pCi/L)	EPA-900.0	1.0
Gross beta activity (pCi/L)	EPA-900.0	4.0
^{241}Am and ^{244}Cm (pCi/L)		
^{241}Am	ACD-160066[h]	3.0
^{244}Cm	ACD-160066[h]	3.0
As and Se, gaseous hydride-AA (mg/L)		
As	EPA-206.2	0.005
Se	EPA-270.2	0.005
Asbestos (fibers/L)		0.3×10^6
Biochemical oxygen demand, 5-d (mg/L)	EPA-405.1	5
Bromide, spectrophotometric (mg/L)	EPA-320.1	0.1
Chemical oxygen demand (low level) titration method (mg/L)	EPA-410.4	5
Chloride, titration, $HgNO_3$ (mg/L)	EPA-325.3	2
Anions, ion chromatograph[b] (mg/L)		
Chloride	EPA-300.0	1
Nitrate (N)	EPA-352.1	1
Sulfate	EPA-375.4	1
Phosphate (P)	EPA-365.1	1
$TRCl_2$, amperometric (mg/L)	EPA-330.1	0.05
Cr (VI), colorimetric (mg/L)	307B	0.01
Coliform bacteria, fecal (colonies/100 mL)	9221C Std Mth[d]	1
Coliform bacteria, total (colonies/100 mL)	9221B Std Mth	1
Color (color unit)	EPA-110.2	1
Conductance, specific (μmho/cm)	EPA-120.1	0.5
Cyanide, total (5-cm cell)	EPA-335.2	0.004
Dissolved oxygen, membrane electrode method (mg/L)	EPA-360.1	0.1
Fluoride (mg/L)	EPA-340.2	0.1
Gamma-ray emitters (pCi/L)		2.5
Herbicides (chlorinated phenoxy acid), GC method (μg/L)		
2,4-D	6640B Std Mth	<1.0
Silvex	6640B Std Mth	<0.1
Hg, total (mg/L)	EPA-245.1	0.0002
Methylene-blue-active substances (mg/L)	EPA-425.1	0.05
^{237}Np (pCi/L)	ACD-1665[h]	1.0
N (mg/L)		
Ammonia, SIE	EPA-350.3	0.2
Kjeldahl (total), spectrophotometric	EPA-351.3	0.2
Kjeldahl (total), volumetric	EPA-351.3	0.2
Kjeldahl (total), SIE	EPA-351.4	0.2
Nitrate, brucine method	EPA-352.1	0.1
Nitrate-nitrite, Cd-Redn.	EPA-353.3	0.1
O&G, gravimetric (mg/L)	EPA-413.1	5
Pesticides (organochlorine), GC method (μg/L)		
Lindane	EPA-608[e]	0.01
Endrin	EPA-608	0.05
Toxaphene	EPA-608	1.0
Methoxychlor	6630 B & C Std Mth	0.2
Phenols (mg/L)	EPA-420.1	0.03
pH, electrometric (standard units)	EPA-9040	Nearest 0.1

Table 10.3 (continued)

Parameter	Regulatory method	Lowest concentration reported[a]
P (all forms), spectrophotometric (mg/L)	EPA-365.2	0.1
Pu isotopes (pCi/L)	ACD-1665[h]	1.0
PCBs, each (μg/L)	EPA-608	
Aroclor-1016		0.5
Aroclor-1221		0.5
Aroclor-1232		0.5
Aroclor-1242		0.5
Aroclor-1248		0.5
Aroclor-1254		1.0
Aroclor-1260		1.0
Priority pollutants, organic (base/neutral/acid), each (μg/L)	CLP Methodology	Mostly 10–50[f]
Priority pollutants, organic (volatile, purgeable), each (μg/L)	CLP Methodology	Mostly 10–30[g]
Solids (residue)		
Dissolved (mg/L)	EPA-160.1	10
Settleable [mL/(L·h)]	EPA-160.5	0.1
Total (mg/L)	EPA-160.3	1.0
Undissolved (mg/L)	EPA-160.2	4
Volatile (mg/L)	EPA-160.4	5
^{90}Sr (pCi/L)	ACD-160069[h]	4.0
Sulfate, turbidimetric method (mg/L)	375.4	5
^{99}Tc (pCi/L)	ACD-160069[h]	300
Th isotopes (pCi/L)	ACD-1665[h]	0.4
Th, spectrophotometric (mg/L)		2×10^{-3}
Total organic carbon, combustion or oxidation (mg/L)	EPA-415.1	1
Tritium (pCi/L)	ACD-160059[h]	5000
Turbidity (NTU)	EPA-180.1	0.1
U (total), fluorometric (mg/L)	ACD-183707[h]	1×10^{-3}
U isotopes (pCi/L)	ACD-210026[h]	1
U isotopic abundances (wt %)	ACD-2116[h]	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.

[h]No regulatory method available for use.

Table 10.4. K-25 Site environmental analysis procedures for waste water characterization and groundwater monitoring

Parameter	Regulatory method	Lowest concentration reported[a]
Alkalinity, $CaCO_3$ (mg/L)	EPA-310.1	1
Gross alpha activity (pCi/L)	EPA-900.0	1.0
Gross beta activity (pCi/L)	EPA-900.0	4.0
^{241}Am and ^{244}Cm (pCi/L)		
^{241}Am	ACD-160066[h]	3.0
^{244}Cm	ACD-160066[h]	3.0
As, gaseous hydride-AA (mg/L)	EPA-7060	0.002
Se, gaseous hydride-AA (mg/L)	EPA-7740	0.002
Asbestos (fibers/L)		0.3×10^6
Biochemical oxygen demand, 5-d (mg/L)	EPA-405.1	5
Bromide, spectrophotometric (mg/L)	EPA-320.1	0.1
Chemical oxygen demand (low level) titration method (mg/L)	EPA-410.4	5
Chloride, titration, $HgNO_3$ (mg/L)	EPA-325.3	2
Anions, ion chromatograph[b] (mg/L)		
Chloride	EPA-300.0	1
Nitrate (N)	EPA-352.1	1
Sulfate	EPA-375.4	1
Phosphate (P)	EPA-365.1	1
$TRCl_2$, amperometric (mg/L)	EPA-330.1	0.05
Cr (VI), colorimetric (mg/L)	307B	0.01
Coliform bacteria, fecal (colonies/100 mL)	9221C Std Mth[d]	1
Coliform bacteria, total (colonies/100 mL)	9221B Std Mth	1
Color (color unit)	EPA-110.2	1
Conductance, specific (μmho/cm)	EPA-120.1	0.5
Cyanide, total (5-cm cell)	EPA-335.2	0.004
Dissolved oxygen, membrane electrode method (mg/L)	EPA-360.1	0.1
Fluoride (mg/L)	EPA-340.2	0.1
Gamma-ray emitters (pCi/L)		2.5
Herbicides (chlorinated phenoxy acid), GC method (μg/L)		
2,4-D	6640B Std Mth	<1.0
Silvex	6640B Std Mth	<0.1
Hg, total (mg/L)	245.1	0.0002
Methylene-blue-active substances (mg/L)	425.1	0.05
^{237}Np (pCi/L)	ACD-1665[h]	1.0
N (mg/L)		
Ammonia, SIE	EPA-350.3	0.2
Kjeldahl (total), spectrophotometric	EPA-351.3	0.2
Kjeldahl (total), volumetric	EPA-351.3	0.2
Kjeldahl (total), SIE	EPA-351.4	0.2
Nitrate, brucine method	EPA-352.1	0.1
Nitrate-nitrite, Cd-Redn.	EPA-353.3	0.1
N-nitrosomorpholine, spectrophotometric (mg/L)		0.1
O&G, gravimetric (mg/L)	EPA-413.1	5
Pesticides (organochlorine), GC method (μg/L)		
Lindane	EPA-608[e]	0.01
Endrin	EPA-608	0.05
Toxaphene	EPA-608	1.0
Methoxychlor	6630 B & C Std Mth	0.2
Phenols (mg/L)	EPA-420.1	0.03
pH, electrometric (standard units)	EPA-9040	Nearest 0.1

Table 10.4 (continued)

Parameter	Regulatory method	Lowest concentration reported[a]
P (all forms), spectrophotometric (mg/L)	EPA-365.2	0.1
Pu isotopes (pCi/L)		1.0
PCBs, each (μg/L)	EPA-8080	
Aroclor-1016		0.5
Aroclor-1221		0.5
Aroclor-1232		0.5
Aroclor-1242		0.5
Aroclor-1248		0.5
Aroclor-1254		1.0
Aroclor-1260		1.0
Priority pollutants, organic (base/neutral/acid), each (μg/L)	CLP Methodology	Mostly 10–50[f]
Priority pollutants, organic (volatile, purgeable), each (μg/L)	CLP Methodology	Mostly 10–30[g]
Solids (residue)		
Dissolved (mg/L)	EPA-160.1	10
Settleable [mL/(L·h)]	EPA-160.5	1.0
Total (mg/L)	EPA-160.3	10
Undissolved (mg/L)	EPA-160.2	4
Volatile (mg/L)	EPA-160.4	5
^{90}Sr (pCi/L)		4.0
Sulfate, turbidimetric method (mg/L)	EPA-375.4	5
^{99}Tc (pCi/L)	ACD-160069[h]	300
Th isotopes (pCi/L)	ACD-1665[h]	0.4
Th, spectrophotometric (mg/L)		2×10^{-3}
Total organic carbon, combustion or oxidation (mg/L)	EPA-415.1	1
Tritium (pCi/L)	ACD-160059[h]	5000
Turbidity (NTU)	EPA-180.1	0.05
U (total), fluorometric (mg/L)	ACD-183707[h]	1×10^{-3}
U isotopes (pCi/L)	ACD-210026[h]	1
U isotopic abundances (wt %)	ACD-2116[h]	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.

[h]No regulatory method available for use.

Table 10.5. K-25 Site atomic absorption and ICP environmental analysis procedures for waters

Element	Lowest concentration reported[a] (mg/L)			
	EPA 200 series/7000 series flame AA	EPA 200 series/7000 series graphite furnace AA	EPA -200.7 ICP	EPA-6010 ICP
Ag	0.05	0.01	0.01	0.006
Al	0.10	0.01	0.10	0.02
As	*b*	0.005	0.05	0.05
Ba	0.10	0.01	0.10	0.0010
Ca	0.05	*b*	0.05	5.0
Cd	0.01	0.002	0.003	0.003
Cr	0.05	0.01	0.010	0.010
Cu	0.01	0.004	0.004	0.004
Fe	0.05	*b*	0.05	0.005
K	0.2	*b*	0.60	0.60
Li	*b*	*b*	0.004	0.004
Mg	0.02	*b*	0.02	0.003
Mn	0.02	0.01	0.01	0.001
Mo	*b*	*b*	0.01	0.01
Na	*b*	*b*	0.05	0.02
Ni	0.05	0.01	0.05	0.01
Pb	0.10	0.004	0.05	0.05
Se	*b*	0.005	0.05	0.05
Zn	0.02	*b*	0.02	0.002

[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 10.6. K-25 Site environmental analysis procedures for air

Parameter	NIOSH[a] or EPA method	Lowest concentration reported[b]
Gross alpha, beta, air filters, radiochemistry (pCi/m^3)	APHA 601, 602[c]	
Alpha		0.005
Beta		0.025
Fluoride, air, SIE (total μg)	EPA-340.2	0.2
Fluoride, stacks, SIE (mg/L)		0.001
Gamma-ray spec., air filters (pCi/filter)		30
^{131}I, gamma-ray spec., air filter (pCi/filter)		2.5
Metals in air particulates emission spec. (μg/sample)	EC-2440	For 48 metals, mostly 1–10
Air filters, radiochemistry (pCi/filter)		
Pu	EPA-680/4-75-001	0.04
^{90}Sr		2
^{99}Tc		300
Th alpha isotopes, radiochemistry (pCi/filter)		0.04
U, air filters, fluorometric (total μg)		0.2
U isotopes, air filters, radiochemistry (pCi/filter)	EPA-680/4-75-001	0.04
U, stack gases, spec./fluoro. (mg/L)		0.001
Dioctyl phthalate, air, GC method (mg/m^3)	NIOSH S40	2
Formaldehyde, air (mg/m^3)	NIOSH 125	0.1
Isopropanol, air (mg/m^3)	NIOSH S64	180
Oil mist, air, infrared (mg/m^3)		0.5
Organic solvents, air, GC method (mg/sample)	NIOSH 1003	18 cpds; 0.01 to 1.0
Pentachlorophenol, air, HPLC (mg/m^3)	NIOSH S297	0.27
PCBs, air, GC (total μg)	NIOSH 244	0.2

[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 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.

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

Table 10.7. Energy Systems environmental analysis procedures for soil and sediment

Parameter	EPA method	Lowest concentration reported[a]
Fluoride (mg/L)		0.1
Gamma-ray spectrum analysis (pCi/filter)		2.5
Hg (total), cold vapor absorption (mg/kg)	EPA-7471	0.1
Metals, atomic absorption	EPA-7000 Series	*c*
Metals, inductively coupled plasma-optical emission spectrometric (ICP-OES)	EPA-6010	*c*
Np, direct gamma spectrum		*b*
^{237}Np, radiochemical (pCi/kg)		20
Pu, radiochemical (pCi/filter)		1.0
PCBs, gas chromatographic (mg/kg)	EPA-8080	
Aroclor 1016		0.1
Aroclor 1221		0.1
Aroclor 1232		0.1
Aroclor 1242		0.1
Aroclor 1248		0.1
Aroclor 1254		0.2
Aroclor 1260		0.2
^{90}Sr, radiochemical (pCi/filter)	704 Std Mth[d]	4
^{99}Tc, radiochemical (pCi/filter)		300
Th, spectrophotometric (mg/kg)		3
Th (alpha-emitting) isotopes, radiochemical (pCi/filter)		1
U (total), fluorometric (mg/kg)		1
U (total and isotopic), isotope dilution mass spectrometric (ng)		10
U isotopes, radiochemical (pCi/filter)		1.0

[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 10.5.

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

Table 10.8. Proficiency Analytical Testing Program at the Y-12 Environmental Laboratory for NIOSH Program, 1991

Analysis and sample date	Sample	Values		Performance limits	Performance evaluation
		Reference	Y-12		
Cadmium (mg)					
2/91	1	0.0092	0.0093	0.0083–0.0101	Acceptable
	2	0.0118	0.0122	0.0105–0.0131	Acceptable
	3	0.0149	0.0150	0.0134–0.0163	Acceptable
	4	0.0168	0.0171	0.0151–0.0184	Acceptable
5/91	1	0.0139	0.0140	0.0124–0.0154	Acceptable
	2	0.0070	0.0071	0.0062–0.0077	Acceptable
	3	0.0197	0.0197	0.0178–0.0216	Acceptable
	4	0.0110	0.0107	0.0098–0.0121	Acceptable
8/91	1	0.0123	0.0123	0.0108–0.0138	Acceptable
	2	0.0100	0.0100	0.0087–0.0113	Acceptable
	3	0.0061	0.0059	0.0053–0.0069	Acceptable
	4	0.0166	0.0166	0.0147–0.0186	Acceptable
11/91	1	0.0090	0.0091	0.0080–0.0099	Acceptable
	2	0.0051	0.0051	0.0044–0.0057	Acceptable
	3	0.0129	0.0130	0.0114–0.0143	Acceptable
	4	0.0109	0.0112	0.0097–0.0121	Acceptable
Lead (mg)					
2/91	1	0.0358	0.0355	0.0319–0.0397	Acceptable
	2	0.0779	0.0797	0.0694–0.0863	Acceptable
	3	0.0446	0.0448	0.0405–0.0487	Acceptable
	4	0.0612	0.0612	0.0546–0.0678	Acceptable
5/91	1	0.0464	0.0461	0.0414–0.0514	Acceptable
	2	0.0557	0.0558	0.0495–0.0618	Acceptable
	3	0.0243	0.0245	0.0216–0.0270	Acceptable
	4	0.0348	0.0342	0.0307–0.0389	Acceptable
8/91	1	0.0601	0.0606	0.0541–0.0660	Acceptable
	2	0.0300	0.0304	0.0267–0.0332	Acceptable
	3	0.0849	0.0852	0.0761–0.0937	Acceptable
	4	0.0494	0.0500	0.0449–0.0538	Acceptable
11/91	1	0.0247	0.0255	0.0219–0.0275	Acceptable
	2	0.0493	0.0498	0.0443–0.0543	Acceptable
	3	0.0734	0.0746	0.0664–0.0804	Acceptable
	4	0.0589	0.0608	0.0535–0.0644	Acceptable
Zinc (mg)					
2/91	1	0.1505	0.1500	0.1328–0.1682	Acceptable
	2	0.1115	0.1130	0.0930–0.1300	Acceptable
	3	0.2125	0.2140	0.1916–0.2334	Acceptable
	4	0.1770	0.1770	0.1562–0.1978	Acceptable
5/91	1	0.1356	0.1355	0.1223–0.1489	Acceptable
	2	0.0779	0.0776	0.0678–0.0879	Acceptable
	3	0.2064	0.2060	0.1815–0.2313	Acceptable
	4	0.1627	0.1600	0.1429–0.1826	Acceptable
11/91	1	0.0941	0.0959	0.0836–0.1046	Acceptable
	2	0.0746	0.0754	0.0649–0.0843	Acceptable
	3	0.1194	0.1210	0.1050–0.1339	Acceptable
	4	0.1737	0.1790	0.1564–0.1910	Acceptable
Chromium (mg)					
8/91	1	0.1185	0.1160	0.0909–0.1461	Acceptable
	2	0.0601	0.0591	0.0472–0.0730	Acceptable
	3	0.1979	0.1930	0.1485–0.2474	Acceptable
	4	0.1494	0.1450	0.1146–0.1842	Acceptable

Table 10.8 (continued)

Analysis and sample date	Sample	Values		Performance limits	Performance evaluation
		Reference	Y-12		
Asbestos (F/MM2)					
2/91	1	238	254.2	107.6–419.5	Acceptable
	2	603.5	533.2	320.2–975.8	Acceptable
	3	838.4	712	455.2–1337.7	Acceptable
	4	416.3	303	191.6–727	Acceptable
5/91	1	745.6	908.2	411.7–1177.9	Acceptable
	2	592.6	812.6	289.9–1002.4	Acceptable
	3	224.3	243.4	99.7–398.7	Acceptable
	4	320.2	336.8	153.5–547.5	Acceptable
8/91	1	231.1	182.8	115.8–385.9	Acceptable
	2	408.5	312.6	224.1–647.8	Acceptable
	3	805.6	745.5	422.2–1311.8	Acceptable
	4	657.6	622.4	368.8–1029.2	Acceptable
11/91	1	296.3	310	82.4–642.7	Acceptable
	2	238.7	187.4	69.1–510.2	Acceptable
	3	402.7	265.3	155.9–764.6	Acceptable
	4	668.1	523.8	303.4–1175	Acceptable
1,1,1-Trichloroethane (mg)					
2/91	1	1.0121	0.9975	0.8694–1.1547	Acceptable
	2	0.5112	0.5040	0.4383–0.5839	Acceptable
	3	0.8764	0.8802	0.7646–0.9882	Acceptable
	4	1.2244	1.2260	1.0862–1.3625	Acceptable
Tetrachlorethylene (mg)					
2/91	1	0.5678	0.5650	0.4798–0.6557	Acceptable
	2	0.8797	0.8920	0.7584–1.0010	Acceptable
	3	1.0753	1.1057	0.9336–1.2169	Acceptable
	4	0.4294	0.4221	0.3676–0.4911	Acceptable
Trichloroethylene (mg)					
2/91	1	0.4771	0.4635	0.4189–0.5353	Acceptable
	2	0.7274	0.7242	0.6418–0.8129	Acceptable
	3	0.9451	0.9471	0.8416–1.0485	Acceptable
	4	0.8049	0.7951	0.7130–0.8968	Acceptable
Chloroform (mg)					
5/91	1	0.4937	0.4325	0.4237–0.5637	Acceptable
	2	1.1172	0.9418	0.9775–1.2568	Unacceptable
	3	0.6446	0.5277	0.5636–0.7255	Unacceptable
	4	0.8139	0.6830	0.7215–0.9064	Unacceptable
Carbon tetrachloride (mg)					
5/91	1	0.6094	0.5675	0.5325–0.6863	Acceptable
	2	1.3941	1.2122	1.2547–1.5335	Unacceptable
	3	0.9685	0.8343	0.8549–1.0820	Unacceptable
	4	1.0979	0.9622	0.9732–1.2225	Unacceptable
1,2-Dichloroethane (mg)					
5/91	1	0.9101	0.7969	0.8164–1.0037	Unacceptable
	2	0.8343	0.6879	0.7463–0.9223	Unacceptable
	3	0.4492	0.3660	0.3998–0.4985	Unacceptable
	4	0.7042	0.5889	0.6282–0.7801	Unacceptable
Benzene (mg)					
8/91	1	0.0926	0.0881	0.0746–0.1105	Acceptable
	2	0.1774	0.1708	0.1519–0.2028	Acceptable
	3	0.2265	0.2178	0.1988–0.2541	Acceptable
	4	0.2545	0.2479	0.2191–0.2900	Acceptable
O-xylene (mg)					
8/91	1	1.6014	1.6166	1.3560–1.8468	Acceptable
	2	1.2698	1.2471	1.0834–1.4562	Acceptable
	3	1.0270	1.0389	0.8799–1.1741	Acceptable
	4	0.7036	0.7169	0.6068–0.8005	Acceptable

Table 10.8 (continued)

Analysis and sample date	Sample	Values		Performance limits	Performance evaluation
		Reference	Y-12		
Toluene (mg)					
8/91	1	0.7084	0.6772	0.5854–0.8315	Acceptable
	2	0.9961	0.9725	0.8752–1.1171	Acceptable
	3	1.2135	1.1903	1.0568–1.3702	Acceptable
	4	1.2897	1.2865	1.1471–1.4322	Acceptable
Carbon tetrachloride (mg)					
11/91	1	1.0459	1.0091	0.9069–1.1849	Acceptable
	2	0.7349	0.7370	0.6310–0.8388	Acceptable
	3	0.4216	0.4167	0.3449–0.4983	Acceptable
	4	1.2862	1.3154	1.1219–1.4505	Acceptable
1,2-Dichloroethane (mg)					
11/91	1	0.9289	0.8825	0.8230–1.0347	Acceptable
	2	0.7369	0.7265	0.6450–0.8288	Acceptable
	3	1.1655	1.1405	1.0159–1.3152	Acceptable
	4	0.6918	0.6815	0.6194–0.7641	Acceptable
Trichloroethylene (mg)					
11/91	1	0.9064	0.8750	0.7820–1.0308	Acceptable
	2	0.5177	0.5207	0.4498–0.5857	Acceptable
	3	1.0936	1.0792	0.9415–1.2457	Acceptable
	4	0.7079	0.7140	0.6284–0.7873	Acceptable

Table 10.9. Proficiency Analytical Testing Program at the K-25 Laboratory for NIOSH Program, 1991

Analysis and sample date	Sample	Values		Performance limits	Performance evaluation
		Reference	K-25		
Cd (mg)					
2/91	1	0.0092	0.0090	0.0083–0.0101	Acceptable
	2	0.0118	0.0118	0.0105–0.0131	Acceptable
	3	0.0149	0.0145	0.0134–0.0163	Acceptable
	4	0.0168	0.0168	0.0151–0.0184	Acceptable
5/91	1	0.0139	0.0132	0.0124–0.0154	Acceptable
	2	0.0070	0.0068	0.0062–0.0077	Acceptable
	3	0.0197	0.0185	0.0178–0.0216	Acceptable
	4	0.0110	0.0105	0.0098–0.0121	Acceptable
8/91	1	0.0123	0.0117	0.0108–0.0138	Acceptable
	2	0.0100	0.0094	0.0087–0.0113	Acceptable
	3	0.0061	0.0056	0.0053–0.0069	Acceptable
	4	0.0166	0.0160	0.0147–0.0186	Acceptable
11/91	1	0.0090	0.0077	0.0080–0.0099	Unacceptable
	2	0.0051	0.0048	0.0044–0.0057	Acceptable
	3	0.0129	0.0124	0.0097–0.0121	Acceptable
	4	0.0109	0.0106	0.0097–0.0121	Acceptable
Cr (mg)					
8/91	1	0.1185	0.1003	0.0909–0.1461	Acceptable
	2	0.0601	0.0567	0.0472–0.0730	Acceptable
	3	0.1979	0.1795	0.1485–0.2474	Acceptable
	4	0.1494	0.1411	0.1146–0.1842	Acceptable
Pb (mg)					
2/91	1	0.0358	0.0342	0.0319–0.0397	Acceptable
	2	0.0779	0.0745	0.0694–0.0863	Acceptable
	3	0.0446	0.0418	0.0405–0.0487	Acceptable
	4	0.0612	0.0598	0.0546–0.0678	Acceptable
5/91	1	0.0464	0.0450	0.0414–0.0514	Acceptable
	2	0.0557	0.0525	0.0495–0.0618	Acceptable
	3	0.0243	0.0225	0.0216–0.0270	Acceptable
	4	0.0348	0.0338	0.0307–0.0389	Acceptable
8/91	1	0.0601	0.0588	0.0541–0.0660	Acceptable
	2	0.0300	0.0292	0.0267–0.0332	Acceptable
	3	0.0849	0.0808	0.0761–0.0937	Acceptable
	4	0.0494	0.0489	0.0449–0.0538	Acceptable
11/91	1	0.0247	0.0216	0.0219–0.0275	Unacceptable
	2	0.0493	0.0484	0.0443–0.0543	Acceptable
	3	0.0734	0.0722	0.0664–0.0804	Acceptable
	4	0.0589	0.0593	0.0535–0.0644	Acceptable
Zn (mg)					
2/91	1	0.1505	0.1508	0.1328–0.1682	Acceptable
	2	0.1115	0.1122	0.0930–0.1300	Acceptable
	3	0.2125	0.2188	0.1916–0.2334	Acceptable
	4	0.1770	0.1838	0.1562–0.1978	Acceptable
5/91	1	0.1356	0.1268	0.1223–0.1489	Acceptable
	2	0.0779	0.0705	0.0678–0.0879	Acceptable
	3	0.2064	0.1973	0.1815–0.2313	Acceptable
	4	0.1627	0.1563	0.1429–0.1826	Acceptable
11/91	1	0.0941	0.0810	0.0836–0.1046	Unacceptable
	2	0.0746	0.0704	0.0649–0.0843	Acceptable
	3	0.1194	0.1130	0.1050–0.1339	Acceptable
	4	0.1737	0.1660	0.1564–0.1910	Acceptable

Table 10.9 (continued)

Analysis and sample date	Sample	Values		Performance limits	Performance evaluation
		Reference	K-25		
Asbestos (F/mm^2)					
2/91	1	238	293	107.6–419.5	Acceptable
	2	603.5	585.9	320.2–975.8	Acceptable
	3	838.4	585.9	455.2–1337.7	Acceptable
	4	416.3	343.9	191.6–727	Acceptable
5/91	1	745.6	482	411.7–1177.9	Acceptable
	2	592.6	435	289.9–1002.4	Acceptable
	3	224.3	230	99.7–398.7	Acceptable
	4	320.2	266.2	153.5–547.5	Acceptable
8/91	1	231.1	356.6	115.8–385.9	Acceptable
	2	408.5	509.5	224.1–647.8	Acceptable
	3	805.6	780.2	422.2–1311.8	Acceptable
	4	657.6	710.1	368.8–1029.2	Acceptable
11/91	1	296.3	497.3	82.4–642.7	Acceptable
	2	238.7	227.4	69.1–510.2	Acceptable
	3	402.7	424.6	155.9–764.6	Acceptable
	4	668.1	751.5	303.4–1175	Acceptable
Benzene (mg)					
8/91	1	0.0926	0.0892	0.0746–0.1105	Acceptable
	2	0.1774	0.1708	0.1519–0.2028	Acceptable
	3	0.2265	0.2182	0.1988–0.2541	Acceptable
	4	0.2545	0.2457	0.2191–0.2900	Acceptable
1,1,1-Trichloroethane (mg)					
2/91	1	1.0121	1.0123	0.8694–1.1547	Acceptable
	2	0.5112	0.5095	0.4383–0.5839	Acceptable
	3	0.8764	0.8712	0.7646–0.9882	Acceptable
	4	1.2244	1.1998	1.0862–1.3625	Acceptable
Tetrachloroethylene (mg)					
2/91	1	1.0121	1.0123	0.8694–1.1547	Acceptable
	2	0.5112	0.5095	0.4383–0.5839	Acceptable
	3	0.8764	0.8712	0.7646–0.9882	Acceptable
	4	1.2244	1.1998	1.0862–1.3625	Acceptable
Trichloroethylene (mg)					
2/91	1	0.4771	0.4662	0.4189–0.5353	Acceptable
	2	0.7274	0.6963	0.6418–0.8129	Acceptable
	3	0.9451	0.9052	0.8416–1.0485	Acceptable
	4	0.8049	0.7669	0.7130–0.8968	Acceptable
11/91	1	0.9064	0.8792	0.7820–1.0308	Acceptable
	2	0.5177	0.5000	0.4498–0.5857	Acceptable
	3	1.0936	1.0515	0.9415–1.2457	Acceptable
	4	0.7079	0.6788	0.6284–0.7873	Acceptable
Chloroform (mg)					
5/91	1	0.4937	0.4920	0.4237–0.5637	Acceptable
	2	1.1172	1.0890	0.9775–1.2568	Acceptable
	3	0.6446	0.6263	0.5636–0.7255	Acceptable
	4	0.8139	0.8080	0.7215–0.9064	Acceptable

Table 10.9 (continued)

Analysis and sample date	Sample	Values		Performance limits	Performance evaluation
		Reference	K-25		
Carbon tetrachloride (mg)					
5/91	1	0.6094	0.6330	0.5325–0.6863	Acceptable
	2	1.3941	1.4924	1.2547–1.5335	Acceptable
	3	0.9685	1.0359	0.8549–1.0820	Acceptable
	4	1.0979	1.2041	0.9732–1.2225	Acceptable
11/91	1	1.0459	0.9834	0.9069–1.1849	Acceptable
	2	0.7349	0.6915	0.6310–0.8388	Acceptable
	3	0.4216	0.3959	0.3449–0.4983	Acceptable
	4	1.2862	1.2017	1.1219–1.4505	Acceptable
1,2-Dichloroethane (mg)					
5/91	1	0.9101	0.8970	0.8164–1.0037	Acceptable
	2	0.8343	0.8264	0.7463–0.9223	Acceptable
	3	0.4492	0.4422	0.3998–0.4985	Acceptable
	4	0.7042	0.6966	0.6282–0.7801	Acceptable
11/91	1	0.9289	0.8964	0.8230–1.0347	Acceptable
	2	0.7369	0.7006	0.6450–0.8288	Acceptable
	3	1.1655	1.1102	1.0159–1.3152	Acceptable
	4	0.6918	0.6666	0.6194–0.7641	Acceptable
O-xylene (mg)					
8/91	1	1.6014	1.4934	1.3560–1.8468	Acceptable
	2	1.2698	1.1886	1.0834–1.4562	Acceptable
	3	1.0270	0.9690	0.8799–1.1741	Acceptable
	4	0.7036	0.6435	0.6068–0.8005	Acceptable
Toluene (mg)	1	0.7084	0.6410	0.5854–0.8315	Acceptable
	2	0.9961	0.9011	0.8752–1.1171	Acceptable
	3	1.2135	1.1007	1.0568–1.3702	Acceptable
	4	1.2897	1.1612	1.1471–1.4322	Acceptable

Table 10.10. Water supply performance evaluation study WS-028 for NIOSH Program—K-25 Site, 1991

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Trace metals (μg/L)			
Sb	2	33.6	35.0	27.8–46.6	Acceptable
As	1	109	129	109–144	Acceptable
Ba	1	538	533	472–574	Acceptable
Be	2	0.810	0.800	0.611–0.991	Acceptable
Cd	1	7.40	7.73	6.37–8.90	Acceptable
Cr	1	199	220	179–223	Acceptable
Cu	1	968	950	866–1020	Acceptable
Pb	1	7.54	7.28	5.52–9.41	Acceptable
Hg	1	7.16	7.14	5.54–8.46	Acceptable
Ni	2	227	211	185–231	Acceptable
Se	1	12.2[b]	13.1	9.68–14.6	Acceptable
Ag	1	60.4	60.7	52.7–68.9	Acceptable
Tl	2	1.53	2.00	1.08–2.94	Acceptable
		Nitrate/nitrite/fluoride (mg/L)			
Nitrate as N	1	7.76	8.80	7.40–10.4	Acceptable
Nitrite as N	1	0.74	0.770	0.674–0.879	Acceptable
Fluoride	1	1.57	1.60	1.44–1.76	Acceptable
		Insecticides (μg/L)			
Chlordane[b]	3	5.51	3.77	2.04–4.77	Unacceptable
Endrin	1	0.181	0.163	0.107–0.233	Acceptable
Heptachlor	4	0.132	0.142	0.0398–0.220	Acceptable
Heptachlor epoxide	4	0.119	0.125	0.0721–0.168	Acceptable
Lindane	1	1.15	0.638	0.378–0.861	Unacceptable
Methoxychlor	1	10.7	12.4	8.10–15.9	Acceptable
Toxaphene[b]	2	12.6	12.7	7.47–15.7	Acceptable
		Herbicides (μg/L)			
2,4-D	1	2.17	3.33	0.971–5.26	Acceptable
2,4,5-TP, Silvex	1	1.47	1.75	0.532–2.57	Acceptable
		Trihalomethanes (μg/L)			
Bromodichloromethane	1	15.9	18.7	15.0–22.4	Acceptable
Bromoform	1	26.0	34.6	27.7–41.5	Unacceptable
Chlorodibromomethane	1	21.7	27.1	21.7–32.5	Acceptable
Chloroform	1	15.5	14.2	11.4–17.0	Acceptable
Total trihalomethane	1	79.10	94.6	75.7–114	Acceptable

Table 10.10 (continued)

Parameter	Number of samples	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Volatile organic compounds (µg/L)			
Benzene	1	11.4	11.8	9.44–14.2	Acceptable
Carbon tetrachloride	1	10.7	12.2	9.76–14.6	Acceptable
1,4-Dichlorobenzene	1	10.7	12.5	10.0–15.0	Acceptable
1,2-Dichloroethane	1	7.19	6.95	4.17–9.73	Acceptable
1,1-Dichloroethylene	1	3.99	4.72	2.83–6.61	Acceptable
Cis-1,2-Dichloroethylene	2	12.9	13.0	10.4–15.6	Acceptable
Trans-1,2-Dichloroethylene	2	11.2	11.6	9.28–13.9	Acceptable
Bromobenzene	3	13.2	13.4	10.7–16.1	Acceptable
N-Butylbenzene	3	6.70	7.29	4.37–10.2	Acceptable
4-Chlorotoluene	3	8.06	12.3	9.84–14.8	Unacceptable
4-Isopropyltoluene	3	12.6	13.9	11.1–16.7	Acceptable
1,1,1,2-Tetrachloroethane	3	7.55	8.23	4.94–11.5	Acceptable
1,2,4-Trichlorobenzene	3	8.66	8.62	5.17–12.1	Acceptable
1,2,3-Trichloropropane	3	12.2	11.6	9.28–13.9	Acceptable
1,2,4–Trimethylbenzene	3	8.26	9.46	5.68–13.2	Acceptable
Ethylbenzene	2	11.2	11.6	9.28–13.9	Acceptable
Styrene	2	10.5	10.6	8.48–12.7	Acceptable
Chlorobenzene	2	14.7	14.6	11.7–17.5	Acceptable
Tetrachloroethylene	2	9.02	9.03	5.42–12.6	Acceptable
Toluene	2	13.8	13.8	11.0–16.6	Acceptable
1,2-Dichlorobenzene	2	13.3	15.4	12.3–18.5	Acceptable
1,1,1-Trichloroethane	1	12.8	15.2	12.2–18.2	Acceptable
Trichloroethylene	1	6.84	7.37	4.42–10.3	Acceptable
1.3-Dichloropropane	2	3.94	4.32	2.59–6.05	Acceptable
Vinyl chloride	1	8.07	9.40	5.64–13.2	Acceptable
Total xylenes	2	8.40	8.45	5.07–11.8	Acceptable
		Miscellaneous analytes			
Residual free chlorine (mg/L)[b]	1	1.58	1.70	1.33–1.88	Acceptable
Turbidity (NTUs)[b]	1	5.6	5.60	5.23–6.27	Acceptable
Sulfate (mg/L)	1	42.8	43.0	37.7–47.2	Acceptable
Total cyanide (mg/L)	1	0.50	0.460	0.312–0.567	Acceptable

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

Table 10.11. EPA EMSL-LV Intercomparison Radionuclide Control Program

Y-12, 1991

Analysis and sample date	Values		Normalized deviation	Performance evaluation
	EPA	Y-12		
		Water (pCi/L)		
Gross alpha				
4-16	54.0 ± 14.0	51.7	0.29	Acceptable
5–17	24.0 ± 6.0	23.3	0.19	Acceptable
10–22	82.0 ± 21.0	150	5.61	Unacceptable
Gross beta				
4–16	115.0 ± 17.0	125	1.05	Acceptable
5–17	46.0 ± 5.0	64.0	6.24	Unacceptable
10–22	65.0 ± 10.0	72	1.21	Acceptable
^{3}H				
6–21	12,480 ± 1,248.0	14,767	3.17	Unacceptable
10–18	2,454.0 ± 352.0	2,730	1.36	Acceptable
^{239}Pu				
1–18	3.3 ± 0.3	3.33	0.19	Acceptable
8–23	19.4 ± 1.9	16.8	2.40	Acceptable
U				
3–15	7.6 ± 3.0	7.97	0.21	Acceptable
4–16	29.8 ± 3.0	30.8	0.60	Acceptable
7–19	14.2 ± 3.0	13.4	0.46	Acceptable
11–15	24.9 ± 3.0	25.0	0.06	Acceptable
^{131}I				
2–15	75.0 ± 8.0	77.0	0.43	Acceptable
^{134}Cs				
4–16	24.0 ± 5.0	22.3	0.58	Acceptable
6–7	15.0 ± 5.0	15.0	0.00	Acceptable
10–4	10.0 ± 5.0	9.67	0.12	Acceptable
^{137}Cs				
4–16	25.0 ± 5.0	25.3	0.12	Acceptable
6–7	14.0 ± 5.0	15.7	0.58	Acceptable
10–4	10.0 ± 5.0	10.3	0.12	Acceptable
^{60}Co				
6–7	10.0 ± 5.0	9.67	0.12	Acceptable
10–4	29.0 ± 5.0	29.0	0.00	Acceptable
^{65}Zn				
6–7	108.0 ± 11.0	112	0.68	Acceptable
10–4	73.0 ± 7.0	78.7	1.40	Acceptable
^{106}Ru				
6–7	149.0 ± 15.0	154	0.54	Acceptable
10–4	199.0 ± 20.0	206	0.64	Acceptable
^{133}Ba				
6–7	62.0 ± 6.0	71.7	2.79	Acceptable
10–4	98.0 ± 10.0	108	1.67	Acceptable

Table 10.11 (continued)

Analysis and sample date	Values		Normalized deviation	Performance evaluation
	EPA	Y-12		
		Air filter (pCi/filter)		
Gross alpha				
3–29	25.0 ± 6.0	30.7	1.64	Acceptable
Gross beta				
3–29	124.0 ± 6.0	130	1.64	Acceptable
^{90}Sr				
3–29	40.0 ± 5.0	40.3	0.12	Acceptable
^{137}Cs				
3–29	40.0 ± 5.0	48.3	2.89	Acceptable

Table 10.12. EPA EMSL-LV Intercomparison Radionuclide Control Program

ORNL Low-Level Radiochemical Laboratory, 1991

Analysis and sample date	Values		Ratio[b] (ORNL/EPA)	Performance evaluation[c]
	EPA[a]	ORNL		
		Water (pCi/L)		
Gross alpha				
2/91	5.0 ± 8.7	4.67	0.93	Acceptable
5/91	24 ± 10.4	13.7	0.57	Acceptable
9/91	10 ± 8.7	5.0	0.50	Acceptable
Gross beta				
2/91	5.0 ± 8.7	6.3	1.26	Acceptable
5/91	46 ± 8.7	36	0.78	Unacceptable
9/91	20 ± 5	18	0.90	Acceptable
^{133}Ba				
2/91	75 ± 13.9	71	0.95	Acceptable
6/91	62 ± 10.4	57.3	0.92	Acceptable
10/91	98 ± 17.3	89.7	0.92	Acceptable
^{134}Cs				
2/91	8 ± 8.7	6.3	0.79	Acceptable
4/91	24 ± 8.7	22.7	0.95	Acceptable
6/91	15 ± 8.7	12.3	0.82	Acceptable
10/91	10 ± 8.7	9.0	0.90	Acceptable
^{137}Cs				
2/91	8 ± 8.7	11	1.38	Acceptable
4/91	25 ± 8.7	25.0	1.00	Acceptable
6/91	14 ± 8.7	15.7	1.12	Acceptable
10/91	10 ± 8.7	10.7	1.07	Acceptable
^{60}Co				
2/91	40 ± 8.7	38.7	0.97	Acceptable
6/91	10 ± 8.7	10.3	1.03	Acceptable
10/91	29 ± 8.7	28.7	0.99	Acceptable
^{3}H				
6/91	12,480 ± 2,165	11,333	0.91	Acceptable
^{131}I				
2/91	75 ± 13.9	78.3	1.04	Acceptable
^{106}Ru				
2/91	186 ± 33	190	1.02	Acceptable
6/91	149 ± 26	142	0.95	Acceptable
10/91	199 ± 34.7	186.7	0.94	Acceptable
^{89}Sr				
1/91	5.0 ± 8.7	5.33	1.07	Acceptable

Table 10.12 (continued)

Analysis and sample date	Values		Ratio[b] (ORNL/EPA)	Performance evaluation[c]
	EPA[a]	ORNL		
		Water (pCi/L)		
^{90}Sr				
1/91	5.0 ± 8.7	5.0	1.00	Acceptable
5/91	39 ± 8.7	30.7	0.79	Acceptable
U				
4/91	29.8 ± 5.2	29.0	0.97	Acceptable
^{65}Zn				
2/91	149 ± 26	150	1.01	Acceptable
6/91	108 ± 19.1	109	1.01	Acceptable
10/91	73 ± 12.1	74	1.01	Acceptable
		Air (pCi/filter)		
Gross alpha				
3/91	25 ± 10.4	20.7	0.83	Acceptable
Gross beta				
3/91	125 ± 10.4	111.7	0.90	Unacceptable
^{137}Cs				
3/91	40 ± 8.7	39	0.98	Acceptable
^{90}Sr				
3/91	40 ± 8.7	44	1.10	Acceptable
		Milk (pCi/L)		
^{137}Cs				
4/91	49 ± 8.7	49	1.00	Acceptable
^{131}I				
4/91	60 ± 10.4	65	1.08	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 10.13. EPA EMSL-LV Intercomparison Radionuclide Control Program—K-25 Site, 1991

Analysis and sample data	Values[a]		Ratio[b] (EPA/K-25)	Performance evaluation
	EPA	K-25		
		Water (pCi/L)		
^{239}Pu				
1/18/91	*c*	*c*	*c*	*c*
8/23/91	19.4 ± 1.9	18.37 ± 0.45	1.1	Acceptable
Gross alpha				
1/25/91	5.0 ± 5.0	4.33 ± 1.53	1.2	Acceptable
4/16/91	54.0 ± 14.0	900.0 ± 26.06	0.060	Outlier[d]
5/17/91	24.0 ± 6.0	20.67 ± 1.15	1.2	Acceptable
9/20/91	10.0 ± 5.0	*c*	*c*	*c*
Gross beta				
1/25/91	5.0 ± 5.0	8.33 ± 1.53	0.60	Acceptable
4/16/91	115.0 ± 17.0	2185.67 ± 75.04	0.05	Outlier[d]
5/17/91	46.0 ± 5.0	43.0 ± 4.58	1.1	Acceptable
9/20/91	20.0 ± 5.0	*c*	*c*	*c*
U				
3/15/91	7.6 ± 3.0	6.50 ± 0.20	1.2	Acceptable
11/15/91	29.4 ± 3.0	22.70 ± 2.13	1.30	Acceptable
^{60}Co				
2/8/91	40.0 ± 5.0	42.00 ± 2.0	0.95	Acceptable
6/7/91	10.0 ± 5.0	8.67 ± 0.58	1.2	Acceptable
10/4/91	29.0 ± 5.0	26.00 ± 1.0	1.1	Acceptable
10/4/91	29.0 ± 5.0	26.0 ± 1.0	1.1	Acceptable
^{65}Zn				
2/8/91	149.0 ± 15.0	157.67 ± 2.08	0.94	Acceptable
6/7/91	108.0 ± 11.0	110.33 ± 2.52	0.98	Acceptable
10/4/91	73.0 ± 7.0	71.0 ± 3.46	1.0	Acceptable
10/4/91	73.0 ± 7.0	71.0 ± 3.46	1.02	Acceptable
^{106}Ru				
2/8/91	186.0 ± 19.0	181.67 ± 20.8	1.0	Acceptable
6/7/91	149.0 ± 15.0	119.33 ± 23.18	1.2	Unacceptable
10/4/91	199.0 ± 20.0	166.0 ± 13.08	1.2	Acceptable
^{134}Ce				
2/8/91	8.0 ± 5.0	5.33 ± 0.58	1.5	Acceptable
4/16/91	24.0 ± 5.0	358.0 ± 28.0	0.07	Outlier[d]
6/7/91	15.0 ± 5.0	12.33 ± 1.15	1.2	Acceptable
10/4/91	10.0 ± 5.0	7.0 ± 1.0	1.4	Acceptable

Table 10.13 (continued)

Analysis and sample data	Values (pCi/unit)[a]		Ratio[b] (EPA/K-25)	Performance evaluation
	EPA	K-25		
		Water (pCi/L)		
^{137}Ce				
2/8/91	8.0 ± 5.0	10.0 ± 0.0	0.8	Acceptable
4/17/91	25.0 ± 5.0	411.0 ± 8.66	0.061	Outlier[d]
6/7/91	14.0 ± 5.0	13.00 ± 2.00	1.2	Acceptable
10/4/91	10.0 ± 5.0	10.0 ± 1.0	1.0	Acceptable
^{133}Ba				
2/8/91	75.0 ± 8.0	78.0 ± 0.0	0.96	Acceptable
6/7/91	62.0 ± 6.0	57.00 ± 2.65	1.2	Acceptable
10/4/91	98.0 ± 10.0	94.33	1.0	Acceptable
10/4/91	98.0 ± 10.0	94.33 ± 6.43	1.03	Acceptable
^{131}I				
2/15/91	75.0 ± 8.0	*c*	*c*	*c*
^{3}H				
2/22/91	4,418.0 ± 442.0	4,558.67 ± 286.7	0.97	Acceptable
5/17/91	12,480 ± 1,248.0	12,427.67 ± 468.29	1.0	Acceptable
10/18/91	2,454 ± 352	2,217 ± 55.0	1.1	Acceptable
^{226}Ra				
4/16/91	8.0 ± 1.2	*c*	*c*	*c*
^{228}Ra				
4/16/91	15.2 ± 3.8	*c*	*c*	*c*
U (Natural)				
4/16/91	29.8 ± 3.0	467.5 ± 13.13	0.060	Outlier[d]
7/19/91	14.2 ± 3.0	15.4 ± 0.85	0.92	Acceptable
^{89}Sr				
4/16/91	28.0 ± 5.0	*c*	*c*	*c*
^{90}Sr				
4/16/91	26.0 ± 5.0	*c*	*c*	*c*
Alpha				
3/29/91	25.0 ± 6.0	20.67 ± 0.58	1.2	Acceptable

Table 10.13 (continued)

Analysis and sample data	Values (pCi/unit)[a]		Ratio[b] (EPA/K-25)	Performance evaluation
	EPA	K-25		
		Air (pCi/filter)		
Beta				
3/29/91	124.0 ± 6.0	156.33 ± 6.81	0.79	Unacceptable
8/30/91	92.0 ± 10.0	101.67 ± 4.16	0.90	Acceptable
^{90}Sr				
3/29/91	40.0 ± 5.0	*c*	*c*	*c*
8/30/91	30.0 ± 5.0	*c*	*c*	*c*
^{137}Ce				
?	40.0 ± 5.0	39.0 ± 1.73	1.02	Acceptable
8/30/91	30.0 ± 5.0	28.0 ± 0.0	1.1	Acceptable
Alpha	25.0 ± 6.0	22.67 ± 0.58	1.1	Acceptable
8/30/91				

[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]No data reported.

[d]A calculation error was made.

Table 10.14. DOE Environmental Measurements Laboratory (EML) Quality Assessment Program (QAP)

Y-12 Radiochemistry Laboratory

Parameter	EML value	Y-12 value	Y-12 percent error[a]	Ratio Y-12/EML	Performance evaluation
		QAP-34, May 1991			
		Air filter			
^{7}Be (Bq/filter)	53.0	66	9	1.25	Acceptable
^{54}Mn (Bq/filter)	4.80	5.6	7	1.17	Acceptable
^{57}Co (Bq/filter)	5.82	6.5	4	1.12	Acceptable
^{60}Co (Bq/filter)	5.14	4.8	3	0.93	Acceptable
^{90}Sr (Bq/filter)	0.0789	0.12	58	1.52	Unacceptable
^{137}Cs (Bq/filter)	4.53	5.7	7	1.26	Acceptable
^{144}Ce (Bq/filter)	52.2	63	3	1.21	Acceptable
^{239}Pu (Bq/filter)	0.154	0.16	25	1.04	Acceptable
^{241}Am (Bq/filter)	0.101	0.093	31	0.92	Acceptable
U (μg/filter)	2.76	0.027		0.01	Unceptable
		Soil			
^{40}K (Bq/kg)	374	396	7	1.06	Acceptable
^{90}Sr (Bq/kg)	9.20	6.6	53	0.72	Acceptable
^{137}Cs (Bq/kg)	150	155	9	1.03	Acceptable
^{238}Pu (Bq/kg)	11.5	8.49	26	0.74	Acceptable
^{239}Pu (Bq/kg)	3.40	3.01	38	0.89	Acceptable
^{241}Am (Bq/kg)	1.76	1.0	209	0.57	Acceptable
U (μg/g)	2.34	1.59		0.68	Acceptable
		Vegetation (Bq/kg)			
^{40}K	1,150	1,310	4	1.14	Acceptable
^{90}Sr	186	170	5	0.91	Acceptable
^{137}Cs	67.6	72	11	1.07	Acceptable
^{238}Pu	4.06	3.84	24	0.95	Acceptable
^{239}Pu	1.40	1.08	36	0.77	Acceptable
^{241}Am	0.829	0.89	68	1.07	Acceptable
		Water			
^{3}H (Bq/L)	361	374	10	1.04	Acceptable
^{54}Mn (Bq/L)	213	229	10	1.08	Acceptable
^{57}Co (Bq/L)	230	238	7	1.03	Acceptable
^{60}Co (Bq/L)	201	184	1	0.92	Acceptable
^{90}Sr (Bq/L)	8.63	10.1	5	1.17	Acceptable
^{137}Cs (Bq/L)	169	171	15	1.01	Acceptable
^{144}Ce (Bq/L)	35.1	38	15	1.08	Acceptable
^{239}Pu (Bq/L)	0.773	0.73	17	0.94	Acceptable
^{241}Am (Bq/L)	1.19	0.94	18	0.79	Acceptable
U (μg/ml)	0.0172	0.021		1.22	Acceptable
		QAP-35, November 1991			
		Air filter			
^{239}Pu (Bq/filter)	0.084	0.08	25	0.95	Acceptable
^{241}Am (Bq/filter)	0.104	0.11	18	1.06	Acceptable
U (μg/filter)	3.08	4.3		1.40	Acceptable

Table 10.14 (continued)

Parameter	EML value	Y-12 value	Y-12 percent error	Ratio Y-12/EML	Performance evaluation
		Soil			
^{239}Pu (Bq/kg)	7.35	8.2	18	1.12	Acceptable
U (μg/g)	2.28	1.7		0.75	Acceptable
		Water			
^{239}Pu (Bq/L)	0.510	0.44	18	0.86	Acceptable
^{241}Am (Bq/L)	0.570	0.58	15	1.02	Acceptable
U (μg/ml)	0.037	0.04		1.08	Acceptable

Table 10.15. 1991 EML intercomparison study

ORNL Low-Level Radiochemical Laboratory, March 1991

Parameter	EML value	ORNL value	ORNL % error[a]	Ratio (ORNL/EML)	Performance evaluation
		Air (pCi/filter)			
^{7}Be	0.530E+02	0.500E+02	6	0.94	Acceptable
^{54}Mn	0.480E+01	0.500E+01	6	1.04	Acceptable
^{57}Co	0.582E+01	0.580E+01	8	1.00	Acceptable
^{60}Co	0.514E+01	0.530E–01	7	1.03	Acceptable
^{90}Sr	0.789E–01	0.600E–01	61	0.76	Acceptable
^{90}Sr	0.789E–01	0.680E–01	98	0.86	Acceptable
^{137}Cs	0.453E+01	0.480E+01	6	1.06	Acceptable
^{144}Ce	0.522E+02	0.550E+02	1	1.05	Acceptable
^{239}Pu	0.154E+00	0.110E+00	9	0.71	Acceptable
^{239}Pu	0.154E+00	0.110E+00	18	0.71	Acceptable
^{241}Am	0.101E+00	0.720E–01	16	0.71	Acceptable
^{241}Am	0.101E+00	0.640E–01	21	0.63	Acceptable
		Soil (pCi/g)			
^{40}K	0.374E+03	0.370E+03	10	0.99	Acceptable
^{40}K	0.374E+03	0.350E+03	11	0.94	Acceptable
^{90}Sr	0.920E+01	0.980E+01	27	1.07	Acceptable
^{137}Cs	0.150E+03	0.150E+03	6	1.00	Acceptable
^{137}Cs	0.150E+03	0.150E+03	6	1.00	Acceptable
^{238}Pu	0.115E+02	0.104E+02	9	0.90	Acceptable
^{239}Pu	0.340E+01	0.350E+01	14	1.03	Acceptable
^{241}Am	0.176E+01	0.170E+01	29	0.97	Acceptable
U, Bq	0.594E+02	0.220E+02	13	0.37	Unacceptable
		Vegetation (pCi/g)			
^{40}K	0.115E+04	0.120E+04	8	1.04	Acceptable
^{90}Sr	0.186E+03	0.169E+03	5	0.91	Acceptable
^{137}Cs	0.676E+02	0.680E+02	7	1.01	Acceptable
^{238}Pu	0.406E+01	0.340E+01	14	0.84	Acceptable
^{239}Pu	0.140E+01	0.880E+00	22	0.63	Acceptable
^{241}Am	0.829E+00	0.790E+00	37	0.95	Acceptable
		Water (pCi/mL)			
^{3}H	0.361E+03	0.350E+03	14	0.97	Acceptable
^{54}Mn	0.213E+03	0.230E+03	4	1.08	Acceptable
^{54}Mn	0.213E+03	0.230E+03	4	1.08	Acceptable
^{57}Co	0.230E+03	0.235E+03	4	1.02	Acceptable
^{60}Co	0.201E+03	0.190E+03	5	0.95	Acceptable
^{60}Co	0.201E+03	0.210E+02	4	1.04	Acceptable
^{90}Sr	0.863E+01	0.100E+02	10	1.16	Acceptable
^{137}Cs	0.169E+03	0.185E+03	5	1.09	Acceptable
^{144}Ce	0.351E+02	0.4004+02	7	1.14	Acceptable
^{239}Pu	0.773E+00	0.700E+00	14	0.91	Acceptable
^{241}Am	0.119E+01	0.120E+01	8	1.01	Acceptable
U, Bq	0.437E+00	0.400E+00	25	0.92	Acceptable

[a]Counting error = 2 sigma.

Table 10.16. 1991 EML Intercomparison Study

ORNL Low-Level Radiochemical Laboratory, September 1991

Parameter	EML value	ORNL value	ORNL % error[a]	Ratio (ORNL/EML)	Performance evaluation
		Air (pCi/filter)			
^{7}Be	0.538E+02	0.540E+02	7	1.00	Acceptable
^{54}Mn	0.243E+02	0.250E+02	4	1.03	Acceptable
^{57}Co	0.166E+02	0.180E+02	5	1.08	Acceptable
^{60}Co	0.230E+02	0.230E+02	4	1.00	Acceptable
^{90}Sr	0.663E+00	0.520E+00	23	0.78	Acceptable
^{137}Cs	0.280E+02	0.280E+02	3	1.00	Acceptable
^{144}Ce	0.508E+02	0.490E+02	2	0.96	Acceptable
^{239}Pu	0.840E-01	0.530E-01	18	0.63	Acceptable
^{241}Am	0.104E+00	0.820E-01	20	0.79	Acceptable
U, Bq	0.783E-01	0.780E-01	21	1.00	Acceptable
		Soil (pCi/filter)			
^{40}K	0.430E+03	0.460E+03	13	1.07	Acceptable
^{90}Sr	0.378E+01	0.340E+01	55	0.90	Acceptable
^{137}Cs	0.312E+03	0.350E+03	2	1.12	Acceptable
^{239}Pu	0.735E+01	0.800E+01	11	1.09	Acceptable
^{241}Am	0.158E+01	0.160E+01	37	1.01	Acceptable
U, Bq	0.578E+02	0.200E+02	10	0.35	Unacceptable
		Vegetation (pCi/g)			
^{40}K	0.992E+03	0.110E+04	9	1.11	Acceptable
^{90}Sr	0.439E+03	0.420E+03	4	0.96	Acceptable
^{137}Cs	0.271E+02	0.300E+02	10	1.11	Acceptable
^{239}Pu	0.365E+00	0.240E+00	29	0.66	Acceptable
^{241}Am	0.266E+00	0.320E+00	59	1.20	Acceptable
^{3}H	0.100E+03	0.100E+03	30	1.00	Acceptable
^{54}Mn	0.103E+03	0.100E+03	10	0.97	Acceptable
^{57}Co	0.166E+03	0.170E+03	5	1.02	Acceptable
^{60}Co	0.291E+03	0.300E+03	3	1.03	Acceptable
^{90}Co	0.101E+02	0.110E+02	18	1.09	Acceptable
^{137}Cs	0.460E+02	0.480E+02	2	1.04	Acceptable
^{144}Ce	0.226E+03	0.220E+03	4	0.97	Acceptable
^{239}Pu	0.510E+00	0.460E+00	13	0.90	Acceptable
^{241}Am	0.570E+00	0.630E+00	22	1.11	Acceptable
U, Bq	0.940E+00	0.11E+01	18	1.17	Acceptable

[a]Counting error = 2 sigma.

Table 10.17. EML intercomparison study results for K-25 Site in March 1991

Parameter	EML value	K-25 value	Error, K-25 %	Ratio (K-25/EML)	Performance evaluation[a]
		Water (pCi/mL)			
^{3}H	0.361×10^{3}	0.786×10^{3}	13	2.18 ± 0.31	Unacceptable
^{54}Mn	0.213×10^{3}	0.225×10^{3}	0	1.06 ± 0.05	Acceptable
^{57}Co	0.230×10^{3}	0.234×10^{3}	0	1.02 ± 0.05	Acceptable
^{60}Co	0.201×10^{3}	0.197×10^{3}	0	0.98 ± 0.05	Acceptable
^{90}Sr	0.863×10^{1}	0.853×10^{1}	9	0.99 ± 0.11	Acceptable
^{137}Cs	0.169×10^{3}	0.179×10^{3}	0	1.06 ± 0.05	Acceptable
^{239}Pu	0.773×10^{0}	0.770×10^{0}	5	1.0 ± 0.10	Acceptable
^{241}Am	0.119×10^{1}	0.945×10^{0}	6	0.79 ± 0.08	Acceptable
U, Bq	0.437×10^{0}	0.364×10^{0}	9	0.83 ± 0.09	Acceptable
^{144}Ce	0.351×10^{2}	0.414×10^{2}	4	1.18 ± 0.09	Unacceptable
		Air (pCi/filter)			
^{54}Mn	0.480×10^{1}	0.490×10^{1}	7	1.02 ± 0.08	Acceptable
^{57}Co	0.582×10^{1}	0.553×10^{1}	4	0.95 ± 0.05	Acceptable
^{60}Co	0.514×10^{1}	0.488×10^{1}	6	0.95 ± 0.07	Acceptable
^{137}Cs	0.453×10^{1}	0.496×10^{1}	7	1.09 ± 0.09	Acceptable
^{144}Ce	0.522×10^{2}	0.553×10^{2}	3	1.06 ± 0.06	Acceptable
^{239}Pu	0.154×10^{0}	0.175×10^{0}	9	1.14 ± 0.25	Acceptable
^{241}Am	0.101×10^{0}	0.734×10^{-1}	14	0.73 ± 0.13	Acceptable
U, Bq	0.700×10^{-1}	0.576×10^{-1}	27	0.82 ± 0.25	Acceptable
		Soil (pCi/g)			
^{239}Pu	0.340×10^{1}	0.445×10^{1}	23	1.31 ± 0.32	Acceptable
^{137}Cs	0.150×10^{3}	0.150×10^{3}	8	1.0 ± 0.09	Acceptable
^{238}Pu	0.115×10^{2}	0.114×10^{2}	14	0.99 ± 0.15	Acceptable
^{241}Am	0.176×10^{1}	0.117×10^{1}	31	0.66 ± 0.22	Acceptable
U, Bq	0.549×10^{2}	0.254×10^{2}	6	0.43 ± 0.04	Unacceptable

[a]Acceptable ratio is 0.5 to 1.5.

Table 10.18. EML intercomparison study results for K-25 Site in September 1991

Parameter	EML value	K-25 value	Error, K-25 %	Ratio (K-25/EML)	Performance evaluation[a]
		Water (pCi/mL)			
^{54}Mn	0.103×10^{3}	0.103×10^{3}	1	1.00 ± 0.04	Acceptable
^{57}Co	0.166×10^{3}	0.175×10^{3}	0	1.02 ± 0.05	Acceptable
^{60}Co	0.291×10^{3}	0.292×10^{3}	0	1.00 ± 0.04	Acceptable
^{137}Cs	0.460×10^{2}	0.488×10^{2}	1	1.06 ± 0.05	Acceptable
^{144}Ce	0.226×10^{3}	0.233×10^{3}	1	1.03 ± 0.05	Acceptable
^{239}Pu	0.510×10^{0}	0.598×10^{0}	10	1.17 ± 0.14	Acceptable
^{3}H	0.100×10^{3}	0.453×10^{3}	6	4.53 ± 0.30	Unacceptable
		Air (pCi/filter)			
^{54}Mn	0.243×10^{2}	0.230×10^{2}	2	0.95 ± 0.04	Acceptable
^{57}Co	0.166×10^{2}	0.169×10^{2}	1	1.02 ± 0.05	Acceptable
^{60}Co	0.230×10^{2}	0.209×10^{2}	1	0.91 ± 0.04	Acceptable
^{137}Cs	0.280×10^{2}	0.265×10^{2}	2	0.95 ± 0.05	Acceptable
^{144}Ce	0.508×10^{2}	0.481×10^{2}	2	0.95 ± 0.04	Acceptable
^{239}Pu	0.840×10^{-1}	0.839×10^{-1}	62	1.00 ± 0.63	Acceptable
^{241}Am	0.104×10^{0}	0.858×10^{-1}	41	0.82 ± 0.35	Acceptable
		Soil (pCi/g)			
^{137}Cs	0.312×10^{3}	0.242×10^{3}	7	0.78 ± 0.07	Acceptable
^{239}Pu	0.735×10^{1}	0.703×10^{1}	31	0.96 ± 0.31	Acceptable
U, Bq	0.289×10^{2}	0.662×10^{1}	39	0.23 ± 0.09	Unacceptable

[a]Acceptable ratio is 0.5 to 1.5.

Table 10.19. Proficiency Environmental Testing Control Program at the Y-12 Environmental Laboratory in 1991

Level 1 Concentrations

Parameter	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Warning	Unacceptable
Biochemical oxygen demand	102.8	0.499	11	0	0
Chemical oxygen demand	91.8	0.671	11	1	0
Total organic carbon	104.4	0.566	12	0	0
Ammonia nitrogen	100.5	0.266	12	0	0
Nitrate nitrogen	102.9	0.268	12	0	0
Phosphate-P	102.0	0.155	12	0	0
Kjeldahl nitrogen	119.4	0.299	11	0	0
Total phosphorus	92.9	0.509	12	0	0
Total suspended solids	87.3	0.726	11	1	0
Total dissolved solids	92.3	0.526	12	0	0
Oil and grease	102.3	0.605	12	0	0
Alkalinity	100.1	0.195	12	0	0
Calcium	101.3	0.300	12	0	0
Chloride	98.9	0.335	12	0	0
Conductivity	89.4	0.610	11	0	1
Magnesium	102.4	0.308	12	0	0
Potassium	103.5	0.483	12	0	0
Sodium	100.4	0.402	12	0	0
Sulfate	96.8	0.444	12	0	0
Total hardness	101.6	0.245	12	0	0
pH	96.4	0.923	12	0	0
Aluminum	110.4	0.302	12	0	0
Antimony	95.4	0.346	10	0	0
Arsenic	92.8	0.710	11	1	0
Barium	102.1	0.416	12	0	0
Beryllium	99.8	0.230	12	0	0
Boron	114.1	0.366	11	0	0
Cadmium	104.0	0.518	12	0	0
Chromium	101.3	0.319	12	0	0
Cobalt	100.9	0.228	12	0	0
Copper	106.1	0.497	12	0	0
Iron	100.6	0.468	12	0	0
Lead	103.4	0.858	10	1	1
Manganese	102.8	0.585	12	0	0
Mercury	101.6	0.473	11	0	0
Molybdenum	102.1	0.587	12	0	0
Nickel	105.7	0.568	12	0	0
Selenium	103.0	0.524	12	0	0
Silver	98.4	0.430	12	0	0
Thallium	91.9	0.861	11	1	0
Vanadium	101.3	0.354	12	0	0
Zinc	107.2	0.320	12	0	0
Phenol	111.6	0.871	12	0	0
Cyanide	91.7	0.696	11	1	0
Residual chlorine	98.8	0.449	10	0	0
Fluoride	107.0	1.201	9	1	2
Hexavalent chromium	106.2	1.028	9	1	0
Uranium	97.6	0.384	12	0	0

Table 10.19 (continued)

Parameter	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Warning	Unacceptable
		Organics			
Benzene	113.3	0.860	3	0	0
Chlorobenzene	111.1	1.105	2	1	0
1,2-Dichlorobenzene	130.7	2.003	1	0	1
1,4-Dichlorobenzene	108.5	1.740	1	0	0
Ethylbenzene	114.8	1.287	3	0	0
Toluene	110.8	0.917	3	0	0
Carbon Tetrachloride	96.6	0.315	1	0	0
Chloroform	113.7	0.902	2	1	0
Methylene Chloride	126.4	1.887	1	0	0
Tetrachloroethene	106.1	0.621	1	0	0
1,1,1-Trichloroethane	102.5	0.015	1	0	0
1,1,2-Trichloroethane	107.7	0.628	2	0	0
4-Chloro-3-Methyl Phenol	44.9	1.237	1	0	0
2,4-Dichlorophenol	46.9	1.053	1	0	0
2-Nitrophenol	50.7	0.642	1	0	0
Pentachlorophenol	61.0	0.273	1	0	0
Phenol	49.7	0.141	1	0	0
2,4,6-Trichlorophenol	59.1	0.793	1	0	0
Diethylphthlate	27.8	0.632	1	0	0
2,4-Dinitrotoluene	597	26.8	0	0	1
2,6-Dinitrotoluene	91.4	1.498	1	0	0
Acenaphthene	356	18.1	0	0	1
Chrysene	101.5	1.61	1	0	0
Naphthlene	90.8	1.096	1	0	0
Pyrene	429	18.8	0	0	1
Bis (2-Chloroethyl) Ether	88.7	0.907	1	0	0
Hexachlorobutadiene	71.5	0.832	1	0	0
Hexachlorocyclopentadiene	78.9	1.770	1	0	0
Hexachloroethane	80.8	1.108	1	0	0
1,2,4-Trichlorobenzene	248	9.78	0	0	1

[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 10.20. Proficiency Environmental Testing Control Program at the Y-12 Environmental Laboratory in 1991

Level 2 Concentrations

Parameter	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Warning	Unacceptable
Biochemical oxygen demand	103.8	0.510	11	0	0
Chemical oxygen demand	91.5	0.444	12	0	0
Total organic carbon	107.1	0.462	12	0	0
Ammonia nitrogen	99.7	0.164	12	0	0
Nitrate nitrogen	106.5	0.700	12	0	0
Phosphate-P	103.4	0.293	12	0	0
Kjeldahl nitrogen	107.4	0.180	11	0	0
Total phosphorus	102.1	0.509	12	0	0
Total suspended solids	94.1	0.368	12	0	0
Total dissolved solids	97.8	0.524	12	0	0
Oil and grease	96.8	0.445	12	0	0
Alkalinity	99.3	0.442	12	0	0
Calcium	100.0	0.231	12	0	0
Chloride	98.3	0.391	12	0	0
Conductivity	87.8	0.696	11	0	1
Magnesium	101.9	0.376	12	0	0
Potassium	102.3	0.477	12	0	0
Sodium	98.8	0.378	12	0	0
Sulfate	98.7	0.439	12	0	0
Total hardness	101.2	0.361	12	0	0
pH	95.9	0.652	12	0	0
Aluminum	101.7	0.270	12	0	0
Antimony	100.7	0.427	12	0	0
Arsenic	97.5	0.737	11	1	0
Barium	102.0	0.366	12	0	0
Beryllium	100.1	0.251	12	0	0
Boron	102.4	0.336	12	0	0
Cadmium	102.7	0.429	12	0	0
Chromium	102.8	0.366	12	0	0
Cobalt	101.1	0.254	12	0	0
Copper	102.9	0.384	12	0	0
Iron	100.9	0.329	12	0	0
Lead	103.5	0.554	12	0	0
Manganese	103.3	0.726	12	0	0
Mercury	94.6	0.434	11	0	0
Molybdenum	100.8	0.560	12	0	0
Nickel	100.9	0.257	12	0	0
Selenium	105.9	0.678	10	2	0
Silver	100.1	0.347	12	0	0
Thallium	98.9	0.505	10	0	0
Vanadium	100.7	0.209	12	0	0
Zinc	102.3	0.411	12	0	0
Phenol	107.1	0.863	11	1	0
Cyanide	96.1	0.368	12	0	0
Residual chlorine	96.4	0.316	12	0	0
Fluoride	109.1	1.440	8	2	2
Hexavalent chromium	94.4	1.527	8	1	1
Uranium	97.5	0.358	12	0	0

Table 10.20 (continued)

Parameter	Average recovery[a] (%)	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Warning	Unacceptable
		Organics			
Benzene	111.8	0.907	2	1	0
Chlorobenzene	106.0	0.761	3	0	0
1,2-Dichlorobenzene	114.9	1.135	2	0	0
1,4-Dichlorobenzene	111.5	0.979	1	0	0
Ethylbenzene	108.0	0.990	2	1	0
Toluene	104.1	0.756	2	1	0
Carbon Tetrachloride	105.3	0.638	1	0	0
Chloroform	106.6	0.788	3	0	0
Methylene Chloride	120.6	1.394	1	0	0
Tetrachloroethene	106.1	1.293	1	0	0
1,1,1-Trichloroethane	90.6	0.608	1	0	0
1,1,2-Trichloroethane	104.2	0.574	2	0	0
4-Chloro-3-Methyl Phenol	77.0	0.352	1	0	0
2,4-Dichlorophenol	63.9	0.421	1	0	0
2-Nitrophenol	65.3	0.251	1	0	0
Phenol	56.9	0.042	1	0	0
2,4,6-Trichlorophenol	55.4	0.910	1	0	0
Diethylphthlate	10.9	0.971	1	0	0
2,4-Dinitrotoluene	161.9	3.108	0	0	1
2,6-Dinitrotoluene	87.3	0.859	1	0	0
Acenapthene	225	10.6	0	0	1
Chrysene	86.4	0.426	1	0	0
Naphthalene	94.4	1.343	1	0	0
Pyrene	219	9.127	0	0	1
Bis (2-Chloroethyl) Ether	103.4	1.447	1	0	0
Hexachlorobutadiene	81.9	1.097	1	0	0
Hexachlorocyclopentadiene	66.6	0.560	1	0	0
Hexachloroethane	79.7	1.211	1	0	0
1,2,4-Trichlorobenzene	170	5.502	0	0	1

[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 10.21. Proficiency Environmental Testing Control Program at ORNL in 1991

Level 1 Concentration, Inorganics

Parameter	Average recovery (%)[a]	Average number of standard deviations[b]	Performance		
			Acceptable[c]	Marginal[c]	Unacceptable[c]
BOD	95.9	0.70	12	0	0
TOC	101.7	0.15	8	0	0
Ammonia as N	120.1	0.64	12	0	0
Nitrate as N	97.4	0.31	9	0	0
Orthophosphate as P	82.2	1.64	7	0	2
Total P	85.1	0.67	5	0	0
Suspended solids	90.0	0.86	10	1	0
Dissolved solids	101.5	0.62	11	0	0
Oil and grease	92.9	0.30	11	0	0
Alkalinity	98.2	0.36	12	0	0
Chloride	96.0	0.59	2	0	0
Conductivity	94.3	0.58	12	0	0
Sulfate	99.0	0.58	3	0	0
Total hardness as $CaCO_3$	100.3	0.21	12	0	0
pH	98.9	0.56	12	0	0
Ag	99.1	0.31	11	0	0
Al	100.2	0.21	11	0	0
As	103.9	0.60	11	0	0
Ba	100.4	0.45	11	0	0
Be	100.9	0.31	11	0	0
B	104.8	0.34	11	0	0
Cd	101.3	0.21	11	0	0
Co	96.7	0.58	11	0	0
Cr	98.0	0.24	11	0	0
Cu	99.4	0.37	11	0	0
Fe	99.4	0.29	11	0	0
Hg	102.5	0.28	10	0	0
Mo	99.1	0.28	11	0	0
Mn	95.1	0.45	11	0	0
Ni	98.1	0.20	11	0	0
Pb	100.9	0.39	11	0	0
Sb	96.2	0.43	11	0	0
Se	80.6	1.10	9	1	0
U	93.4	0.64	10	0	0
V	99.4	0.25	11	0	0
Zn	97.1	0.50	11	0	0
Phenol	94.8	0.40	12	0	0
Cyanide	104.5	0.45	12	0	0
Total residual chloride	98.7	0.56	9	0	0
Total organic halides	103.3	0.37	5	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 ORNL in 1991

Level 2 Concentration, Inorganics

Parameter	Average recovery (%)[a]	Average number of standard deviations[b]	Performance		
			Acceptable[c]	Marginal[c]	Unacceptable[c]
BOD	95.0	0.34	12	0	0
TOC	97.5	0.72	7	0	1
Ammonia as N	107.6	0.56	12	0	0
Nitrate as N	100.6	0.25	9	0	0
Orthophosphate as P	91.9	0.95	9	0	0
Total P	96.6	0.77	7	0	0
Suspended solids	96.3	0.80	12	0	0
Dissolved solids	101.7	0.48	11	0	0
Oil and grease	91.5	0.21	11	0	0
Alkalinity	99.0	0.48	12	0	0
Chloride	87.7	2.29	0	1	0
Conductivity	92.3	0.63	12	0	0
Sulfate	99.4	0.31	3	0	0
Total hardness as $CaCO_3$	101.3	0.50	11	0	1
pH	98.7	0.49	12	0	0
Ag	100.5	0.27	11	0	0
Al	99.7	0.25	11	0	0
As	105.6	0.55	11	0	0
Ba	99.7	0.41	11	0	0
Be	101.1	0.36	11	0	0
B	101.4	0.29	11	0	0
Cd	100.6	0.36	11	0	0
Co	96.8	0.61	11	0	0
Cr	98.6	0.35	11	0	0
Cu	101.3	0.37	11	0	0
Fe	100.0	0.45	11	0	0
Hg	101.3	0.26	10	0	0
Mo	99.1	0.31	11	0	0
Mn	98.7	0.35	11	0	0
Ni	99.6	0.32	11	0	0
Pb	100.6	0.32	11	0	0
Sb	101.1	0.45	11	0	0
Se	105.8	0.46	10	0	0
U	96.3	0.80	10	0	0
V	98.8	0.38	11	0	0
Zn	99.2	0.58	10	1	0
Phenol	93.6	0.62	12	0	0
Cyanide	105.6	0.46	12	0	0
Total residual chloride	100.8	0.72	9	0	0
Total organic halides	94.6	0.34	5	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 10.23. Proficiency Environmental Testing Control Program at ORNL in 1991

Level 1 Concentration, Organics

Parameter	Average recovery (%)[a]	Average number of standard deviations[b]	Performance		
			Acceptable[c]	Marginal[c]	Unacceptable[c]
Benzene	178.0	5.00	7	0	1
Chlorobenzene	234.2[d]	21.2[d]	10	0	1
1,2 Dichlorobenzene	87.1	0.46	2	0	0
1,4 Dichlorobenzene	104.1	0.42	2	0	0
Ethyl benzene	127.7	2.53	10	0	1
Toluene	104.1	1.07	9	0	1
Carbon tetrachloride	88.8	0.46	6	0	0
Chloroform	173.0	12.7	8	0	1
Methylene chloride	115.5	1.39	8	0	1
Tetrachloroethene	93.7	0.36	5	0	0
1,1,1-Trichloroethane	110.4	2.05	4	0	1
1,1,2-Trichloroethane	116.9	1.76	8	0	1
Trichloroethene	448.7[e]	39.6[e]	3	0	1
4-Chloro-3-methyl phenol	76.6	0.48	6	0	0
2-Chlorophenol	58.8	0.52	3	0	0
2,4-Dichlorophenol	70.2	0.50	5	0	0
2,4-Dinitrophenol	38.7	0.38	3	0	0
2-Methyl-4,6-dinitrophenol	62.2	0.51	5	0	0
2-Nitrophenol	66.9	0.26	5	0	0
4-Nitrophenol	81.1	0.84	3	0	0
Pentachlorophenol	58.4	0.60	5	0	0
Phenol	72.0	0.84	4	0	0
2,4,6-Trichlorophenol	66.5	0.45	6	0	0
Bis(2-ethylhexyl)phthalate	85.2	1.05	2	0	0
Di-n-butylphthalate	84.0	0.41	2	0	0
Diethylphthalate	85.1	0.69	7	0	0
Dimethylphthalate	74.1	0.46	4	0	0
2,4-Dinitrotoluene	69.9	0.38	6	0	0
2,6-Dinitrotoluene	67.4	0.15	6	0	0
Isophorone	67.9	0.54	5	0	0
Nitrobenzene	68.2	0.23	2	0	0
Acenaphthene	73.8	0.38	6	0	0
Anthracene	72.8	0.77	1	0	0
Chrysene	77.2	0.58	5	0	0
Naphthalene	69.0	0.51	3	0	0
Phenanthrene	82.1	0.51	5	0	0
Pyrene	86.8	0.69	6	0	0
Bis (2-chloroethyl) ether	62.4	0.62	6	0	0
1,2-Dichlorobenzene	51.7	0.61	2	0	0
1,4-Dichlorobenzene	60.0	0.78	6	0	0
Hexachlorobutadiene	50.5	0.63	5	0	0
Hexachlorocyclopentadiene	43.0	0.05	1	0	0
Hexachloroethane	58.0	0.50	6	0	0
1,2,4-Trichlorobenzene	62.8	0.60	7	0	0
Aldrin	62.1	0.92	9	1	0
Gamma-BHC	83.8	0.36	8	0	0
4,4'-DDT	88.4	0.21	7	0	0
Dieldrin	99.4	0.62	9	1	0
Endrin	97.6	0.38	9	0	0
Heptachlor	63.5	0.71	7	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 98.7% and 0.51 if outlier is removed.

[e]Would be 90.7% and 0.51 if outlier is removed.

Table 10.24. Proficiency Environmental Testing Control Program at ORNL in 1991

Level 2 Concentration, Organics

Parameter	Average recovery (%)[a]	Average number of standard deviations[b]	Performance		
			Acceptable[c]	Marginal[c]	Unacceptable[c]
Benzene	85.3	1.07	7	0	1
Chlorobenzene	86.5	1.65	10	0	1
1,2-Dichlorobenzene	89.5	0.46	2	0	0
1,4-Dichlorobenzene	103.1	0.45	2	0	0
Ethyl benzene	86.7	0.73	10	0	1
Toluene	89.7	0.66	9	0	1
Carbon tetrachloride	90.7	0.65	5	1	0
Chloroform	87.7	1.33	8	0	1
Methylene chloride	93.2	0.57	8	0	1
Tetrachloroethene	91.8	0.40	5	0	0
1,1,1-Trichloroethane	82.9	1.71	4	0	1
1,1,2-Trichloroethane	92.6	0.75	8	0	1
Trichloroethene	69.3	2.18	3	0	1
4-Chloro-3-methyl phenol	71.8	0.53	6	0	0
2-Chlorophenol	61.8	0.58	3	0	0
2,4-Dichlorophenol	70.4	0.37	5	0	0
2,4-Dinitrophenol	61.5	0.34	3	0	0
2-Methyl-4,6-dinitrophenol	74.4	0.41	5	0	0
2-Nitrophenol	67.3	0.54	5	0	0
4-Nitrophenol	82.5	0.75	3	0	0
Pentachlorophenol	66.9	0.61	5	0	0
Phenol	73.6	0.67	4	0	0
2,4,6-Trichorophenol	71.1	0.58	6	0	0
Bis(2-ethylhexyl)phthalate	84.6	0.25	2	0	0
Di-n-butylphthalate	68.6	0.48	2	0	0
Diethylphthalate	73.0	0.61	7	0	0
Dimethylphthalate	73.2	0.48	4	0	0
2,4-Dinitrotoluene	76.8	0.70	6	0	0
2,6-Dinitrotoluene	76.5	0.45	6	0	0
Isophorone	67.5	0.82	5	0	0
Nitrobenzene	58.1	0.77	2	0	0
Acenaphthene	73.1	0.28	6	0	0
Anthracene	66.0	0.85	1	0	0
Chrysene	80.3	0.20	5	0	0
Naphthalene	61.7	0.63	3	0	0
Phenanthrene	73.2	0.74	4	1	0
Pyrene	82.7	0.57	6	0	0
Bis (2-chloroethyl) ether	61.8	0.56	6	0	0
1,2-Dichlorobenzene	44.8	0.91	2	0	0
1,4-Dichlorobenzene	53.1	0.83	6	0	0
Hexachlorobutadiene	48.3	0.77	5	0	0
Hexachlorocyclopentadiene	43.6	0.42	1	0	0
Hexachloroethane	58.8	0.71	6	0	0
1,2,4-Trichlorobenzene	60.3	0.54	7	0	0
Aldrin	59.5	1.26	9	1	0
Gamma-BHC	82.9	0.22	8	0	0
4,4'-DDT	87.6	0.32	7	0	0
Dieldrin	100.0	0.78	10	0	0
Endrin	92.1	0.30	9	0	0
Heptachlor	63.8	0.89	7	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 10.25. Proficiency Environmental Testing Control Program at K-25 in 1991

Level 1 Concentrations

Parameter[a]	Average recovery (%)[a]	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Marginal	Unacceptable
Alkalinity	94.671	–0.75	10	1	0
Aluminum	92.630	–0.44	11	0	0
Ammonia nitrogen	140.241	0.83	9	0	1
Antimony	81.371	–0.66	9	0	2
Arsenic	99.170	0.11	10	0	0
Barium	99.383	0.06	11	0	0
Beryllium	95.720	–0.35	11	0	0
Biochemical oxygen demand	104.087	0.43	11	0	0
Boron	107.621	–0.02	11	0	0
Cadmium	103.783	0.50	11	0	0
Calcium	100.750	0.15	11	0	0
Chemical oxygen demand	91.141	–0.47	11	0	0
Chloride	102.265	0.27	11	0	0
Chromium	104.617	0.24	11	0	0
Chromium+6	91.953	–0.11	10	0	0
Cobalt	103.081	0.49	10	1	0
Conductivity	91.906	0.07	11	0	0
Copper	99.532	–0.23	11	0	0
Cyanide	107.266	0.40	9	1	1
Fluoride	100.231	–0.03	11	0	0
Iron	100.418	–0.11	11	0	0
Lead	100.845	0.17	10	0	0
Magnesium	105.799	0.66	11	0	0
Manganese	102.779	0.60	11	0	0
Mercury	97.320	–0.32	11	0	0
Molybdenum	95.595	–0.14	11	0	0
Nickel	107.210	0.46	11	0	0
Nitrate nitrogen	98.164	–0.01	11	0	0
Oil and grease	111.255	0.64	11	0	0
Orthophosphate as P	93.409	–0.43	11	0	0
pH	96.597	0.14	11	0	0
Phenol	94.101	–0.33	11	0	0
Potassium	104.139	0.48	11	0	0
Selenium	95.642	–0.31	10	0	0
Silver	107.142	0.52	11	0	0
Sodium	103.365	0.47	9	2	0
Sulfate	100.740	0.04	11	0	0
Thallium	95.113	–0.17	10	0	0
Total dissolved solids	104.392	0.12	11	0	0
Total hardness (as $CaCO_3$)	100.616	–0.13	11	0	0
Total Kjeldahl nitrogen	132.424	0.24	10	1	0
Total organic carbon	102.271	0.03	10	1	0
Total organic halides (TO_x)	91.749	–0.40	7	1	0
Total phosphorus as P	118.702	0.55	11	0	0
Total residual chlorine	80.226	–0.95	9	2	0
Total suspended solids	90.785	–0.31	11	0	0
Uranium	100.626	0.25	10	1	0
Vanadium	102.786	0.36	11	0	0
Zinc	106.567	0.16	11	0	0

[a]Average of all results for ORGDP. 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 10.26. Proficiency Environmental Testing Control Program at K-25 in 1991

Level 2 Concentrations

Parameter[a]	Average recovery (%)[a]	Average number of standard deviations[b]	Performance[c]		
			Acceptable	Marginal	Unacceptable
Alkalinity	94.533	–0.68	11	0	0
Aluminum	106.746	0.46	10	0	1
Ammonia nitrogen	102.375	0.04	8	0	3
Antimony	95.760	–0.12	11	0	0
Arsenic	99.571	0.02	10	0	0
Barium	100.817	0.24	11	0	0
Beryllium	96.833	–0.29	11	0	0
Biochemical oxygen demand	99.720	0.15	11	0	0
Boron	103.306	0.39	11	0	0
Cadmium	106.531	0.99	10	1	0
Calcium	100.945	0.09	11	0	0
Chemical oxygen demand	85.430	–0.32	11	0	0
Chloride	101.888	0.33	11	0	0
Chromium	108.605	1.06	11	0	0
Chromium +6	105.384	0.95	10	0	1
Cobalt	104.357	0.83	10	1	0
Conductivity	90.320	0.18	11	0	0
Copper	102.624	0.33	11	0	0
Cyanide	107.844	0.36	10	0	1
Fluoride	103.334	0.38	10	1	0
Iron	105.158	0.75	11	0	0
Lead	102.868	0.27	10	0	0
Magnesium	105.407	0.76	11	0	0
Manganese	104.048	0.84	11	0	0
Mercury	96.188	–0.29	10	1	0
Molybdenum	98.722	0.21	11	0	0
Nickel	108.640	0.89	11	0	0
Nitrate nitrogen	91.847	–0.71	11	0	0
Oil and grease	100.231	0.50	11	0	0
Orthophosphate as P	95.928	–0.56	11	0	0
pH	96.540	–0.02	10	1	0
Phenol	99.143	0.06	11	0	0
Potassium	102.004	0.16	11	0	0
Selenium	99.838	0.05	10	0	0
Silver	104.823	0.71	11	0	0
Sodium	101.976	0.30	9	1	1
Sulfate	99.640	0.03	11	0	0
Thallium	94.088	–0.25	10	0	0
Total dissolved solids	103.452	0.27	11	0	0
Total hardness as $CaCO_3$	96.672	–0.29	11	0	0
Total Kjeldahl nitrogen	103.338	–0.11	11	0	0
Total organic carbon	99.429	–0.20	11	0	0
Total organic halides (TO_x)	78.111	–0.83	8	0	0
Total phosphorus as P	101.960	0.28	11	0	0
Total residual chlorine	92.167	–0.15	11	0	0
Total suspended solids	95.649	–0.04	10	1	0
Uranium	97.892	0.24	11	0	0
Vanadium	104.294	0.67	11	0	0
Zinc	105.691	0.74	10	1	0

[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 10.27. 1991 performance evaluation report, DMR-QA study number 011—Y-12 Environmental Laboratory

Analytes	Values		Limits		Performance evaluation
	Reported	True	Acceptable	Warning	
		Trace metals (μg/L)			
Aluminum	3,340	3,200	2,730–3,630	2,840–3,510	Acceptable
Arsenic	148	200	158–234	168–225	Unacceptable
Beryllium	143	130	104–159	111–152	Acceptable
Cadmium	194	190	161–218	168–211	Acceptable
Chromium	429	410	334–477	352–459	Acceptable
Cobalt	190	180	154–205	161–198	Acceptable
Copper	772	730	656–817	676–797	Acceptable
Iron	1,080	1,000	887–1,140	918–1,110	Acceptable
Lead	98	47.9	38.3–58.3	40.8–55.8	Unacceptable
Manganese	956	920	850–1,010	869–986	Acceptable
Mercury	3.20	3.40	2.54–4.41	2.78–4.18	Acceptable
Nickel	460	430	383–485	396–472	Acceptable
Selenium	75	86.0	60.7–105	66.1–99.1	Acceptable
Vanadium	4,870	4,600	4,130–5,160	4,260–5,020	Acceptable
Zinc	118	110	88.5–133	94.1–128	Acceptable
		Miscellaneous analytes			
pH, standard units	5.55	5.52	5.42–5.66	5.45–5.64	Acceptable
Total suspended solids, mg/L	18.7	23.9	14.8–26.5	16.3–25.0	Acceptable
Oil and grease, mg/L	15.8	17.0	9.07–22.1	10.7–20.5	Acceptable
		Nutrients (mg/L)			
Ammonia-nitrogen	4.13	4.20	3.30–5.09	3.51–4.88	Acceptable
Nitrate-nitrogen	9.48	10.0	8.09–11.9	8.55–11.4	Acceptable
Kjeldahl-nitrogen	23.8	25.0	18.9–29.9	20.3–28.5	Acceptable
Total phosphorus	1.85	1.80	1.38–2.13	1.47–2.04	Acceptable
Orthophosphate	0.313	0.320	0.251–0.385	0.267–0.369	Acceptable
		Demands (mg/L)			
COD	62.7	65.4	49.3–75.8	52.7–72.5	Acceptable
TOC	27.0	25.9	21.9–29.8	22.9–28.8	Acceptable
5-day BOD	52.7	41.4	22.7–60.2	27.4–55.5	Acceptable
		Additional miscellaneous analytes (mg/L)			
Total cyanide	0.535	0.530	0.365–0.676	0.404–0.637	Acceptable
Total phenolics	0.015	0.0146	0.0025–0.0266	0.0056–0.0236	Acceptable
Total residual chlorine	0.10	0.110	D.L.–0.246	0.0099–0.210	Acceptable

Table 10.28. EPA performance evaluation DMR-QA study number 011—K-25 Site, 1991

Analytes	Values		Limits		Performance evaluation
	Reported	True[a]	Acceptance	Warning	
		Trace metals (μg/L)			
Al	3280	3200	2730–3630	2840–3510	Acceptable
As[a]	202	200	158–234	168–225	Acceptable
Be	131	130	104–159	111–152	Acceptable
Cd	194	190	161–218	168–211	Acceptable
Cr	440	410	334–477	352–459	Acceptable
Co	190	180	154–205	161–198	Acceptable
Cu	756	730	656–817	676–797	Acceptable
Fe	1040	1000	887–1140	918–1110	Acceptable
Pb	49.3	47.9	38.3–58.3	40.8–55.8	Acceptable
Mn[a]	973	920	850–1010	869–986	Acceptable
Hg	1.24	3.40	2.54–4.41	2.78–4.78	Unacceptable
Ni	454	430	383–485	396–472	Acceptable
Se	84.7	86.0	60.7–105	66.1–99.1	Acceptable
V	4900	4600	4130–5160	4260–5020	Acceptable
Zn	118	110	88.5–133	94.1–128	Acceptable
		Miscellaneous analytes (mg/L)			
pH, standard units	5.42	5.52	5.42–5.66	5.45–5.64	Warning
Total suspended solids	21.8	23.9	14.8–26.5	16.3–25.0	Acceptable
O&G	15.6	17.0	9.07–22.1	10.7–20.5	Acceptable
		Nutrients (mg/L)			
Ammonia-nitrogen	5.22	4.20	3.30–5.09	3.51–4.88	Unacceptable
Nitrate-nitrogen	9.08	10.0	8.09–11.9	8.55–11.4	Acceptable
Kjeldahl-nitrogen	22.9	25.0	18.9–29.9	20.3–28.5	Acceptable
Total P	1.96	1.80	1.38–2.13	1.47–2.04	Acceptable
Orthophosphate	0.326	0.320	0.251–0.385	0.267–0.369	Acceptable
		Demands (mg/L)			
COD	69	65.4	49.3–75.8	52.7–72.5	Acceptable
TOC	21.1	25.9	21.9–29.8	22.9–28.8	Unacceptable
5-day BOD	39.4	41.4	22.7–60.2	27.4–55.5	Acceptable
		Additional miscellaneous analytes (mg/L)			
Total cyanide	0.515	0.530	0.365–0.676	0.404–0.637	Acceptable
Total phenolics	0.01	0.0146	0.0025–0.0266	0.0056–0.0236	Acceptable
Total residual chlorine	0.059	0.110	D.L.–0.246	0.099–0.210	Acceptable

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

Table 10.29. 1991 performance evaluation report, water supply study number WS028—Y-12 Environmental Laboratory

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True		
		Trace metals (μg/L)			
Antimony	2	38	35.0	27.8–46.6	Acceptable
Arsenic	1	109	129	109–144	Acceptable
Barium	1	535	533	472–574	Acceptable
Beryllium	2	0.81	0.800	0.611–0.991	Acceptable
Cadmium	1	7.88	7.73	6.37–8.90	Acceptable
Chromium	1	204	200	179–223	Acceptable
Copper	1	936	950	866–1020	Acceptable
Lead	1	6.7	7.28	5.52–9.41	Acceptable
Mercury	1	6.49	7.14	5.54–8.46	Acceptable
Nickel	2	216	211	185–231	Acceptable
Selenium	1	12	13.1	9.68–14.6	Acceptable
Silver	1	62.8	60.7	52.7–68.9	Acceptable
Thallium	2	1.9	2.00	1.08–2.94	Acceptable
		Insecticides (μg/L)			
Lindane	1	1.197	0.638	0.378–0.861	Unacceptable
Methoxychlor	1	12.4	12.4	8.10–15.9	Acceptable
Toxaphene	2	8.70	12.7	7.47–15.7	Acceptable
Chlordane	3	2.29	3.77	2.04–4.77	Acceptable
Endrin	1	0.180	0.163	0.107–0.233	Acceptable
Heptachlor	4	0.101	0.142	0.0398–0.220	Acceptable
Heptachlor epoxide	4	0.100	0.125	0.0721–0.168	Acceptable
Hexachlorobenzene	4	0.158	0.167	0.0786–0.236	Acceptable
Hexachlorocyclopentadiene	4	0.075	0.230	D.L.–0.402	Acceptable
		Herbicides (μg/L)			
2,4-D	1	5.8	3.33	0.971–5.26	Unacceptable
2,4,5-TP (Silvex)	1	2.7	1.75	0.532–2.57	Unacceptable
		Trihalomethanes (μg/L)			
Bromodichloromethane	1	17.8	18.7	15.0–22.4	Acceptable
Bromoform	1	35.9	34.6	27.7–41.5	Acceptable
Chlorodibromomethane	1	27.0	27.1	21.7–32.5	Acceptable
Chloroform	1	13.4	14.2	11.4–17.0	Acceptable
Total trihalomethane	1	94.10	94.6	75.7–114	Acceptable
		Volatile organic compounds (μg/L)			
Benzene	1	11.2	11.8	9.44–14.2	Acceptable
Carbon tetrachloride	1	10.8	12.2	9.76–14.6	Acceptable
Chlorobenzene	2	13.8	14.6	11.7–17.5	Acceptable
1,2-Dichlorobenzene	2	15.4	15.4	12.3–18.5	Acceptable
1,4-Dichlorobenzene	1	11.3	12.5	10.0–15.0	Acceptable
1,2-Dichloroethane	1	6.8	6.95	4.17–9.73	Acceptable
1,1-Dichloroethylene	1	4.3	4.72	2.83–6.61	Acceptable
C 1,2-Dichloroethylene	2	12.9	13.0	10.4–15.6	Acceptable
T 1,2-Dichloroethylene	2	9.2	9.81	5.89–13.7	Acceptable
1,2-Dichloropropane	2	6.6	7.37	4.42–10.3	Acceptable

Table 10.29 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True		
Volatile organic compounds (μg/L)					
Ethylbenzene	2	10.5	11.6	9.28–13.9	Acceptable
Styrene	2	9.5	10.6	8.48–12.7	Acceptable
Tetrachloroethylene	2	7.7	9.03	5.42–12.6	Acceptable
Toluene	2	12.4	13.8	11.0–16.6	Acceptable
1,1,1-Trichloroethane	1	13.4	15.2	12.2–18.2	Acceptable
Trichloroethylene	1	3.8	4.32	2.59–6.05	Acceptable
Vinyl chloride	1	8.0	9.40	5.64–13.2	Acceptable
Total xylenes	2	8.4	8.45	5.07–11.8	Acceptable
Bromobenzene	3	12.6	13.4	10.7–16.1	Acceptable
N-Butylbenzene	3	6.3	7.29	4.37–10.2	Acceptable
4-Chlorotoluene	3	10.4	12.3	9.84–14.8	Acceptable
4-Isopropyltoluene	3	12.3	13.9	11.1–16.7	Acceptable
1,1,1,2-Tetrachloroethane	3	7.7	8.23	4.94–11.5	Acceptable
1,2,4-Trichlorobenzene	3	7.9	8.62	5.17–12.1	Acceptable
1,2,3-Trichloropropane	3	10.7	11.6	9.28–13.9	Acceptable
1,2,4-Trimethylbenzene	3	8.4	9.46	5.68–13.2	Acceptable
Miscellaneous analytes					
Sulfate (mg/L)	1	40.6	43.0	37.7–47.2	Acceptable
Total cyanide (mg/L)	1	0.420	0.460	0.312–0.567	Acceptable
Residual free chlorine (mg/L)	1	1.64	1.70	1.33–1.88	Acceptable
Turbidity (NTUs)	1	6.11	5.60	5.23–6.27	Acceptable
Total filterable residue (mg/L)	1	363	261	180–385	Acceptable
Calcium (as $CaCO_3$) (mg/L)	1	129	130	119–139	Acceptable
pH (standard units)	1	8.87	9.17	8.84–9.32	Acceptable
Alkalinity (as $CaCO_3$) (mg/L)	1	38.4	37.0	34.7–41.9	Acceptable
Corrosivity (Langelier ind. at 20°C)	1	+0.59	0.85	0.597–1.18	Unacceptable
Corrosivity (Aggressive ind. at 20°C)	1	12.54	12.8	12.5–13.1	Acceptable
Sodium (mg/L)	1	16.6	17.0	15.2–18.9	Acceptable
Nitrate/nitrite/fluoride (mg/L)					
Nitrate as N	1	7.39	8.80	7.40–10.4	Unacceptable
Nitrite as N	1	0.804	0.770	0.674–0.879	Acceptable
Fluoride	1	1.52	1.60	1.44–1.76	Acceptable

Table 10.30. Water supply performance evaluation study WP-026-ORNL, 1991

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
		Trace metals (mg/L)				
Al	1	900	870	720–999	755–964	Acceptable
	2	3,290	3,200	2,730–3,630	2,840–3,510	Acceptable
As	1	76.0	69.9	55.5–82.8	58.9–79.4	Acceptable
	2	217	200	158–234	168–225	Acceptable
Be	1	11.1	11.1	7.73–14.7	8.63–13.8	Acceptable
	2	134	130	104–159	111–152	Acceptable
Cd	1	6.10	5.07	3.42–6.82	3.85–6.40	Acceptable
	2	203	190	161–218	168–211	Acceptable
Co	1	804	815	706–915	733–888	Acceptable
	2	179	180	154–205	161–198	Acceptable
Cr	1	74.0	74.0	56.7–90.2	60.8–86.0	Acceptable
	2	410	410	334–477	352–459	Acceptable
Fe	1	346	340	293–391	305–379	Acceptable
	2	1,030	1,000	887–1,140	918–1,110	Acceptable
Hg	1	0.52	0.543	0.246–0.903	0.329–0.820	Acceptable
	2	3.37	3.40	2.54–4.41	2.78–4.18	Acceptable
Mn	1	423	420	385–460	394–451	Acceptable
	2	947	920	850–1,010	869–986	Acceptable
Ni	1	1,610	1,600	1,420–1,770	1,460–1,720	Acceptable
	2	432	430	383–485	396–472	Acceptable
Pb	1	249	320	271–369	283–357	Unacceptable
	2	42.0	47.9	38.3–58.3	40.8–55.8	Acceptable
Se	1	31.7	10.0	5.92–13.1	6.82–12.2	Unacceptable
	2	92.5	86.0	60.7–105	66.1–9.1	Acceptable
V	1	1,930	2,000	1,760–2,240	1,820–2,180	Acceptable
	2	4,510	4,600	4,130–5,160	4,260–5,020	Acceptable
Zn	1	1,860	1,900	1,670–2,110	1,720–2,060	Acceptable
	2	102	110	88.5–133	94.1–128	Acceptable
Sb	3	17.8	17.1	8.31–26.0	10.5–23.8	Acceptable
	4	97.1	97.0	55.9–128	64.9–118	Acceptable
Ag	3	0.760	0.806	0.460–1.16	0.550–1.07	Acceptable
	4	6.56	6.80	5.14–8.34	5.54–7.94	Acceptable
Tl	3	6.60	6.75	4.11–9.43	4.81–8.73	Acceptable
	4	86.5	97.1	76.6–118	81.9–112	Acceptable

Table 10.30 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
		Trace metals (μg/L)				
Mo	3	26.6	27.3	17.0–36.6	19.8–33.9	Acceptable
	4	3.01	4.01	1.21–6.99	2.03–6.17	Acceptable
Sr	3	3.18	2.99	2.07–3.95	2.33–3.70	Acceptable
	4	69.1	68.0	52.8–84.3	57.0–80.1	Acceptable
Ti	3	201	190	160–222	168–214	Acceptable
	4	40.2	39.9	30.8–47.5	33.0–45.2	Acceptable
		Minerals (mg/L except as noted)				
pH, standard units	3	8.94	8.80	8.46–9.24	8.55–9.14	Acceptable
	4	5.55	5.52	5.42–5.66	5.45–5.64	Acceptable
Specific conductivity (μmhos/cm)	1	120	119	104–128	107–125	Acceptable
	2	913	901	799–986	822–963	Acceptable
Total hardness (as $CaCO_3$)	1	18.2	18.5	14.7–22.4	15.6–21.5	Acceptable
	2	67.1	71.0	61.8–80.3	64.1–77.9	Acceptable
Ca	1	1.27	1.30	0.909–1.61	0.997–1.52	Acceptable
	2	67.1	71.0	61.8–80.3	64.1–77.9	Acceptable
Mg	1	3.59	3.70	3.16–4.25	3.29–4.11	Acceptable
	2	17.8	18.5	16.0–21.0	16.6–20.4	Acceptable
Na	1	8.80	9.44	8.29–10.8	8.60–10.5	Acceptable
	2	49.2	55.8	49.3–61.8	50.9–60.3	Unacceptable
K	1	8.85	8.95	7.43–10.3	7.80–9.97	Acceptable
	2	28.5	28.9	24.8–33.2	25.9–32.1	Acceptable
Total alkalinity (as $CaCO_3$)	1	18.8	18.2	14.7–23.0	15.7–22.0	Acceptable
	2	108	112	96.7–116	99.1–114	Acceptable
Chloride	1	24.9	18.4	10.6–15.5	11.2–14.9	Unacceptable
	2	356	181	164–201	169–196	Unacceptable
Fluoride	1	1.45	0.750	0.636–0.852	0.664–0.825	Unacceptable
	2	5.95	2.90	2.38–3.27	2.50–3.16	Unacceptable
Sulfate	1	22.1	11.0	8.35–13.4	8.98–12.8	Unacceptable
	2	68.6	35.5	28.0–41.9	29.8–40.1	Unacceptable
		Nutrients (mg/L)				
Ammonia-N	1	18.0	18.0	14.4–21.3	15.2–20.4	Acceptable
	2	3.95	4.20	3.30–5.09	3.51–4.88	Acceptable
Nitrate-N	1	7.84	8.00	6.47–9.52	6.83–9.15	Acceptable
	2	9.93	10.0	8.09–11.9	8.55–11.4	Acceptable

Table 10.30 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
			Nutrients (mg/L)			
Orthophosphate	1	1.27	1.40	1.15–1.63	1.20–1.57	Acceptable
	2	0.28	0.320	0.251–0.385	0.267–0.369	Acceptable
Kjeldahl-N	3	2.91	3.10	1.96–4.21	2.23–3.94	Acceptable
	4	22.8	25.0	18.9–29.9	20.3–28.5	Acceptable
Total P	3	3.22	3.60	2.84–4.28	3.02–4.11	Acceptable
	4	1.67	1.80	1.38–2.13	1.47–2.04	Acceptable
			Demand (mg/L)			
TOC	1	18.6	18.4	15.5–21.7	16.3–20.9	Acceptable
	2	26.1	25.9	21.9–29.8	22.9–28.8	Acceptable
5-day BOD	1	25.6	30.0	15.8–44.2	19.3–40.6	Acceptable
	2	33.8	41.4	22.7–60.2	27.4–55.5	Acceptable
			PCB's (μg/L)			
Aroclor-1232	1	3.19	3.77	1.93–5.06	2.33–4.66	Acceptable
Aroclor-1254	2	4.49	8.37	3.86–11.0	4.70–10.1	Acceptable
			PCB's in oil (mg/kg)			
PCB 1016/1242	1	17.1	32.4	5.93–45.6	11.0–40.5	Acceptable
PCB 1260	2	9.61	18.6	2.82–29.5	6.25–26.0	Acceptable
			Pesticides (μg/L)			
Chlordane	3	0.546	1.13	0.543–1.49	0.661–1.37	Check for error
	4	4.39	8.88	4.60–11.5	5.48–10.6	Unacceptable
Aldrin	1	0.116	0.227	0.0496–0.315	0.0828–0.282	Acceptable
	2	0.277	0.606	0.134–0.891	0.229–0.797	Acceptable
Dieldrin	1	0.163	0.208	0.104–0.300	0.129–0.275	Acceptable
	2	0.321	0.467	0.269–0.650	0.317–0.603	Acceptable
DDD	1	0.137	0.157	0.0504–0.272	0.0787–0.244	Acceptable
	2	0.642	0.882	0.436–1.13	0.523–1.04	Acceptable
DDE	1	0.136	0.183	0.0715–0.274	0.0974–0.249	Acceptable
	2	0.254	0.417	0.170–0.626	0.227–0.569	Acceptable
DDT	1	0.219	0.217	0.0782–0.352	0.113–0.317	Acceptable
	2	0.601	0.780	0.383–1.13	0.476–1.04	Acceptable
Heptachlor	1	0.080	0.119	0.0234–0.174	0.0466–0.155	Acceptable
	2	0.336	0.587	0.214–0.796	0.287–0.723	Acceptable

Table 10.30 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
		Volatile halocarbons (μg/L)				
1,2 dichloroetane	1	17.6	17.2	10.5–23.1	12.1–21.5	Acceptable
	2	40.2	38.9	26.8–52.3	30.0–49.1	Acceptable
Chloroform	1	13.2	13.3	8.35–17.4	9.49–16.3	Acceptable
	2	63.6	64.4	41.1–82.8	46.4–77.6	Acceptable
1,1,1 trichloroethane	1	12.8	14.3	8.15–18.5	9.44–17.2	Acceptable
	2	32.8	36.6	21.5–48.6	24.9–45.2	Acceptable
Trichloroethene	1	12.6	13.9	8.68–18.6	9.94–17.3	Acceptable
	2	34.1	38.9	25.9–50.2	29.0–47.1	Acceptable
Carbon tetrachloride	1	10.1	11.7	6.46–16.2	7.68–15.0	Acceptable
	2	43.0	46.6	28.6–64.2	33.0–59.7	Acceptable
Tetrachloroethene	1	14.5	15.1	9.27–20.4	10.7–19.0	Acceptable
	2	62.3	63.9	40.5–85.0	46.2–79.3	Acceptable
Bromodichloromethane	1	14.9	16.1	10.5–20.7	11.8–19.4	Acceptable
	2	52.4	53.8	37.0–70.5	41.3–66.2	Acceptable
Dibromochloromethane	1	12.8	15.2	9.76–20.6	11.1–19.2	Acceptable
	2	49.5	52.5	36.0–69.7	40.3–65.4	Acceptable
Bromoform	1	14.5	17.8	9.79–25.1	11.7–23.1	Acceptable
	2	52.2	54.0	32.8–76.2	38.3–70.7	Acceptable
Methylene chloride	1	20.0	17.5	9.11–25.1	11.1–23.1	Acceptable
	2	59.8	54.6	29.0–77.3	35.1–71.2	Acceptable
Chlorobenzene	1	16.4	16.5	11.1–21.6	12.4–20.3	Acceptable
	2	69.2	68.4	45.5–90.2	51.2–84.5	Acceptable
		Volatile aromatics (μg/L)				
Benzene	1	12.1	11.8	7.72–16.1	8.78–15.0	Acceptable
	2	46.7	46.5	31.3–61.0	35.1–57.2	Acceptable
Ethylbenzene	1	15.2	15.3	9.78–20.0	11.1–18.7	Acceptable
	2	66.1	66.2	43.8–86.2	49.2–80.8	Acceptable
Toluene	1	19.0	18.9	12.8–24.6	14.3–23.1	Acceptable
	2	53.1	52.7	39.4–65.9	42.7–62.6	Acceptable

Table 10.30 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
		Miscellaneous paramaters (mg/L)				
Total cyanide	1	0.012	0.020	D.L.–0.0352	0.0020–0.0304	Acceptable
	2	0.510	0.530	0.365–0.676	0.404–0.637	Acceptable
Non-filter residue	1	60.5	63.3	46.1–67.2	48.7–64.5	Acceptable
	2	22.0	23.9	14.8–26.5	16.3–25.0	Acceptable
Oil & grease	1	12.2	13.0	6.48–17.7	7.88–16.3	Acceptable
	2	16.2	17.0	9.07–22.1	10.7–20.5	Acceptable
Total phenolic	1	0.439	0.455	0.195–0.714	0.261–0.648	Acceptable
	2	0.012	0.0146	0.0025–0.0266	0.0056–0.0236	Acceptable
Total residual chlorine	1	1.76	2.00	1.27–2.25	1.40–2.12	Acceptable
	2	0.12	0.110	D.L.–0.246	0.0099–0.210	Acceptable

[a]Based upon theoretical calculations or a reference value, when necessary.
D.L. stands for detection limit.

Table 10.31. Water supply performance evaluation study WP-027—ORNL, 1991

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
			Trace metals (mg/L)			
Al	1	90.6	88.0	55.2–138	65.7–128	Acceptable
	2	1,040	1,051	864–1240	911–1,190	Acceptable
As	1	259	242	193–283	204–272	Acceptable
	2	9	9.85	6.89–12.9	7.65–12.2	Acceptable
Be	1	6.49	6.24	3.75–8.99	4.42–8.32	Acceptable
	2	209	210	171–242	180–233	Acceptable
Cd	1	1.96	2.16	1.07–3.44	1.37–3.14	Acceptable
	2	427	432	367–502	384–485	Acceptable
Co	1	120	125	106–142	111–138	Acceptable
	2	32.8	33.2	26.5–40.3	28.3–38.5	Acceptable
Cr	1	32.0	33.7	24.7–40.7	26.7–38.7	Acceptable
	2	559	550	428–645	456–618	Acceptable
Cu	1	11.9	11.8	8.12–15.6	9.06–14.6	Acceptable
	2	151	148	130–164	134–160	Acceptable
Fe	1	140	139	117–163	123–157	Acceptable
	2	19.5	18.7	12.4–26.5	14.1–24.7	Acceptable
Hg	1	0.71	0.74	0.401–1.05	0.483–0.964	Acceptable
	2	16.7	18.0	13.4–22.0	14.5–20.9	Acceptable
Mn	1	265	271	238–297	245–289	Acceptable
	2	49.8	50.4	43.5–56.0	45.1–54.5	Acceptable
Ni	1	506	520	450–577	466–561	Acceptable
	2	21.9	20.4	15.4–25.3	16.7–24.1	Acceptable
Pb	1	70.3	67.8	55.2–79.9	58.3–76.8	Acceptable
	2	358	351	300–401	312–388	Acceptable
Se	1	104	94.7	62.0–114	68.6–108	Acceptable
	2	40.4	41.2	27.3–50.7	30.2–47.7	Acceptable
V	1	719	720	637–806	659–783	Acceptable
	2	90.2	90.0	75.9–105	79.7–101	Acceptable
Zn	1	1,610	1,601	1,370–1,800	1,420–1740	Acceptable
	2	78.3	79.9	66.9–92.7	70.1–89.5	Acceptable
Sb	3	46	51.9	34.1–64.3	37.9–60.4	Acceptable
	4	157	174	121–210	132–199	Acceptable
Ag	3	16.4	17.0	14.1–20.5	14.9–19.7	Acceptable
	4	3	3.09	2.29–3.87	2.49–3.66	Acceptable

Table 10.31 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
			Trace metals (mg/L)			
Tl	3	53	52.0	37.0–65.3	40.6–61.7	Acceptable
	4	27	26.9	20.4–33.3	22.1–31.6	Acceptable
Mo	3	16.5	16.0	11.2–21.8	12.6–20.4	Acceptable
	4	67.9	65.0	43.3–84.0	49.1–78.2	Acceptable
Sr	3	40	89.0	30.5–47.9	32.8–45.6	Acceptable
	4	24.1	23.1	17.9–28.5	19.4–27.1	Acceptable
Ti	4	122	120	98.1–135	103–130	Acceptable
			Minerals (mg/L except as noted)			+
pH-units	3	4.98	5.01	4.92–5.10	4.94–5.08	Acceptable
	4	7.17	7.21	7.00–7.40	7.05–7.35	Acceptable
Spec. cond.	1	706	684	608–746	625–729	Acceptable
(umhos/cm 25°C)	2	176	171	152–189	157–185	Acceptable
TDS at 18°C	1	391	406	303–530	331–502	Acceptable
	2	99	107	55.2–126	64.0–117	Acceptable
Total hardness	1	112	113	102–122	105–119	Acceptable
(as $CaCO^3$)	2	50.2	51.1	44.8–55.4	46.1–54.1	Acceptable
Na	1	91.1	88.4	80.5–96.5	82.5–94.5	Acceptable
	2	8.61	7.98	6.65–9.28	6.98–8.95	Acceptable
K	1	14.9	16.0	13.5–18.3	14.1–17.7	Acceptable
	2	3.88	4.00	2.97–4.90	3.21–4.65	Acceptable
Total alkaninity	1	83	79.3	70.7–91.7	73.3–89.1	Acceptable
(as $CaCO^3$)	2	4.5	5.55	3.21–9.91	4.04–9.08	Acceptable
Chloride	1	73.5	31.7	70.7–86.2	72.6–84.2	Acceptable
	2	33.3	36.2	30.6–39.8	31.8–38.7	Acceptable
Fluoride	1	0.31	0.30	0.240–0.382	0.258–0.364	Acceptable
	2	3.49	3.60	3.03–4.11	3.16–3.97	Acceptable
Sulfate	1	143	125	107–142	111–138	Unacceptable[b]
	2	7.41	7.20	4.22–9.71	4.91–9.02	Acceptable
			Nutrients (mg/L)			
Ammonia as N	1	0.56	0.49	0.311–0.712	0.359–0.664	Acceptable
	2	7.10	6.80	5.31–8.17	5.65–7.83	Acceptable
Nitrate as N	1	9.94	9.10	7.34–10.8	7.76–10.4	Acceptable
	2	0.35	0.33	0.212–0.448	0.241–0.420	Acceptable
Orthophosphate	1	0.61	0.73	0.608–0.849	0.637–0.820	Check for error[c]
	2	3.09	3.30	2.80–3.77	2.91–3.66	Acceptable
Total phosphorus	3	9.13	9.90	7.86–11.8	8.33–11.3	Acceptable
	4	1.29	1.40	1.09–1.71	1.16–1.63	Acceptable

Table 10.31 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
			Demands (mg/L)			
TOC	1	5.76	5.00	3.77–7.07	4.20–6.63	Acceptable
	2	101	98.0	83.3–110	86.7–106	Acceptable
5-day BOD	1	5.2	8.10	3.22–13.0	4.44–11.8	Acceptable
	2	146	155	93.4–224	110–207	Acceptable
			PCBs (µg/L)			
Aroclor 1016/1242	2	3.74	3.80	0.698–5.25	1.28–4.66	Acceptable
Aroclor 1248	1	6.4	7.53	3.97–9.82	4.71–9.09	Acceptable
			PCBs in oil (mg/L)			
PCB 1016/1242	2	2.67	41.7	8.26–58.0	14.6–51.7	Unacceptable[b]
PCB 1254	1	3.45	19.5	1.65–34.9	5.90–30.6	Check for error[c]
			Pesticides (µg/L)			
Chlordane	3	4.68	5.61	2.95–7.25	3.50–6.70	Acceptable
	4	1.53	1.84	0.945–2.42	1.13–2.23	Acceptable
Aldrin	1	0.46	0.42	0.918–0.572	0.152–0.511	Acceptable
	2	0.11	0.10	0.122–0.144	0.0289–0.128	Acceptable
Dieldrin	1	0.43	0.42	0.209–0.594	0.258–0.545	Acceptable
	2	0.12	0.14	0.550–0.212	0.0749–0.192	Acceptable
DDD	1	0.59	0.58	0.296–0.818	0.362–0.752	Acceptable
	2	0.15	0.15	0.523–0.254	0.0781–0.229	Acceptable
DDE	1	0.35	0.36	0.159–0.518	0.205–0.472	Acceptable
	2	0.14	0.16	0.0607–0.238	0.0834–0.215	Acceptable
DDT	1	0.67	0.65	0.318–0.932	0.396–0.854	Acceptable
	2	0.14	0.15	0.0447–0.255	0.716–0.228	Acceptable
Heptachlor	1	0.55	0.46	0.157–0.636	0.218–0.574	Acceptable
	2	0.15	0.14	0.411–0.208	0.0624–0.186	Acceptable
Heptachlor epoxide	1	0.58	0.55	0.276–0.736	0.334–0.678	Acceptable
	2	0.27	0.22	0.121–0.300	0.143–0.277	Acceptable
			Volatile aromatics (µg/L)			
Benzene	1	64.4	72.3	51.2–97.8	57.0–91.9	Acceptable
	2	9.08	8.98	5.91–12.2	6.71–11.4	Acceptable
Ethylbenzene	1	60.3	58.3	43.4–75.3	47.4–71.3	Acceptable
	2	11.9	11.9	7.35–15.7	8.41–14.6	Acceptable
Toluene	1	64.8	60.4	44.4–76.8	48.4–72.8	Acceptable
	2	11.9	10.6	7.11–14.0	7.99–13.2	Acceptable
1,2-Dichlorobenzene	1	63.1	73.6	46.2–102	53.3–95.3	Acceptable
	2	13.9	14.2	9.01–19.2	10.3–17.9	Acceptable

Table 10.31 (continued)

Analytes	Sample number	Values		Limits		Performance evaluation
		Reported	True[a]	Acceptable	Warning	
			Volatile aromatics (µg/L)			
1,3-Dichlorobenzene	1	43.5	46.4	28.6–63.4	33.0–59.0	Acceptable
	2	11.8	12.7	7.81–17.2	9.00–16.0	Acceptable
1,4-Dichlorobenzene	1	61.2	63.7	37.9–90.0	44.5–83.4	Acceptable
	2	10.5	9.74	5.94–13.5	6.91–12.5	Acceptable
			Miscellaneous parameters (mg/L)			
Total cyanide	1	1.03	0.97	0.683–1.27	0.757–1.20	Acceptable
	2	0.09	0.09	0.529–0.124	0.619–0.115	Acceptable
Non-filterable residue	1	74.1	78.6	58.6–82.7	61.5–79.7	Acceptable
	2	36.1	37.5	26.5–40.2	28.2–38.5	Acceptable
Oil and grease	1	40.6	46.0	27.9–54.0	31.2–50.7	Acceptable
	2	5.3	8.0	3.21–12.2	4.34–11.1	Acceptable
Total phenolics	1	0.13	0.13	0.0482–0.191	0.0661–0.173	Acceptable
	2	2.38	2.40	0.941–3.51	1.26–3.19	Acceptable

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

[b]The reported value was beyond the acceptance limits.

[c]The reported value was within the acceptance limits, but since the value was outside of the warning limits a marginal problem may exist.

Table 10.32. Water supply performance evaluation study WS–027—ORNL, 1991

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Trace metals (μg/L)			
Sb	2	7.5[b]	7.00	5.20–10.5	Acceptable
As	1	29.5	30.0	24.6–34.0	Acceptable
Ba	1	929	953	849–1030	Acceptable
Be	2	4.63	4.67	3.41–5.81	Acceptable
Cd	1	30.2	29.3	25.2–33.1	Acceptable
Cr	1	73.1	75.3	65.8–84.6	Acceptable
Cu	1	122	122	109–133	Acceptable
Pb	1	87.0	91.3	78.6–102	Acceptable
Hg	1	1.18	1.29	0.903–1.73	Acceptable
Ni	2	445	451	393–495	Acceptable
Se	1	60.4[b]	59.9	46.3–66.8	Acceptable
Ag	1	47.3	48.5	39.7–55.6	Acceptable
Tl	2	25.9	26.9	20.7–31.8	Acceptable
		Nitrate/nitrite/fluoride (mg/L)			
Nitrate as N	1	0.590	0.550	0.381–0.778	Acceptable
Nitrite as N	1	0.290	0.250	0.214–0.290	Acceptable
Fluoride	1	4.23	4.35	3.91–4.79	Acceptable
		Insecticides (μg/L)			
Chlordane	3	0.841	1.84	1.04–2.06	Unacceptable
Endrin	1	0.621	0.554	0.371–0.687	Acceptable
Lindane	1	0.137	0.125	0.0653–0.176	Acceptable
Methoxychlor	1	11.8	16.6	12.0–20.8	Unaccpetable
Toxaphene	2	5.14[b]	6.39	3.79–7.80	Acceptable
		PAH's (μg/L)			
Benzo(a)pyrene	1	4.20[b]	22.1	5.18–25.3	Unacceptable
Benzo(k)fluoranthene	1	*c*	11.7	3.23–15.7	Unacceptable
Fluorene	1	3.90	6.43	2.03–9.18	Acceptable
Fluoranthene	1	12.1[b]	16.3	6.84–21.6	Acceptable
Naphthalene	1	13.7[b]	24.3	7.82–30.0	Acceptable
		Adipate/phthalate (μg/L)			
Bis (2-ethylhexyl) adipate	1	*c*	12.4	D.L—22.2	Unacceptable
Bis (2-ethylhexyl) phthalate	1	2.30	17.3	D.L—34.3	Acceptable
Butylbenzyl phthalate	1	5.20[b]	13.7	D.L—20.3	Acceptable
Dimethyl phthalate	1	3.80[b]	10.2	D.L—14.3	Acceptable
		Trihalomethanes (μg/L)			
Bromodichloromethane	1	31.7	32.4	25.9–38.9	Acceptable
Bromoform	1	21.9	22.7	18.2–27.2	Acceptable
Chlorodibromomethane	1	30.0	30.8	24.6–37.0	Acceptable
Chloroform	1	85.6	87.0	69.6–104	Acceptable
Total trihalomethane	1	169.2	172.9	138–207	Acceptable

Table 10.32 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Volatile organic compounds (μg/L)			
Benzene	1	7.42	7.09	4.25–9.93	Acceptable
Carbon tetrachloride	1	7.90	8.48	5.09–11.9	Acceptable
1,2-Dichlorethane	1	5.38	4.88	2.93–6.83	Acceptable
1,1-Dichloroethylene	1	10.3	9.45	5.67–13.2	Acceptable
1,1,1-Trichloroethane	1	7.16	7.38	4.43–10.3	Acceptable
Trichloroethylene	1	13.8	14.0	11.2–16.8	Acceptable
Vinyl chloride	1	4.57	3.57	2.14–5.00	Acceptable
		Miscellaneous analytes (mg/L except as noted)			
Residual free chlorine	1	0.460[b]	0.470	0.297–0.551	Acceptable
Turbidity (NTU's)	1	1.0[b]	0.910	0.706–1.29	Acceptable
	2	1.0	0.910	0.432–1.42	Acceptable
Calcium (mg $CaCO_3$/L)	1	128	134	122–144	Acceptable
pH (units)	1	9.06[b]	9.17	8.72–9.36	Acceptable
Alkalinity (mg $CaCO_3$/L)	1	27.8[b]	30.5	28.5–35.7	Unacceptable
Soduim	1	7.07	14.0	13.0–15.6	Unacceptable
Sulfate	1	12.7	13.0	10.6–15.1	Acceptable
Total cyanide	1	0.177	0.180	0.121–0.222	Acceptable

[a]Based upon theoretical calculations or a reference value, when necessary.
[b]Significant general method bias is anticipated for this result.
[c]No value was reported.
D.L. stands for detection limit.

Table 10.33. Water supply performance evaluation study WS-028—ORNL, 1991

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Trace metals (μg/L)			
Sb	2	42.0	35.0	27.8–46.6	Acceptable
As	1	126	129	109–144	Acceptable
Ba	1	536	533	472–574	Acceptable
Be	2	0.772	0.800	0.611–0.991	Acceptable
Cd	1	7.84	7.73	6.37–8.90	Acceptable
Cr	1	201	200	179–223	Acceptable
Cu	1	882	950	866–1020	Acceptable
Pb	1	10.0	7.28	5.52–9.41	Unacceptable
Hg	1	7.00	7.14	5.54–8.46	Acceptable
Ni	2	211	211	185–231	Acceptable
Se	1	12.8[b]	13.1	9.68–14.6	Acceptable
Ag	1	57.7	60.7	52.7–68.9	Acceptable
Tl	2	1.70	2.00	1.08–2.94	Acceptable
		Nitrate/nitrite/fluoride (mg/L)			
Nitrate as N	1	9.21	8.80	7.40–10.4	Acceptable
Nitrite as N	1	0.759	0.770	0.674–0.879	Acceptable
Fluoride	1	1.50	1.60	1.44–1.76	Acceptable
		Insecticides (μg/L)			
Chlordane	3	0.802[b]	3.77	2.04–4.77	Unacceptable
Endrin	1	0.123	0.163	0.107–0.233	Acceptable
Lindane	1	0.461	0.638	0.376–0.861	Acceptable
Methoxychlor	1	9.15	12.4	8.10–15.9	Acceptable
Toxaphene	2	3.02[b]	12.7	7.47–15.7	Unacceptable

Table 10.33 (continued)

Analytes	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Trihalomethanes (μg/L)			
Bromodichloromethane	1	16.5	18.7	15.0–22.4	Acceptable
Bromoform	1	31.8	34.6	27.7–41.5	Acceptable
Chlorodibromomethane	1	23.4	27.1	21.7–32.5	Acceptable
Chloroform	1	14.1	14.2	11.4–17.0	Acceptable
Total trihalomethane	1	85.80	94.6	75.7–114	Acceptable
		Miscellaneous analytes			
Residual free chlorine (mg/L)	1	1.59[b]	1.70	1.33–1.88	Acceptable
Turbidity (NTU's)	1	5.1[b]	5.60	5.23–6.27	Unacceptable
Total filterable residue (mg/L)	1	353	261	180–385	Acceptable
Calcium (mg $CaCO_3$/L)	1	127.2	130	119–139	Acceptable
pH units	1	9.25[b]	9.17	8.84–9.32	Acceptable
Alkalinity (mg $CaCO_3$/L)	1	37.5[b]	37.0	34.7–41.9	Acceptable
Corrosivity (Langelier ind. at 20°C)	1	0.950	0.85	0.597–1.18	Acceptable
Sodium (mg/L)	1	17.7	17.0	15.2–18.9	Acceptable
Sulfate (mg/L)	1	41.9	43.0	37.7–47.2	Acceptable
Total cyanide (mg/L)	1	0.479	0.460	0.312–0.567	Acceptable

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

Table 10.34. Water pollution performance evaluation study WP-026—K-25 Site, 1991

Parameter	Sample number	Values		Limits		Performance evaluation
		Reported[a]	True	Acceptable	Warning	
			Minerals (mg/L)			
pH	3	8.39	8.80	8.46–9.24	8.55–9.14	Unacceptable
	4	5.52	5.52	5.42–5.66	5.45–5.64	Acceptable
Special conditions,	1	116	119	104–128	107–125	Acceptable
μmhos/cm at 25°C	2	892	901	799–986	822–963	Acceptable
TDS at 180°C	1	60	59.1	31.9–90.0	39.2–82.7	Acceptable
	2	551	521	387–671	422–636	Acceptable
Total hardness	1	16	18.5	14.7–22.4	15.6–21.5	Acceptable
as $CaCO_3$	2	246	253	233–270	237–266	Acceptable
Total alkalinity	1	18	18.2	14.7–23.0	15.7–22.0	Acceptable
as $CaCO_3$	2	106	112	96.7–116	99.1–114	Acceptable
Chloride	1	13.3	13.4	10.6–15.5	11.2–14.9	Acceptable
	2	183	181	164–201	169–196	Acceptable
Fluoride	1	0.76	0.750	0.636–0.852	0.664–0.825	Acceptable
	2	2.89	2.90	2.38–3.27	2.50–3.16	Acceptable
Sulfate	1	11.2	11.0	8.35–13.4	8.98–12.8	Acceptable
	2	35.8	35.5	28.0–41.9	29.8–40.1	Acceptable
			Nutrients (mg/L)			
Ammonia as N	1	16.1	18.0	14.4–21.3	15.2–20.4	Acceptable
	2	3.76	4.20	3.30–5.09	3.51–4.88	Acceptable
Nitrate as N	1	7.42	8.0	6.47–9.52	6.83–9.15	Acceptable
	2	8.61	10.0	8.09–11.9	8.55–11.4	Acceptable
Orthophosphate	1	1.36	1.40	1.15–1.63	1.20–1.57	Acceptable
	2	0.30	0.320	0.251–0.385	0.267–0.369	Acceptable
Kjeldahl as N	3	3.02	3.10	1.96–4.21	2.23–3.94	Acceptable
	4	19.2	25.0	18.9–20.9	20.3–28.5	Warning
Total phosphorus	3	3.59	3.60	2.84–4.28	3.02–4.11	Acceptable
	4	1.76	1.80	1.38–2.13	1.47–2.04	Acceptable
			Demands (mg/L)			
COD	1	34	46.6	32.5–57.1	35.6–54.0	Warning
	2	65	65.4	49.3–75.8	52.7–72.3	Acceptable
TOC	1	22.4	18.4	15.5–21.7	16.3–20.9	Unacceptable
	2	31.2	25.9	21.9–29.8	22.9–28.8	Unacceptable
5-d BOD	1	29.4	30.0	15.8–44.2	19.3–40.6	Acceptable
	2	38.3	41.4	22.7–60.2	27.4–55.5	Acceptable
			Miscellaneous parameters (mg/L)			
Total cyanide	1	0.020	0.020	D.L.–0.0352	0.0020–0.0304	Acceptable
	2	0.549	0.530	0.365–0.676	0.404–0.637	Acceptable
Nonfilterable residue	1	55	63.3	46.1–67.2	48.7–64.5	Acceptable
	2	21	23.9	14.8–26.5	16.3–25.0	Acceptable
Oil and grease	1	13.4	13.0	6.48–17.7	7.88–11.3	Acceptable
	2	18.1	17.0	9.07–22.1	10.7–20.5	Acceptable
Total phenolics	1	0.470	0.455	0.195–0.714	0.261–0.648	Acceptable
	2	0.011	0.0146	0.0025–0.0266	0.0056–0.0236	Acceptable
Total residual chlorine	1	1.80	2.00	1.27–2.25	1.40–2.12	Acceptable
	2	0.095	0.110	D.L.–0.246	0.0099–0.210	Acceptable

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

Table 10.35. Water supply performance evaluation study number WP-027—K-25 Site, 1991

Parameter	Number of samples	Values[a]		Limits		Performance evaluation
		Reported	True	Acceptable	Warning	
		Minerals (mg/L, except as noted)				
pH, standard units	3	5.00	5.01	4.92–5.10	4.94–5.08	Acceptable
	4	7.22	7.21	7.00–7.40	7.05–7.35	Acceptable
Special conditions,	1	678	684	608–745	625–729	Acceptable
μmhos/cm at 25°C	2	167	171	152–189	157–185	Acceptable
TDS at 180°C	1	447	406	303–530	331–502	Acceptable
	2	123	107	55.2–126	64.0–117	Check for error
Total hardness,	1	107	113	102–122	105–119	Acceptable
as $CaCO_3$	2	48	51.1	44.8–55.4	46.1–54.1	Acceptable
Total alkalinity,	1	78	79.3	70.7–91.7	73.3–89.1	Acceptable
as $CaCO_3$	2	7	5.55	3.21–9.91	4.04–9.08	Acceptable
Chloride	1	82.1	81.7	70.7–86.2	72.6–84.2	Acceptable
	2	37.4	36.2	30.6–39.8	31.8–38.7	Acceptable
Fluoride	1	0.31	0.300	0.240–0.382	0.258–0.364	Acceptable
	2	3.52	3.60	3.03–4.11	3.16–3.97	Acceptable
Sulfate	1	114.5	125	107–142	111–138	Acceptable
	2	6.54	7.20	4.22–9.71	4.91–9.02	Acceptable
		Nutrients (mg/L)				
Nitrate-N	1	8.87	9.10	7.34–10.8	7.76–10.4	Acceptable
	2	0.349	0.330	0.212–0.448	0.241–0.420	Acceptable
Orthophosphate	1	0.69	0.730	0.608–0.849	0.637–0.820	Acceptable
	2	3.16	3.30	2.80–3.77	2.91–3.66	Acceptable
Total phosphorus	3	9.58	9.90	7.86–11.8	8.33–11.3	Acceptable
	4	1.49	1.40	1.09–1.17	1.16–1.63	Acceptable
		Demands (mg/L)				
COD	1	15.0	12.6	3.60–22.4	5.97–20.1	Acceptable
	2	240.0	248	180–286	194–273	Acceptable
TOC	1	5.11	5.00	3.77–7.07	4.20–6.63	Acceptable
	2	57.6	98.0	83.3–110	86.7–106	Unacceptable
		Miscellaneous parameters (mg/L)				
Total cyanide	1	1.35	0.970	0.683–1.27	0.757–1.20	Unacceptable
	2	0.122	0.090	0.0529–0.124	0.0619–0.115	Check for error
Nonfilterable residue	1	74.9	78.6	58.6–82.7	61.6–79.7	Acceptable
	2	33.3	37.5	26.5–40.2	28.2–38.5	Acceptable
Oil and grease	1	30.2	46.0	27.9–54.0	31.2–50.7	Check for error
	2	20.4	8.00	3.21–12.2	4.34–11.1	Unacceptable
Total phenolics	1	0.15	0.130	0.0482–0.191	0.0661–0.173	Acceptable
	2	2.46	2.40	0.941–3.51	1.26–3.19	Acceptable
Total residual chlorine	1	1.92	2.40	1.60–2.84	1.76–2.68	Acceptable
	2	1.02	1.20	0.765–1.53	0.865–1.43	Acceptable

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

Table 10.36. Water supply performance evaluation study number WS-027—K-25 Site, 1991

Parameter	Sample number	Values		Acceptance limits	Performance evaluation
		Reported	True[a]		
		Trace metals (μg/L)			
Sb	2	5.1[b]	7.0	5.20–10.5	Acceptable
As	1	30.1	30.0	24.6–34.0	Acceptable
Ba	1	950	953	849–1030	Acceptable
Be	2	4.8	4.67	3.41–5.81	Acceptable
Cd	1	31.5	29.3	25.2–33.1	Acceptable
Cr	1	80	75.3	65.8–84.6	Acceptable
Cu	1	120	122	109–133	Acceptable
Pb	1	79.8	91.3	78.6–102	Acceptable
Hg	1	1.10	1.29	0.903–1.73	Acceptable
Ni	2	470	451	393–495	Acceptable
Se	1	56.6[b]	59.9	46.3–66.8	Acceptable
Ag	1	31.8	48.5	39.7–55.6	Unacceptable
Tl	2	22.5	26.9	20.7–31.8	Acceptable
		Nitrate/nitrite/fluoride (mg/L)			
Nitrate as N	1	0.551	0.550	0.381–0.778	Acceptable
Nitrite as N	1	0.289	0.250	0.214–0.290	Acceptable
Fluoride	1	4.36	4.35	3.91–4.79	Unacceptable
		Volatile organic compounds in (μg/L)			
Tert-butylbenzene	2	14.0	14.1	11.3–16.9	Acceptable
1,2-Dichlorobenzene	2	6.76	6.50	3.90–9.10	Acceptable
Ethylbenzene	2	11.2	11.6	9.28–13.9	Acceptable
Isopropylbenzene	2	12.2	12.3	9.84–14.8	Acceptable
N-propylbenzene	2	8.24	7.83	4.70–11.0	Acceptable
Styrene	2	8.29	9.16	5.50–12.8	Acceptable
Tetrachloroethylene	2	7.90	7.76	4.66–10.9	Acceptable
1,2,4-Trichlorobenzene	2	<0.5	8.83	5.30–12.4	Unacceptable
Total xylenes	2	7.88	8.45	5.07–11.8	Acceptable
		Miscellaneous analytes			
Turbidity (NTUs)	2	1.3	0.910	0.432–1.42	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 10.37. CLP performance evaluation results

Inorganics—ORNL, 1991

Scoring classification	Points deducted			
	1st quarter	2nd quarter	3rd quarter[a]	4th quarter[a]
Duplicate precision	0.0	1.0	0.0	0.0
Matrix spikes	1.5	0.5	0.0	0.0
		Water sample		
Identification	0.0	0.0	0.0	0.0
Quantitation	9.6	6.0	0.0	0.0
False positives and unmet CRDLs[b]	0.0	4.7	0.0	0.0
		Soil sample		
Identification	0.0	0.0	0.0	0.0
Quantitation	5.4	7.6	0.0	0.0
False positives and unmet CRDLs[b]	0.0	3.3	0.0	0.0
Total points deducted	16	23	0.0	0.0
Laboratory score[c]	84	77	0.0	0.0

[a]PE samples not analyzed due to ICP instrument problems.

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

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

Table 10.38. CLP performance evaluation results

Organics—ORNL, 1991

Scoring classification	Points deducted			
	1st quarter[a]	2nd quarter	3rd quarter[b]	4th quarter[b]
Number of TCL compounds not-identified	0.0	5.5	0.0	0.0
Number of TCL compounds misquantified	0.0	2.8	0.0	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	0.0	0.0
Number of non-TCL contaminants	0.0	0.0	0.0	0.0
Total points deducted	0.0	8.3	0.0	0.0
Laboratory score[c]	0.0	91.7	0.0	0.0

[a]PE samples not sent due to EPA budget problems.

[b]PE samples analyzed, but no score received.

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

Table 10.39. CLP performance evaluation results—inorganics (K-25 Site, 1991)

Scoring classification	Points deducted			
	1st quarter	2nd quarter	3rd quarter	4th quarter
Duplicate precision[a]	0	*b*	*b*	0
Matrix spikes[c]	2	*b*	*b*	0
		Water sample		
Identification	0	*b*	*b*	8
Quantitation	6	*b*	*b*	25
False positives and unmet CRDLs[d]	0	*b*	*b*	0
		Soil sample		
Identification	0	*b*	*b*	5
Quantitation	0	*b*	*b*	1
False positives and unmet CRDLs[d]	0	*b*	*b*	0
Total points deducted	20.2	*b*	*b*	100
Laboratory score[e]	79.8	*b*	*b*	0

[a]Maximum of 10 points deducted based on number of duplicate results that are outside of the control limits.
[b]No data submitted to EPH for evaluation.
[c]Maximum of 10 points deducted based on number of matrix spike results that are outside of the control limits.
[d]Points deducted for false positive values and for not meeting the contract-required detection limits (CRDLs).
[e]The maximum number of possible points is 100.

Table 10.40. CLP performance evaluation results—organics (K-25 Site, FY 1991)

Scoring classification	Points deducted			
	1st quarter	2nd quarter	3rd quarter[a]	4th quarter
Number of TCL compounds not identified	*b*	0	1	1
Number of TCL compounds misquantified	*b*	4	4	6
Number of TCL contaminants	*b*	0	0	0
Number of non-TCL compounds not identified	*b*	0	0	1
Number of non-TCL contaminants	*b*	0	0	3
Total points deducted	*b*	11.1	23.4	35.8
Laboratory score[c]	*b*	88.9	76.6	64.2

[a]EPA did not evaluate any data.
[b]No data submitted to EPA for evaluation.
[c]The maximum number of possible points is 100.

Table 10.41. Environmental audits and reviews at the Y-12 Plant during 1991

Date	Audit	Reviewer	Subject	Findings
January 7–11	Environmental Compliance Review	Energy Systems	Environmental Compliance	18
April 9–12	Compliance Evaluation Inspection (CEI)	TDEC	Groundwater	2
April 13	Surveillance	DOE-OR	RCRA Waste Sampling	2
June 24–25	CEI	EPA	NPAES	0
July 16–17	Surveillance	DOE-OR	Spill Response	6
August 5–9	Inspection	TDEC	RCRA	0
August 13	Inspection	TDEC	Air	0
August 13	Inspection	City of Oak Ridge	Industrial Pretreatment Compliance	0
September 10–13	Technical Audit	MMC	Environmental Management	92
September 16–October 10	Surveillance	DOE-OR	NEPA	6
December 19	Inspection	TDEC	Sanitary Landfill II and Industrial Waste Landfille IV	0

Table 10.42. Environmental audits and reviews at ORNL during 1991

Date	Audit/review	Reviewer	Subject	Findings/outcome
February–November	Review of ORNL air-permitted sources	DOE-OR, Thirty-five air-permitted sources X-10 Site Office	No findings were cited; were reviewed during 9 separate surveillances	several observations have been resolved
February–October	Surveillance of ORNL RCRA satellite and 90-day accumulation areas and sampling and analytical QA	DOE-OR, RCRA Waste Generator, X-10 at Y-12 Site were X-10 Site ffice	Areas at X-10 Site and identified reviewed on 5 separate occasions	No previously regulatory concerns were cited. owever, there were several observations of which have been resolved
March 18–19	RCRA inspection	TDEC	RCRA TSD facilities	No findings were cited
April 10	Mixed waste storage facilities	DOE-OR, X-10 Site Office	Compliance with RCRA and DOE orders	Several observations were noted; areas of concern have been resolved
April 17	Air emission source inspection	TDEC	Selected air-permitted sources	No findings were cited
May 20–25	Review of ORNL Environmental Compliance Program	Energy Systems	Multimedia compliance review of environmental management	Eighteen previously unidentified findings were cited
June 27	NPDES Compliance evaluation inspection	EPA-IV	Review of ORNL NPDES Permit Monitoring Program	No findings were cited; areas of concern have been resolved
July 8–18	Clean Water Act surveillance	DOE-OR, X-10 Site Office	Review of ORNL NPDES Program, ORNL Surface Water Compliance Status	Findings have been resolved or scheduled for resolution
July 30–31	RCRA inspection	TDEC	RCRA Waste Generator Areas at X-10 Site and X-10 facilities at Y-12 Plant	No findings were cited; two areas of potential concern were resolved
August 19–20	RCRA groundwater comprehensive monitoring evaluation	TDEC	Review of ORNL SWSA 6 Groundwater Monitoring Program	No findings were cited

Table 10.43. K-25 Site internal and external environmental audits, 1991

Subject	Auditors	Date	Findings
TDEC review of the K-1413 closure plan	TDEC	1/91	
Inspection of the K-1417 container storage area	EPA/TDEC Corps of Engineers	1/91	
Inspection for the QA operations and records and the analytical laboratory quality assurance operations and records	DOE	2/91	
K-25 Site review	EPA Region IV/Env Mgmt Dept. (EMD)	2/91	
Review of the NPDES permit	TDEC/DOE/ EMD	2/91	
Comprehensive monitoring evaluation of the K-1407-B Pond groundwater-monitoring system	TDEC	3/91	
Preliminary inspection of water retention structures on the K-25 Site	Federal Energy Reg. Commission (FERC)	4/91	
Air program audit	TDEC	5/91	
Satellite and 90-day accumulation area training program	DOE Technical Review	5/91	
Toxic Substances Control Act (TSCA) Incinerator storage and treatment units for Resource Conservation and Recovery Act (RCRA) Part B permit application	DOE Technical Review	6/91	
Inspection of the RCRA operations, units, and records	TDEC	6/91	
Compliance with the NPDES	EPA Region IV	6/91	
Inspection of the K-900 bottle smasher unit	TDEC	7/91	
Tours to determine permitting requirements: (1) proposed stream crossing on Mitchell Branch, and (2) proposed bank stabilization areas on Poplar Creek	TDEC/Corps of Engineers	7/91	
Review of the Satellite and 90-day accumulation areas	DOE Technical Review	7/91	
Energy Systems corporate audit	Energy Systems	7,8/91	78 Findings, 81 neg. obs, 13 pos. obs
Tour of the NPDES monitoring points on the K-25 Site	DOE/EPA	8/91	
Review of the TSCA NPDES requirements	TDEC/EMD/ DOE/TSCA	8/91	
Review of options for K-1515-C Lagoon	TDEC/EMD/ DOE/Utilities	8/91	
Inspection of water retention structures on the K-25 Site	FERC/DOE/ EMD	10/91	
Asbestos management and program audit	Energy Systems	4/91	
Tiger Team review	DOE	11/91	10 (env.)
Groundwater audit	K-25 Site	8/91	18F, 4ob
Material safety data sheets	K-25 Site	11/91	10F, 2ob
Hazardous material spill response training for emergency personnel	K-25 Site	10/91	3ob
Radiochemistry laboratory	K-25 Site	9/91	4F, 5ob
Medical waste disposal	K-25 Site	9/91	7F, 4ob
Tank farm transfer operations	K-25 Site	7/91	0F, 0ob
PCB equipment inspection recordkeeping	K-25 Site	4/91	3ob
X-10 rad waste shipped to K-25 Site	K-25 Site	3/91	2ob, 2F
Internal dosimetry program	K-25 Site	6/91	7F, 2ob

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