Z-AREA SALTSTONE DISPOSAL FACILITY GROUNDWATER MONITORING REPORT (U)

First and Second Quarters 1997

Publication Date: July 1997

Authorized Derivative Classifier
and Reviewing Official:

MASTER

UNCLASSIFIED
Does Not Contain Unclassified
Controlled Nuclear Information

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

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Key Words

**Industrial Solid Waste Permit #025500-1603
hydrocone samples
ZBG wells**

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Savannah River Site
Aiken, SC 29808**

Prepared for the U.S. Department of Energy under Control Contract No. DE-AC09-89SR18035

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Introduction

This report presents the results of groundwater sampling during the first and second quarters of 1997 in the Z-Area Saltstone Disposal Facility. This report presents only the data for sampling during the first half of 1997 as required by Industrial Solid Waste Permit #025500-1603. For a detailed discussion of groundwater monitoring in the Z-Area Saltstone Disposal Facility, consult the 1996 Z-Area Saltstone Disposal Facility Annual Report.

Appendix A presents the proposed South Carolina Department of Health and Environmental Control Proposed Groundwater Monitoring Standards. Flagging criteria are described in Appendix B. In May 1997, SCDHEC granted approval for seven hydrocone samples to be collected within the shallow aquifer for the intended purpose of monitoring groundwater quality and water levels at the facility. Appendix C presents the results from this hydrocone sampling.

Key to Reading the Table

The following abbreviations may appear in the data tables:

Constituents

Sp. conductance specific conductance

Laboratories

EM	Environmental Protection Department/Environmental Monitoring Section (EPD/EMS) Laboratory
ES	QST Environmental, Inc.
EX	EMAX Laboratories, Inc.
GE or GP	General Engineering Laboratories, Inc.
QR	Quanterra, Inc.
TL	Triangle Laboratories, Inc.
WA	Recra LabNet Philadelphia

Sampling Codes

B	blank sample was collected
C	well was pumping continuously
D	well was dry
E	equipment blank was collected
I	well went dry during sampling; insufficient water to collect all samples
L	well went dry before sampling began; only depth to water can be determined
N	well was not stabilized before sampling began
P	inaccessibility or mechanical failure prevented sample collection and field analysis of the water
S	no water in standpipe; for water-level events only
W	purged water must be containerized; only water-level measurements were obtained
X	well went dry during purging; samples collected after well recovered

Sampling Methods

B	sample collected using an open-bucket bailer
O	sample collected by method other than bailer or pump
P	sample collected using a bladder pump
S	sample collected using a single-speed centrifugal downhole pump
V	sample collected using a variable-speed pump

Units

mg/L	milligrams per liter
msl	mean sea level
MSL	million structures per liter
NTU	nephelometric turbidity unit
pCi/L	picocuries per liter
pCi/mL	picocuries per milliliter
pH	pH unit

µg/L	micrograms per liter
µS/cm	microsiemens per centimeter
Other	
CS	carbon steel
DF	dilution factor column in data tables
E	exponential notation (e.g., 1.1E-09 = 1.1×10^{-9} = 0.0000000011)
H	holding time column in data tables
Mod	modifier column in data tables
PDWS	primary drinking water standard
PVC	polyvinyl chloride
ST	exceeded the final PDWS or screening level column in data tables
TOC	Top of casing

Results below Detection

For radiological analyses, the analytical result field contains the result recorded on the analytical instrument and reported by the laboratory, even if it is negative. For nonradiological analyses, if the analyte is not detected, the sample-specific estimated quantitation limit (EQL) is entered into the result field and is reported with a less than [$<$] sign. The EQL is defined as the lowest concentration that can be achieved reliably within specified limits of precision and accuracy during routine laboratory operating conditions. The sample-specific EQL is modified for sample concentration or dilution or unusual aliquot size that affects analytical sensitivity.

Holding Times

Standard analytical methods include a limit, called holding time, on the maximum elapsed time between sample collection and extraction or analysis by the laboratory. In the data tables, a large bullet (•) in the *H* (holding time) column indicates that holding time was exceeded. Analyses performed beyond holding times may not yield valid results.

The South Carolina Department of Health and Environmental Control (SCDHEC) allows only 15 minutes to elapse between sampling and analysis for pH. Thus, only field pH measurements can meet the holding time criterion; laboratory pH analyses always will exceed it.

The laboratory procedure used for the determination of specific conductance allows one day to elapse between sampling and analysis. Thus, laboratory specific conductance measurements may exceed the holding time criterion.

Data Rounding

A constituent result in the analytical results tables that is not marked in the *ST* column but appears to equal an Appendix A standard is below the standard in the database. Values stored in the database contain more significant digits than the reported results. Apparent discrepancies in the tables are due to the rounding of reported results.

Data Qualification

The contract laboratories submit sample- or batch-specific quality assurance/quality control information either at the same time as analytical results or in a quarterly summary. Properly defined and used data modifiers (also referred to as qualifiers) can be a key component in assessing data usability. Modifiers designed by EPD/EMS and provided to the primary laboratories are defined below. These modifiers appear in the data tables under the column *Mod*. All lettered modifiers except *E* are based on EPA's STORET codes.

Modifiers

(Blank)	Data are not qualified. Numbers should be interpreted exactly as reported.
E	The detected result is between the sample-specific EQL and the method detection limit.
I	The value in the result field is the instrument reading, not the sample quantitation limit. Always used with the result qualifier U.
J	Value is estimated because quantitation in the sample or in associated quality control samples did not meet specifications.
L	Value is off-scale high. The actual value is not known but is known to be greater than the value shown.
M	Presence of the analyte is verified but not quantified.
R	Result was rejected because performance requirements in the sample analysis or associated quality control analyses were not met.
T	Analyte was not detected; if present, it was below the criteria for detection.
U	Material analyzed for but not detected. Analytical result reported is less than the sample quantitation limit.
V	Analyte was detected in an associated method blank.
Y	Result was obtained from an unpreserved or improperly preserved sample. Data may not be accurate.
1	Result may be an underestimation of the true value due to analytical bias.
2	Result may be an overestimation of the true value due to analytical bias.
3	The associated result may be of poor precision (high variability) due to analytical bias.

Note: These are only some of the qualifiers present in the database. All modifiers associated with the data are published in the result tables of EPD/EMS' quarterly groundwater monitoring reports, the official repository of the data.

Table 1. Groundwater Monitoring Results for Individual Wells

WELL ZBG 1

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N76584.2 E65584.1	33.302161 °N 81.642863 °W	240.1-220.0 ft msl	291.1 ft msl	4" PVC	S	Water Table

SAMPLE DATE 03/13/97

FIELD DATA

<u>Parameter</u>	<u>1Q97</u>	<u>2Q97</u>	<u>Unit</u>
Water elevation	282.3		ft msl
pH	4.2		pH
Sp. Conductance	38		µS/cm
Water temperature	19.0		°C
Alkalinity as CaCO3	1		mg/L
Turbidity	2		NTU
Volumes purged	2.9		Well vols
Sampling code			

ANALYTICAL DATA

<u>Parameter</u>	<u>1Q97</u>	<u>DF</u>	<u>Mod</u>	<u>ST</u>	<u>H</u>	<u>Flag</u>	<u>Lab</u>	<u>2Q97</u>	<u>DF</u>	<u>Mod</u>	<u>ST</u>	<u>H</u>	<u>Flag</u>	<u>Lab</u>	<u>Unit</u>
Antimony, total recoverable	<15	1				0	GE								µg/L
Arsenic, total recoverable	<10	1				0	GE								µg/L
Barium, total recoverable	12	1	J			0	GE								µg/L
Benzene	<2.0	1				0	GE								µg/L
Cadmium, total recoverable	<4.7	1				0	WA								µg/L
Chromium, total recoverable	2.7	1	J			0	WA								µg/L
Gross alpha	1.6E+00	1				0	QR								pCi/L
Lead, total recoverable	6.6	1	J			0	WA								µg/L
Mercury, total recoverable	<0.70	1				0	WA								µg/L
Nitrate as nitrogen															
Nitrate-nitrite as nitrogen	1,700	2				0	WA								µg/L
Nitrite as nitrogen	10	2	J			0	WA								µg/L
Nonvolatile beta	1.1E+00	1	UI			0	GP								pCi/L
pH	5.9	1	J			0	WA								pH
Radium-226	8.3E-01	1				0	GP								pCi/L
Radium-228	6.6E-01	1				0	QR								pCi/L
Selenium, total recoverable	<10	1				0	GE								µg/L
Silver, total recoverable	<5.0	1				0	WA								µg/L
Toluene	<2.0	1				0	GE								µg/L
Tritium	8.1E+00	1				0	GP								pCi/mL

Note: Concentrations in bold italics exceed the SCDHEC-proposed groundwater monitoring standards, final PDWS, or drinking water screening levels listed in Appendix A. Each radionuclide result in italics is less than its sample quantitation limit. See Appendix B for flagging criteria.

● = exceeded holding time.

■ = exceeded SCDHEC-proposed groundwater monitoring standard, final PDWS, or drinking water screening level.

WELL ZBG 1A

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N76588.5 E65598.8	33.302195 °N 81.642833 °W	281.0-276.0 ft msl	291 ft msl	4" PVC	B	Perched Zone

SAMPLE DATE 03/21/97

FIELD DATA

<u>Parameter</u>	<u>1Q97</u>	<u>2Q97</u>	<u>Unit</u>
Water elevation			ft msl
pH			pH
Sp. conductance			µS/cm
Water temperature			°C
Alkalinity as CaCO ₃			mg/L
Turbidity			NTU
Volumes purged			Well vols
Sampling code	D		

Note: Concentrations in bold italics exceed the SCDHEC-proposed groundwater monitoring standards, final PDWS, or drinking water screening levels listed in Appendix A. Each radionuclide result in italics is less than its sample quantitation limit. See Appendix B for flagging criteria.

● = exceeded holding time.

■ = exceeded SCDHEC-proposed groundwater monitoring standard, final PDWS, or drinking water screening level.

WELL ZBG 2

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N76170.5 E67472.9	33.304327 °N 81.637084 °W	230.9-210.9 ft msl	278 ft msl	4" PVC	S	Water Table

SAMPLE DATE 03/31/97

FIELD DATA

Parameter	1Q97	2Q97	Unit
Water elevation	219.9		ft msl
pH	4.2		pH
Sp. Conductance	20		µS/cm
Water temperature	24.0		°C
Alkalinity as CaCO ₃	3		mg/L
Turbidity	4		NTU
Volumes purged	4.2		Well vols
Sampling code	A		

ANALYTICAL DATA

Parameter	1Q97	DF	Mod	ST	H	Flag	Lab	2Q97	DF	Mod	ST	H	Flag	Lab	Unit
Antimony, total recoverable	<27	1				0	WA								µg/L
Arsenic, total recoverable	<40	1				0	WA								µg/L
Barium, total recoverable	5.9	1	V			0	WA								µg/L
Benzene	<5.0	1				0	WA								µg/L
Cadmium, total recoverable	<4.7	1				0	WA								µg/L
Chromium, total recoverable	1.3	1	J			0	WA								µg/L
Gross alpha	<i>3.5E-01</i>	1	UI			0	QR								pCi/L
Lead, total recoverable	<47	1				0	WA								µg/L
Mercury, total recoverable	<0.70	1				0	WA								µg/L
Nitrate as nitrogen															
Nitrate-nitrite as nitrogen	1,600	2				0	WA								µg/L
Nitrite as nitrogen	<11	1	JV		●	0	WA								µg/L
Nonvolatile beta	1.5E+00	1				0	QR								pCi/L
pH	5.2	1	J		●	0	WA								pH
Radium-226	2.9E-01	1				0	QR								pCi/L
Radium-228	<i>2.7E-01</i>	1	UI			0	QR								pCi/L
Selenium, total recoverable	<66	1				0	WA								µg/L
Silver, total recoverable	<5.0	1				0	WA								µg/L
Toluene	<5.0	1				0	WA								µg/L
Tritium	7.6E+00	1				0	QR								pCi/mL

Note: Concentrations in bold italics exceed the SCDHEC-proposed groundwater monitoring standards, final PDWS, or drinking water screening levels listed in Appendix A. Each radionuclide result in italics is less than its sample quantitation limit. See Appendix B for flagging criteria.

● = exceeded holding time.

■ = exceeded SCDHEC-proposed groundwater monitoring standard, final PDWS, or drinking water screening level.

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Appendix A

Standards

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Table A-1. South Carolina Department of Health and Environmental Control Proposed Groundwater Monitoring Standards (SCDHEC, 1986)

Analyte	Standard	Unit
Antimony	50	µg/L
Arsenic	50	µg/L
Barium	1,000	µg/L
Cadmium	10	µg/L
Chromium	50	µg/L
Lead	10	µg/L
Mercury	2	µg/L
Nitrate as nitrogen	10,000	µg/L
Nitrite as nitrogen	1,000	µg/L
Selenium	10	µg/L
Silver	50	µg/L

Note: Benzene and toluene concentrations are not to exceed concentrations or amounts that interfere with use, actual or intended, as determined by SCDHEC. Proposed standards for radionuclides at SRS are under jurisdictional assessment; therefore, no radionuclide standards are proposed for groundwater quality monitoring for the current permit application.

Table A-2. Final Primary Drinking Water Standards

Analyte	Level	Unit	Status	Source
Alachlor	2	µg/L	Final	EPA, 1995
Aldicarb	3	µg/L	Final	EPA, 1995
Aldicarb sulfone	2	µg/L	Final	EPA, 1995
Aldicarb sulfoxide	4	µg/L	Final	EPA, 1995
Antimony	6	µg/L	Final	EPA, 1995
Arsenic	50	µg/L	Final	EPA, 1995
Asbestos	7,000,000	Fibers/L	Final	EPA, 1995
Atrazine	3	µg/L	Final	EPA, 1995
Barium	2,000	µg/L	Final	EPA, 1995
Benzene	5	µg/L	Final	EPA, 1995
Benzo[a]pyrene	0.2	µg/L	Final	EPA, 1995
Beryllium	4	µg/L	Final	EPA, 1995
Bis(2-ethylhexyl) phthalate	6	µg/L	Final	EPA, 1995
Bromodichloromethane	100	µg/L	Final	EPA, 1995
Bromoform	100	µg/L	Final	EPA, 1995
2-sec-Butyl-4,6-dinitrophenol	7	µg/L	Final	EPA, 1995
Cadmium	5	µg/L	Final	EPA, 1995
Carbofuran	40	µg/L	Final	EPA, 1995
Carbon tetrachloride	5	µg/L	Final	EPA, 1995
Chlordane	2	µg/L	Final	EPA, 1995
Chlorobenzene	100	µg/L	Final	EPA, 1995
Chloroethene (Vinyl chloride)	2	µg/L	Final	EPA, 1995
Chloroform	100	µg/L	Final	EPA, 1995
Chromium	100	µg/L	Final	EPA, 1995
Copper	1,000	µg/L	Final	SCDHEC, 1981
Cyanide	200	µg/L	Final	EPA, 1995
Dalapon	200	µg/L	Final	EPA, 1995
Dibromochloromethane	100	µg/L	Final	EPA, 1995
1,2-Dibromo-3-chloropropane	0.2	µg/L	Final	EPA, 1995
1,2-Dibromoethane	0.05	µg/L	Final	EPA, 1995
1,2-Dichlorobenzene	600	µg/L	Final	EPA, 1995
1,4-Dichlorobenzene	75	µg/L	Final	EPA, 1995
1,2-Dichloroethane	5	µg/L	Final	EPA, 1995
1,1-Dichloroethylene	7	µg/L	Final	EPA, 1995
cis-1,2-Dichloroethylene	70	µg/L	Final	EPA, 1995
trans-1,2-Dichloroethylene	100	µg/L	Final	EPA, 1995
Dichloromethane (Methylene chloride)	5	µg/L	Final	EPA, 1995
2,4-Dichlorophenoxyacetic acid	70	µg/L	Final	EPA, 1995
1,2-Dichloropropane	5	µg/L	Final	EPA, 1995
Di(2-ethylhexyl) adipate	400	µg/L	Final	EPA, 1995
Diquat dibromide	20	µg/L	Final	EPA, 1995
Endothall	100	µg/L	Final	EPA, 1995

Analyte	Level	Unit	Status	Source
Endrin	2	µg/L	Final	EPA, 1995
Ethylbenzene	700	µg/L	Final	EPA, 1995
Fluoride	4,000	µg/L	Final	EPA, 1995
Glyphosate	700	µg/L	Final	EPA, 1995
Gross alpha ^a	1.5E+01	pCi/L	Final	EPA, 1995
Heptachlor	0.4	µg/L	Final	EPA, 1995
Heptachlor epoxide	0.2	µg/L	Final	EPA, 1995
Hexachlorobenzene	1	µg/L	Final	EPA, 1995
Hexachlorocyclopentadiene	50	µg/L	Final	EPA, 1995
Lead	50	µg/L	Final	SCDHEC, 1981
Lindane	0.2	µg/L	Final	EPA, 1995
Mercury	2	µg/L	Final	EPA, 1995
Methoxychlor	40	µg/L	Final	EPA, 1995
Nickel	100	µg/L	Final	EPA, 1995
Nitrate as nitrogen	10,000	µg/L	Final	EPA, 1995
Nitrate-nitrite as nitrogen	10,000	µg/L	Final	EPA, 1995
Nitrite as nitrogen	1,000	µg/L	Final	EPA, 1995
Nonvolatile beta	5E+01	pCi/L	Interim Final	EPA, 1977
Oxamyl	200	µg/L	Final	EPA, 1995
PCB 1016	0.5	µg/L	Final	EPA, 1995
PCB 1221	0.5	µg/L	Final	EPA, 1995
PCB 1232	0.5	µg/L	Final	EPA, 1995
PCB 1242	0.5	µg/L	Final	EPA, 1995
PCB 1248	0.5	µg/L	Final	EPA, 1995
PCB 1254	0.5	µg/L	Final	EPA, 1995
PCB 1260	0.5	µg/L	Final	EPA, 1995
PCB 1262	0.5	µg/L	Final	EPA, 1995
Pentachlorophenol	1	µg/L	Final	EPA, 1995
Picloram	500	µg/L	Final	EPA, 1995
Selenium	50	µg/L	Final	EPA, 1995
Simazine	4	µg/L	Final	EPA, 1995
Strontium-89/90 ^b	8E+00	pCi/L	Final	EPA, 1995
Strontium-90	8E+00	pCi/L	Final	EPA, 1995
Styrene	100	µg/L	Final	EPA, 1995
2,3,7,8-TCDD	0.014	µg/L	Final	EPA, 1995
Tetrachloroethylene	5	µg/L	Final	EPA, 1995
Thallium	2	µg/L	Final	EPA, 1995
Toluene	1,000	µg/L	Final	EPA, 1995
Total coliform	0	N/A	Final	EPA, 1995
Toxaphene	3	µg/L	Final	EPA, 1995
2,4,5-TP (Silvex)	50	µg/L	Final	EPA, 1995
1,2,4-Trichlorobenzene	70	µg/L	Final	EPA, 1995
1,1,1-Trichloroethane	200	µg/L	Final	EPA, 1995
1,1,2-Trichloroethane	5	µg/L	Final	EPA, 1995

Analyte	Level	Unit	Status	Source
Trichloroethylene	5	µg/L	Final	EPA, 1995
Tritium	2E+01	pCi/mL	Final	EPA, 1995
Xylenes	10,000	µg/L	Final	EPA, 1995

^a The standard given is for gross alpha including radium-226 but excluding radon and uranium.

^b For double radionuclide analyses where each separate radionuclide has its own standard, the more stringent standard is used.

Appendix B

Flagging Criteria

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Flagging Criteria

Beginning first quarter 1992, flagging criteria were established for all constituents analyzed as part of the EPD/EMS Groundwater Monitoring Program. Only the flagging criteria for environmental screening analyses are used to trigger scheduling for designated wells in the environmental screening program, while all flagging criteria in Table B-1 are used to flag constituents in the analytical results tables.

The following rules are used in determining flagging criteria and scheduling sampling:

- **Flag 0:** Analysis for a constituent below Flag 1 is classified as Flag 0. Constituents classified as Flag 0 in each well series will be scheduled for analyses only by custodian request or as part of the triennial environmental screening program for wells designated as environmental screening wells.
- **Flag 1:** The Flag 1 criterion for a constituent equals half of the EPA primary drinking water standard (PDWS), the EPA proposed PDWS, or the EPA secondary drinking water standard (SDWS) for that constituent. If a constituent does not have an EPA drinking water standard, the Flag 1 criterion equals 5 times a recently published 90th percentile detection limit obtained by one of the primary laboratories. If a constituent exceeds Flag 1 in a monitoring well series, environmental screening wells in that series are sampled and analyzed for that constituent once a year. If a constituent falls below Flag 1 for three consecutive sampling episodes, the well's flag is reduced from Flag 1 status to Flag 0 status and follows the rules for Flag 0.
- **Flag 2:** The Flag 2 criterion for a constituent equals the EPA PDWS, the EPA proposed PDWS, or the EPA SDWS for that constituent. If a constituent does not have a drinking water standard, the Flag 2 criterion equals 10 times a recently published 90th percentile detection limit obtained by one of the primary laboratories. If a constituent exceeds Flag 2 in a monitoring well series, environmental screening wells in that series are sampled and analyzed for that constituent once a year. If a constituent falls below Flag 2 for three consecutive sampling episodes, the well's flag is reduced from Flag 2 status to Flag 1 or Flag 0 status and follows the rules for the lower flag.

The following constituents are exceptions to the flagging rules:

- Specific conductance and pH, which are indicator parameters, have flagging criteria but do not trigger the scheduling mechanism. No flags are set for alkalinity, 5-day biochemical oxygen demand, calcium, carbonate, chemical oxygen demand, magnesium, potassium, silica, sodium, total dissolved solids, total phosphates (as P), and total phosphorous because they are indicator parameters or major cations. Analyses for these constituents are conducted as part of the triennial environmental screening program or by special request.
- Aesthetic analyses such as color, odor, corrosivity, turbidity, and surfactants are not assigned flagging criteria but are analyzed by special request.
- Common laboratory contaminants and cleaners including phthalates, dichloromethane, ketones, and toluene are not assigned flagging criteria unless they have a PDWS. These constituents are analyzed by special request.

Table B-1. Flagging Criteria

Analyte	Unit	Flag 1	Flag 2	Source
Acenaphthene	µg/L	5.1	10.2	EPA Method 8270
Acenaphthylene	µg/L	5.1	10.2	EPA Method 8270
Acetone	µg/L	500	1,000	EPA Method 8240 (Set by EPD/EMS)
Acetonitrile (Methyl cyanide)	µg/L	50	100	EPA Method 8240
Acetophenone	µg/L	85	170	EPA Method 8270
2-Acetylaminofluorene	µg/L	81	162	EPA Method 8270
Acrolein	µg/L	166.5	333	EPA Method 8240

Analyte	Unit	Flag 1	Flag 2	Source
Acrylonitrile	µg/L	250	500	EPA Method 8240
Actinium-228	µCi/mL	1.64E-06	3.27E-06	Proposed DWS (EPA, 1991a)
Alachlor	µg/L	1	2	Final DWS (CFR, 1996a)
Aldicarb	µg/L	1.5	3	Final DWS (CFR, 1996a)
Aldicarb sulfone	µg/L	1	2	Final DWS (CFR, 1996a)
Aldicarb sulfoxide	µg/L	2	4	Final DWS (CFR, 1996a)
Aldrin	µg/L	0.4	0.8	EPA Method 8080
Alkalinity (as CaCO ₃)		No flag	No flag	Set by EPD/EMS
Allyl chloride	µg/L	416.5	833	EPA Method 8240
Aluminum	µg/L	25	50	Secondary DWS (CFR, 1996b)
Aluminum, dissolved	µg/L	25	50	Secondary DWS (CFR, 1996b)
Aluminum, total recoverable	µg/L	25	50	Secondary DWS (CFR, 1996b)
Americium-241	µCi/mL	3.17E-09	6.34E-09	Proposed DWS (EPA, 1991a)
Americium-243	µCi/mL	3.19E-09	6.37E-09	Proposed DWS (EPA, 1991a)
4-Aminobiphenyl	µg/L	81	162	EPA Method 8270
Ammonia	µg/L	250	500	APHA Method 417B
Ammonia nitrogen	µg/L	500	1,000	EPA Method 350.1
Aniline	µg/L	81	162	EPA Method 8270
Anthracene	µg/L	5.1	10.2	EPA Method 8270
Antimony	µg/L	3	6	Final DWS (CFR, 1996a)
Antimony, dissolved	µg/L	3	6	Final DWS (CFR, 1996a)
Antimony, total recoverable	µg/L	3	6	Final DWS (CFR, 1996a)
Antimony-124	µCi/mL	3E-08	6E-08	Interim Final DWS (EPA, 1977)
Antimony-125	µCi/mL	1.5E-07	3E-07	Interim Final DWS (EPA, 1977)
Aramite	µg/L	81	162	EPA Method 8270
Arsenic	µg/L	25	50	Final DWS (CFR, 1996a)
Arsenic, dissolved	µg/L	25	50	Final DWS (CFR, 1996a)
Arsenic, total recoverable	µg/L	25	50	Final DWS (CFR, 1996a)
Asbestos	Fibers/L	3,500,000	7,000,000	Final DWS (CFR, 1996a)
Atrazine	µg/L	1.5	3	Final DWS (CFR, 1996a)
Azobenzene	µg/L	50	100	EPA Method 625
Barium	µg/L	1000	2,000	Final DWS (CFR, 1996a)
Barium, dissolved	µg/L	1000	2,000	Final DWS (CFR, 1996a)
Barium, total recoverable	µg/L	1000	2,000	Final DWS (CFR, 1996a)
Barium-133	µCi/mL	7.6E-07	1.52E-06	Proposed DWS (EPA, 1991a)
Barium-140 ^a	µCi/mL	4.5E-08	9E-08	Interim Final DWS (EPA, 1977)
Benzene	µg/L	2.5	5	Final DWS (CFR, 1996a)
alpha-Benzene hexachloride	µg/L	0.15	0.3	EPA Method 8080
beta-Benzene hexachloride	µg/L	0.25	0.5	EPA Method 8080
delta-Benzene hexachloride	µg/L	0.25	0.5	EPA Method 8080
Benzidine	µg/L	83.5	167	EPA Method 8270
Benzo[a]anthracene	µg/L	0.05	0.1	Proposed DWS (EPA, 1990)
Benzo[b]fluoranthene	µg/L	0.1	0.2	Proposed DWS (EPA, 1990)
Benzo[k]fluoranthene	µg/L	0.1	0.2	Proposed DWS (EPA, 1990)
Benzoic acid	µg/L	5	10	EPA Method 8270
Benzo[g,h,i]perylene	µg/L	5.1	10.2	EPA Method 8270
Benzo[a]pyrene	µg/L	0.1	0.2	Final DWS (CFR, 1996a)
1,4-Benzoquinone	µg/L	50	100	EPA Method 8270
Benzyl alcohol	µg/L	5	10	EPA Method 8270
Beryllium	µg/L	2	4	Final DWS (CFR, 1996a)
Beryllium, dissolved	µg/L	2	4	Final DWS (CFR, 1996a)
Beryllium, total recoverable	µg/L	2	4	Final DWS (CFR, 1996a)
Beryllium-7	µCi/mL	3E-06	6E-06	Interim Final DWS (EPA, 1977)

Analyte	Unit	Flag 1	Flag 2	Source
5-day Biochemical oxygen demand		No flag	No flag	Set by EPD/EMS
Bis(2-chloroethoxy) methane	µg/L	5.1	10.2	EPA Method 8270
Bis(2-chloroethyl) ether	µg/L	5.1	10.2	EPA Method 8270
Bis(2-chloroisopropyl) ether	µg/L	100	200	EPA Method 8270
Bis(chloromethyl) ether	µg/L	50	100	EPA Method 8270
Bis(2-ethylhexyl) phthalate	µg/L	3	6	Final DWS (CFR, 1996a)
Bismuth-214	µCi/mL	9.4E-06	1.89E-05	Proposed DWS (EPA, 1991a)
Boron	µg/L	2,500	5,000	EPA Method 6010
Boron, dissolved	µg/L	2,500	5,000	EPA Method 6010
Boron, total recoverable	µg/L	2,500	5,000	EPA Method 6010
Bromide	µg/L	5,000	10,000	EPA Method 300.0
Bromobenzene	µg/L	25	50	EPA Method 8260
Bromochloromethane	µg/L	5	10	EPA Method 8260
Bromodichloromethane	µg/L	50	100	Final DWS (CFR, 1996a)
Bromoform	µg/L	50	100	Final DWS (CFR, 1996a)
Bromomethane (Methyl bromide)	µg/L	10	20	EPA Method 8240
4-Bromophenyl phenyl ether	µg/L	5.1	10.2	EPA Method 8270
n-Butylbenzene	µg/L	5	10	EPA Method 8260
sec-Butylbenzene	µg/L	5	10	EPA Method 8260
tert-Butylbenzene	µg/L	5	10	EPA Method 8260
Butylbenzyl phthalate		No flag	No flag	Set by EPD/EMS
2-sec-Butyl-4,6-dinitrophenol	µg/L	3.5	7	Final DWS (CFR, 1996a)
Cadmium	µg/L	2.5	5	Final DWS (CFR, 1996a)
Cadmium, dissolved	µg/L	2.5	5	Final DWS (CFR, 1996a)
Cadmium, total recoverable	µg/L	2.5	5	Final DWS (CFR, 1996a)
Calcium		No flag	No flag	Set by EPD/EMS
Calcium, dissolved		No flag	No flag	Set by EPD/EMS
Calcium, total recoverable		No flag	No flag	Set by EPD/EMS
Carbofuran	µg/L	20	40	Final DWS (CFR, 1996a)
Carbon disulfide	µg/L	25	50	EPA Method 8240
Carbon tetrachloride	µg/L	2.5	5	Final DWS (CFR, 1996a)
Carbon-14	µCi/mL	1E-06	2E-06	Interim Final DWS (EPA, 1977)
Carbonate		No flag	No flag	Set by EPD/EMS
Cerium-141 ^a	µCi/mL	1.5E-07	3E-07	Interim Final DWS (EPA, 1977)
Cerium-144	µCi/mL	1.31E-07	2.61E-07	Proposed DWS (EPA, 1991a)
Cesium-134 ^b	µCi/mL	4.07E-08	8.13E-08	Proposed DWS (EPA, 1991a)
Cesium-137	µCi/mL	1E-07	2E-07	Interim Final DWS (EPA, 1977)
Chemical oxygen demand		No flag	No flag	Set by EPD/EMS
Chlordane	µg/L	1	2	Final DWS (CFR, 1996a)
alpha-Chlordane	µg/L	0.25	0.5	EPA Method 8080
gamma-Chlordane	µg/L	0.25	0.5	EPA Method 8080
Chloride	µg/L	125,000	250,000	Secondary DWS (CFR, 1996b)
4-Chloroaniline	µg/L	5	10	EPA Method 8270
Chlorobenzene	µg/L	50	100	Final DWS (CFR, 1996a)
Chlorobenzilate	µg/L	81	162	EPA Method 8270
4-Chloro-m-cresol	µg/L	5.1	10.2	EPA Method 8270
Chloroethane	µg/L	10	20	EPA Method 8240
Chloroethene (Vinyl chloride)	µg/L	1	2	Final DWS (CFR, 1996a)
Chloroethyl vinyl ether	µg/L	5	10	EPA Method 8240
2-Chloroethyl vinyl ether	µg/L	50	100	EPA Method 8240
Chloroform	µg/L	50	100	Final DWS (CFR, 1996a)
Chloromethane (Methyl chloride)	µg/L	10	20	EPA Method 8240
2-Chloronaphthalene	µg/L	5.1	10.2	EPA Method 8240
2-Chlorophenol	µg/L	5.1	10.2	EPA Method 8270

Analyte	Unit	Flag 1	Flag 2	Source
4-Chlorophenyl phenyl ether	µg/L	5.1	10.2	EPA Method 8270
Chloroprene	µg/L	1,665	3,330	EPA Method 8240
2-Chlorotoluene	µg/L	25	50	EPA Method 8260
4-Chlorotoluene	µg/L	5	10	EPA Method 8260
Chromium	µg/L	50	100	Final DWS (CFR, 1996a)
Chromium, dissolved	µg/L	50	100	Final DWS (CFR, 1996a)
Chromium, total recoverable	µg/L	50	100	Final DWS (CFR, 1996a)
Chromium-51 ^a	µCi/mL	3E-06	6E-06	Interim Final DWS (EPA, 1977)
Chrysene	µg/L	0.1	0.2	Proposed DWS (EPA, 1990)
Cobalt	µg/L	50	100	EPA Method 6010
Cobalt, dissolved	µg/L	50	100	EPA Method 6010
Cobalt, total recoverable	µg/L	50	100	EPA Method 6010
Cobalt-57	µCi/mL	5E-07	1E-06	Interim Final DWS (EPA, 1977)
Cobalt-58	µCi/mL	4.5E-06	9E-06	Interim Final DWS (EPA, 1977)
Cobalt-60	µCi/mL	5E-08	1E-07	Interim Final DWS (EPA, 1977)
Color		No flag	No flag	Set by EPD/EMS
Copper	µg/L	500	1,000	Primary DWS (SCDHEC, 1981)
Copper, dissolved	µg/L	500	1,000	Primary DWS (SCDHEC, 1981)
Copper, total recoverable	µg/L	500	1,000	Primary DWS (SCDHEC, 1981)
Corrosivity		No flag	No flag	Set by EPD/EMS
m-Cresol (3-Methylphenol)	µg/L	50	100	EPA Method 8270
o-Cresol (2-Methylphenol)	µg/L	5	10	EPA Method 8270
p-Cresol (4-Methylphenol)	µg/L	60	120	EPA Method 8270
Curium-242	µCi/mL	6.65E-08	1.33E-07	Proposed DWS (EPA, 1991a)
Curium-243	µCi/mL	4.15E-09	8.3E-09	Proposed DWS (EPA, 1991a)
Curium-243/244 ^c	µCi/mL	4.15E-09	8.3E-09	Proposed DWS (EPA, 1991a)
Curium-244	µCi/mL	4.92E-09	9.84E-09	Proposed DWS (EPA, 1991a)
Curium-245/246 ^c	µCi/mL	3.12E-09	6.23E-09	Proposed DWS (EPA, 1991a)
Curium-246	µCi/mL	3.14E-09	6.27E-09	Proposed DWS (EPA, 1991a)
Cyanide	µg/L	100	200	Final DWS (CFR, 1996a)
Dalapon	µg/L	100	200	Final DWS (CFR, 1996a)
p,p'-DDD	µg/L	0.55	1.1	EPA Method 8080
p,p'-DDE	µg/L	0.25	0.5	EPA Method 8080
p,p'-DDT	µg/L	0.85	1.7	EPA Method 8080
Diallate	µg/L	81	162	EPA Method 8270
Dibenz[a,h]anthracene	µg/L	0.15	0.3	Proposed DWS (EPA, 1990)
Dibenzofuran	µg/L	5	10	EPA Method 8270
Dibromochloromethane	µg/L	50	100	Final DWS (CFR, 1996a)
1,2-Dibromo-3-chloropropane	µg/L	0.1	0.2	Final DWS (CFR, 1996a)
1,2-Dibromoethane	µg/L	0.025	0.05	Final DWS (CFR, 1996a)
Dibromomethane (Methylene bromide)	µg/L	10	20	EPA Method 8240
Di-n-butyl phthalate		No flag	No flag	Set by EPD/EMS
1,2-Dichlorobenzene	µg/L	300	600	Final DWS (CFR, 1996a)
1,3-Dichlorobenzene	µg/L	81	162	EPA Method 8270
1,4-Dichlorobenzene	µg/L	37.5	75	Final DWS (CFR, 1996a)
3,3'-Dichlorobenzidine	µg/L	5.1	10.2	EPA Method 8270
trans-1,4-Dichloro-2-butene	µg/L	250	500	EPA Method 8240
Dichlorodifluoromethane	µg/L	10	20	EPA Method 8240
1,1-Dichloroethane	µg/L	10	20	EPA Method 8240
1,2-Dichloroethane	µg/L	2.5	5	Final DWS (CFR, 1996a)
cis-1,2-Dichloroethylene	µg/L	35	70	Final DWS (CFR, 1996a)
1,1-Dichloroethylene	µg/L	3.5	7	Final DWS (CFR, 1996a)
1,2-Dichloroethylene	µg/L	25	50	EPA Method 8240

Analyte	Unit	Flag 1	Flag 2	Source
trans-1,2-Dichloroethylene	µg/L	50	100	Final DWS (CFR, 1996a)
Dichloromethane (Methylene chloride)	µg/L	2.5	5	Final DWS (CFR, 1996a)
2,4-Dichlorophenol	µg/L	5.1	10.2	EPA Method 8270
2,6-Dichlorophenol	µg/L	83.5	167	EPA Method 8270
2,4-Dichlorophenoxyacetic acid	µg/L	35	70	Final DWS (CFR, 1996a)
1,2-Dichloropropane	µg/L	2.5	5	Final DWS (CFR, 1996a)
2,2-Dichloropropane	µg/L	5	10	EPA Method 8260
cis-1,3-Dichloropropene	µg/L	10	20	EPA Method 8240
trans-1,3-Dichloropropene	µg/L	10	20	EPA Method 8240
Dieldrin	µg/L	4.15	8.3	EPA Method 8080
Diethyl phthalate		No flag	No flag	Set by EPD/EMS
Di(2-ethylhexyl) adipate	µg/L	200	400	Final DWS (CFR, 1996a)
Dimethoate	µg/L	81	162	EPA Method 8270
2,4-Dimethyl phenol	µg/L	5.1	10.2	EPA Method 8270
Dimethyl phthalate		No flag	No flag	Set by EPD/EMS
p-Dimethylaminoazobenzene	µg/L	81	162	EPA Method 8270
p-(Dimethylamino)ethylbenzene	µg/L	50	100	EPA Method 8270
7,12-Dimethylbenz[a]anthracene	µg/L	81	162	EPA Method 8270
3,3'-Dimethylbenzidine	µg/L	81	162	EPA Method 8270
a,a-Dimethylphenethylamine	µg/L	81	162	EPA Method 8270
1,3-Dinitrobenzene	µg/L	81	162	EPA Method 8270
2,4-Dinitrophenol	µg/L	51	102	EPA Method 8270
2,4-Dinitrotoluene	µg/L	0.5	1	EPA Method 8270
2,6-Dinitrotoluene	µg/L	0.5	1	EPA Method 8270
Di-n-octyl phthalate		No flag	No flag	Set by EPD/EMS
1,4-Dioxane	µg/L	500	1,000	EPA Method 8270
Diphenylamine	µg/L	81	162	EPA Method 8270
1,2-Diphenylhydrazine	µg/L	83.5	167	EPA Method 8270
Diquat dibromide	µg/L	10	20	Final DWS (CFR, 1996a)
Dissolved organic carbon	µg/L	10,500,000	21,000,000	EPA Method 9060
Disulfoton	µg/L	81	162	EPA Method 8270
Endosulfan I	µg/L	0.25	0.5	EPA Method 8080
Endosulfan II	µg/L	0.55	1.1	EPA Method 8080
Endosulfan sulfate	µg/L	0.55	1.1	EPA Method 8080
Endothall	µg/L	50	100	Final DWS (CFR, 1996a)
Endrin	µg/L	1	2	Final DWS (CFR, 1996a)
Endrin aldehyde	µg/L	0.85	1.7	EPA Method 8080
Endrin ketone		No flag	No flag	Set by EPD/EMS
Ethyl ether	µg/L	50	100	EPA Method 8260
Ethyl methacrylate	µg/L	2.5	5	EPA Method 8270
Ethyl methanesulfonate	µg/L	81	162	EPA Method 8270
Ethylbenzene	µg/L	350	700	Final DWS (CFR, 1996a)
Europium-152	µCi/mL	3E-08	6E-08	Interim Final DWS (EPA, 1977)
Europium-154	µCi/mL	1E-07	2E-07	Interim Final DWS (EPA, 1977)
Europium-155	µCi/mL	3E-07	6E-07	Interim Final DWS (EPA, 1977)
Famphur	µg/L	81	162	EPA Method 8270
Fluoranthene	µg/L	5.1	10.2	EPA Method 8270
Fluorene	µg/L	5.1	10.2	EPA Method 8270
Fluoride	µg/L	2,000	4,000	Final DWS (CFR, 1996a)
Glyphosate	µg/L	350	700	Final DWS (CFR, 1996a)
Gross alpha	µCi/mL	7.5E-09	1.5E-08	Final DWS (CFR, 1996a)
Heptachlor	µg/L	0.2	0.4	Final DWS (CFR, 1996a)
Heptachlor epoxide	µg/L	0.1	0.2	Final DWS (CFR, 1996a)

Analyte	Unit	Flag 1	Flag 2	Source
Heptachlorodibenzo-p-dioxin isomers	µg/L	0.007	0.014	EPA Method 8280
1,2,3,4,6,7,8-HPCDD	µg/L	0.007	0.014	EPA Method 8280
Heptachlorodibenzo-p-furan isomers	µg/L	0.008	0.016	EPA Method 8280
1,2,3,4,6,7,8-HPCDF	µg/L	0.008	0.016	EPA Method 8280
Hexachlorobenzene	µg/L	0.5	1	Final DWS (CFR, 1996a)
Hexachlorobutadiene	µg/L	5	10	EPA Method 8270
Hexachlorocyclopentadiene	µg/L	25	50	Final DWS (CFR, 1996a)
Hexachlorodibenzo-p-dioxin isomers	µg/L	0.008	0.016	EPA Method 8280
1,2,3,4,7,8-HXCDD	µg/L	0.0105	0.021	EPA Method 8280
Hexachlorodibenzo-p-furan isomers	µg/L	0.006	0.012	EPA Method 8280
1,2,3,4,7,8-HXCDF	µg/L	0.0085	0.017	EPA Method 8280
Hexachloroethane	µg/L	0.5	1	EPA Method 8270
Hexachlorophene	µg/L	83.5	167	EPA Method 8270
Hexachloropropene	µg/L	81	162	EPA Method 8270
2-Hexanone	µg/L	50	100	EPA Method 8240
Indeno[1,2,3-c,d]pyrene	µg/L	0.5	1	EPA Method 8270
Iodine	µg/L	250	500	APHA Method 415A
Iodine-129	µCi/mL	5E-10	1E-09	Interim Final DWS (EPA, 1977)
Iodine-131 ^a	µCi/mL	1.5E-09	3E-09	Interim Final DWS (EPA, 1977)
Iodomethane (Methyl iodide)	µg/L	125	250	EPA Method 8240
Iron	µg/L	150	300	Secondary DWS (CFR, 1996b)
Iron, dissolved	µg/L	150	300	Secondary DWS (CFR, 1996b)
Iron, total recoverable	µg/L	150	300	Secondary DWS (CFR, 1996b)
Iron-55 ^a	µCi/mL	1E-06	2E-06	Interim Final DWS (EPA, 1977)
Iron-59 ^a	µCi/mL	1E-07	2E-07	Interim Final DWS (EPA, 1977)
Isobutyl alcohol	µg/L	834.5	1,669	EPA Method 8240
Isodrin	µg/L	81	162	EPA Method 8270
Isophorone	µg/L	5.1	10.2	EPA Method 8270
Isopropylbenzene	µg/L	5	10	EPA Method 8260
p-Isopropyltoluene	µg/L	5	10	EPA Method 8260
Isosafrole	µg/L	81	162	EPA Method 8270
Kepone	µg/L	81	162	EPA Method 8270
Lanthanum-140 ^a	µCi/mL	3E-08	6E-08	Interim Final DWS (EPA, 1977)
Lead	µg/L	25	50	Final DWS (SCDHEC, 1981)
Lead, dissolved	µg/L	25	50	Final DWS (SCDHEC, 1981)
Lead, total recoverable	µg/L	25	50	Final DWS (SCDHEC, 1981)
Lead-212	µCi/mL	6.2E-08	1.23E-07	Proposed DWS (EPA, 1991a)
Lindane	µg/L	0.1	0.2	Final DWS (CFR, 1996a)
Lithium	µg/L	125	250	EPA Method 6010
Lithium, dissolved	µg/L	125	250	EPA Method 6010
Lithium, total recoverable	µg/L	125	250	EPA Method 6010
Magnesium		No flag	No flag	Set by EPD/EMS
Magnesium, dissolved		No flag	No flag	Set by EPD/EMS
Magnesium, total recoverable		No flag	No flag	Set by EPD/EMS
Manganese	µg/L	25	50	Secondary DWS (CFR, 1996b)
Manganese, dissolved	µg/L	25	50	Secondary DWS (CFR, 1996b)
Manganese, total recoverable	µg/L	25	50	Secondary DWS (CFR, 1996b)
Manganese-54	µCi/mL	1.5E-07	3E-07	Interim Final DWS (EPA, 1977)
Mercury	µg/L	1	2	Final DWS (CFR, 1996a)
Mercury, dissolved	µg/L	1	2	Final DWS (CFR, 1996a)
Mercury, total recoverable	µg/L	1	2	Final DWS (CFR, 1996a)
Methacrylonitrile	µg/L	416.5	833	EPA Method 8240
Methapyrilene	µg/L	81	162	EPA Method 8270

Analyte	Unit	Flag 1	Flag 2	Source
Methoxychlor	µg/L	20	40	Final DWS (CFR, 1996a)
Methyl tert-butyl ether	µg/L	5	10	EPA Method 8260
Methyl ethyl ketone		No flag	No flag	Set by EPD/EMS
Methyl isobutyl ketone		No flag	No flag	Set by EPD/EMS
Methyl methacrylate	µg/L	50	100	EPA Method 8270
Methyl methanesulfonate	µg/L	81	162	EPA Method 8270
3-Methylcholanthrene	µg/L	81	162	EPA Method 8270
2-Methyl-4,6-dinitrophenol	µg/L	51	102	EPA Method 8270
2-Methylnaphthalene	µg/L	5	10	EPA Method 8270
Molybdenum	µg/L	250	500	EPA Method 6010
Molybdenum, dissolved	µg/L	250	500	EPA Method 6010
Molybdenum, total recoverable	µg/L	250	500	EPA Method 6010
Naphthalene	µg/L	83.5	167	EPA Method 8270
1,4-Naphthoquinone	µg/L	81	162	EPA Method 8270
1-Naphthylamine	µg/L	81	162	EPA Method 8270
2-Naphthylamine	µg/L	81	162	EPA Method 8270
Neptunium-237	µCi/mL	3.53E-09	7.06E-09	Proposed DWS (EPA, 1991a)
Neptunium-239	µCi/mL	8.4E-07	1.68E-06	Proposed DWS (EPA, 1991a)
Nickel	µg/L	50	100	Final DWS (CFR, 1996a)
Nickel, dissolved	µg/L	50	100	Final DWS (CFR, 1996a)
Nickel, total recoverable	µg/L	50	100	Final DWS (CFR, 1996a)
Nickel-59	µCi/mL	1.5E-07	3E-07	Interim Final DWS (EPA, 1977)
Nickel-63	µCi/mL	2.5E-08	5E-08	Interim Final DWS (EPA, 1977)
Niobium-95 ^a	µCi/mL	1.5E-07	3E-07	Interim Final DWS (EPA, 1977)
Nitrate as nitrogen	µg/L	5,000	10,000	Final DWS (CFR, 1996a)
Nitrate-nitrite as nitrogen	µg/L	5,000	10,000	Final DWS (CFR, 1996a)
Nitrite as nitrogen	µg/L	500	1,000	Final DWS (CFR, 1996a)
m-Nitroaniline	µg/L	5	10	EPA Method 8270
o-Nitroaniline	µg/L	5	10	EPA Method 8270
p-Nitroaniline	µg/L	5	10	EPA Method 8270
Nitrobenzene	µg/L	5.1	10.2	EPA Method 8270
Nitrogen by Kjeldahl method	µg/L	500	1,000	EPA Method 351.2
2-Nitrophenol	µg/L	5.1	10.2	EPA Method 8270
4-Nitrophenol	µg/L	5.1	10.2	EPA Method 8270
4-Nitroquinoline-1-oxide	µg/L	81	162	EPA Method 8270
N-Nitrosodi-n-butylamine	µg/L	81	162	EPA Method 8270
N-Nitrosodiethylamine	µg/L	81	162	EPA Method 8270
N-Nitrosodimethylamine	µg/L	83.5	167	EPA Method 8270
N-Nitrosodiphenylamine	µg/L	5.1	10.2	EPA Method 8270
N-Nitrosodipropylamine	µg/L	5.1	10.2	EPA Method 8270
N-Nitrosomethylethylamine	µg/L	81	162	EPA Method 8270
N-Nitrosomorpholine	µg/L	81	162	EPA Method 8270
N-Nitrosopiperidine	µg/L	81	162	EPA Method 8270
N-Nitrosopyrrolidine	µg/L	81	162	EPA Method 8270
5-Nitro-o-toluidine	µg/L	81	162	EPA Method 8270
Nonvolatile beta	µCi/mL	2.5E-08	5E-08	Interim Final DWS (EPA, 1977)
Octachlorodibenzo-p-dioxin isomers	µg/L	0.0085	0.017	EPA Method 8280
Octachlorodibenzo-p-furan isomers	µg/L	0.0065	0.013	EPA Method 8280
Odor		No flag	No flag	Set by EPD/EMS
Oil and grease	µg/L	8,350	16,700	EPA Method 413.1
Oxamyl	µg/L	100	200	Final DWS (CFR, 1996a)
Parathion	µg/L	0.4	0.8	EPA Method 8080
Parathion methyl	µg/L	0.4	0.8	EPA Method 8080

Analyte	Unit	Flag 1	Flag 2	Source
PCB 1016	µg/L	0.25	0.5	Final DWS (CFR, 1996a)
PCB 1221	µg/L	0.25	0.5	Final DWS (CFR, 1996a)
PCB 1232	µg/L	0.25	0.5	Final DWS (CFR, 1996a)
PCB 1242	µg/L	0.25	0.5	Final DWS (CFR, 1996a)
PCB 1248	µg/L	0.25	0.5	Final DWS (CFR, 1996a)
PCB 1254	µg/L	0.25	0.5	Final DWS (CFR, 1996a)
PCB 1260	µg/L	0.25	0.5	Final DWS (CFR, 1996a)
PCB 1262	µg/L	0.25	0.5	Final DWS (CFR, 1996a)
Pentachlorobenzene	µg/L	81	162	EPA Method 8270
Pentachlorodibenzo-p-dioxin isomers	µg/L	0.008	0.016	EPA Method 8280
1,2,3,7,8-PCDD	µg/L	0.0075	0.015	EPA Method 8280
Pentachlorodibenzo-p-furan isomers	µg/L	0.0085	0.017	EPA Method 8280
1,2,3,7,8-PCDF	µg/L	0.0085	0.017	EPA Method 8280
Pentachloroethane	µg/L	81	162	EPA Method 8270
Pentachloronitrobenzene	µg/L	81	162	EPA Method 8270
Pentachlorophenol	µg/L	0.5	1	Final DWS (CFR, 1996a)
pH ^d	pH	8	10	Set by EPD/EMS
pH ^d	pH	4	3	Set by EPD/EMS
Phenacetin	µg/L	81	162	EPA Method 8270
Phenanthrene	µg/L	5.1	10.2	EPA Method 8270
Phenol	µg/L	83.5	167	EPA Method 8270
Phenols	µg/L	50	100	EPA Method 420.1
p-Phenylenediamine	µg/L	81	162	EPA Method 8270
Phorate	µg/L	0.85	1.7	EPA Method 8080
Picloram	µg/L	250	500	Final DWS (CFR, 1996a)
2-Picoline	µg/L	81	162	EPA Method 8270
Plutonium-238	µCi/mL	3.51E-09	7.02E-09	Proposed DWS (EPA, 1991a)
Plutonium-239	µCi/mL	3.11E-08	6.21E-08	Proposed DWS (EPA, 1991a)
Plutonium-239/240 ^c	µCi/mL	3.11E-08	6.21E-08	Proposed DWS (EPA, 1991a)
Plutonium-240	µCi/mL	3.11E-08	6.22E-08	Proposed DWS (EPA, 1991a)
Plutonium-241 ^a	µCi/mL	3.13E-08	6.26E-08	Proposed DWS (EPA, 1991a)
Plutonium-242 ^a	µCi/mL	3.27E-08	6.54E-08	Proposed DWS (EPA, 1991a)
Potassium		No flag	No flag	Set by EPD/EMS
Potassium, dissolved		No flag	No flag	Set by EPD/EMS
Potassium, total recoverable		No flag	No flag	Set by EPD/EMS
Potassium-40	µCi/mL	1.5E-07	3E-07	Proposed DWS (EPA, 1986a)
Promethium-144	µCi/mL	5E-08	1E-07	EPA Method 901.1
Promethium-146	µCi/mL	5E-08	1E-07	EPA Method 901.1
Promethium-147	µCi/mL	2.62E-06	5.24E-06	Proposed DWS (EPA, 1991a)
Pronamid	µg/L	81	162	EPA Method 8270
Propionitrile	µg/L	1,665	3,330	EPA Method 8240
n-Propylbenzene	µg/L	5	10	EPA Method 8260
Pyrene	µg/L	5.1	10.2	EPA Method 8270
Pyridine	µg/L	81	162	EPA Method 8270
Radium, total alpha-emitting	µCi/mL	1E-08	2E-08	Proposed DWS (EPA, 1991a)
Radium-226	µCi/mL	1E-08	2E-08	Proposed DWS (EPA, 1991a)
Radium-228	µCi/mL	1E-08	2E-08	Proposed DWS (EPA, 1991a)
Radon-222	µCi/mL	1.5E-07	3E-07	Proposed DWS (EPA, 1991a)
Ruthenium-103 ^a	µCi/mL	1E-07	2E-07	Interim Final DWS (EPA, 1977)
Ruthenium-106	µCi/mL	1.5E-08	3E-08	Interim Final DWS (EPA, 1977)
Safrole	µg/L	81	162	EPA Method 8270
Selenium	µg/L	25	50	Final DWS (CFR, 1996a)
Selenium, dissolved	µg/L	25	50	Final DWS (CFR, 1996a)

Analyte	Unit	Flag 1	Flag 2	Source
Selenium, total recoverable	µg/L	25	50	Final DWS (CFR, 1996a)
Silica		No flag	No flag	Set by EPD/EMS
Silica, dissolved		No flag	No flag	Set by EPD/EMS
Silica, total recoverable		No flag	No flag	Set by EPD/EMS
Silver	µg/L	50	100	Secondary DWS (CFR, 1996b)
Silver, dissolved	µg/L	50	100	Secondary DWS (CFR, 1996b)
Silver, total recoverable	µg/L	50	100	Secondary DWS (CFR, 1996b)
Simazine	µg/L	2	4	Final DWS (CFR, 1996a)
Sodium		No flag	No flag	Set by EPD/EMS
Sodium, dissolved		No flag	No flag	Set by EPD/EMS
Sodium, total recoverable		No flag	No flag	Set by EPD/EMS
Sodium-22	µCi/mL	2.33E-07	4.66E-07	Proposed DWS (EPA, 1991a)
Specific conductance ^d	µS/cm	250	500	Set by EPD/EMS
Strontium-89	µCi/mL	1E-08	2E-08	Interim Final DWS (EPA, 1977)
Strontium-89/90 ^c	µCi/mL	4E-09	8E-09	Final DWS (CFR, 1996a)
Strontium-90	µCi/mL	4E-09	8E-09	Final DWS (CFR, 1996a)
Styrene	µg/L	50	100	Final DWS (CFR, 1996a)
Sulfate	µg/L	200,000	400,000	Proposed DWS (EPA, 1990)
Sulfide	µg/L	8,350	16,700	EPA Method 9030
Sulfotep	µg/L	81	162	EPA Method 8270
Surfactants		No flag	No flag	Set by EPD/EMS
2,3,7,8-TCDD	µg/L	0.007	0.014	Final DWS (CFR, 1996a)
2,3,7,8-TCDF	µg/L	0.00425	0.0085	EPA Method 8280
Technetium-99	µCi/mL	4.5E-07	9E-07	Interim Final DWS (EPA, 1977)
1,2,4,5-Tetrachlorobenzene	µg/L	81	162	EPA Method 8270
Tetrachlorodibenzo-p-dioxin isomers	µg/L	0.007	0.014	EPA Method 8280
Tetrachlorodibenzo-p-furan isomers	µg/L	0.0055	0.011	EPA Method 8280
1,1,1,2-Tetrachloroethane	µg/L	10	20	EPA Method 8240
1,1,2,2-Tetrachloroethane	µg/L	50	100	EPA Method 8240
Tetrachloroethylene	µg/L	2.5	5	Final DWS (CFR, 1996a)
2,3,4,6-Tetrachlorophenol	µg/L	83.5	167	EPA Method 8270
Thallium	µg/L	1	2	Final DWS (CFR, 1996a)
Thallium, dissolved	µg/L	1	2	Final DWS (CFR, 1996a)
Thallium, total recoverable	µg/L	1	2	Final DWS (CFR, 1996a)
Thionazin	µg/L	81	162	EPA Method 8270
Thorium-228	µCi/mL	6.25E-08	1.25E-07	Proposed DWS (EPA, 1991a)
Thorium-230	µCi/mL	3.96E-08	7.92E-08	Proposed DWS (EPA, 1991a)
Thorium-232	µCi/mL	4.4E-08	8.8E-08	Proposed DWS (EPA, 1991a)
Thorium-234 ^a	µCi/mL	2E-07	4.01E-07	Proposed DWS (EPA, 1991a)
Tin	µg/L	250	500	EPA Method 282.2
Tin, dissolved	µg/L	250	500	EPA Method 282.2
Tin, total recoverable	µg/L	250	500	EPA Method 282.2
Tin-113	µCi/mL	1.5E-07	3E-07	Interim Final DWS (EPA, 1977)
Toluene	µg/L	500	1,000	Final DWS (CFR, 1996a)
o-Toluidine	µg/L	81	162	EPA Method 8270
Total carbon	µg/L	5,000	10,000	EPA Method 9060
Total coliform	N/A	0	0	Final DWS (CFR, 1996a)
Total dissolved solids		No flag	No flag	Set by EPD/EMS
Total hydrocarbons	µg/L	5,000	10,000	EPA Method 418.1
Total inorganic carbon	µg/L	8,350	16,700	EPA Method 9060
Total organic carbon	µg/L	500,000	1,000,000	EPA Method 9060
Total organic halogens	µg/L	50	100	EPA Method 9020
Total organic nitrogen	µg/L	500	1,000	APHA Method 420
Total petroleum hydrocarbons	µg/L	8,350	16,700	EPA Method 418.1

Analyte	Unit	Flag 1	Flag 2	Source
Total phosphates (as P)		No flag	No flag	Set by EPD/EMS
Total phosphorus		No flag	No flag	Set by EPD/EMS
Toxaphene	µg/L	1.5	3	Final DWS (CFR, 1996a)
2,4,5-TP (Silvex)	µg/L	25	50	Final DWS (CFR, 1996a)
Tributyl phosphate	µg/L	86	172	EPA Method 8270
1,2,3-Trichlorobenzene	µg/L	5	10	EPA Method 8260
1,2,4-Trichlorobenzene	µg/L	35	70	Final DWS (CFR, 1996a)
1,1,1-Trichloroethane	µg/L	100	200	Final DWS (CFR, 1996a)
1,1,2-Trichloroethane	µg/L	2.5	5	Final DWS (CFR, 1996a)
Trichloroethylene	µg/L	2.5	5	Final DWS (CFR, 1996a)
Trichlorofluoromethane	µg/L	10	20	EPA Method 8240
2,4,5-Trichlorophenol	µg/L	5	10	EPA Method 8270
2,4,6-Trichlorophenol	µg/L	0.5	1	EPA Method 8270
2,4,5-Trichlorophenoxyacetic acid	µg/L	0.25	0.5	EPA Method 8150
1,2,3-Trichloropropane	µg/L	10	20	EPA Method 8240
Trichlorotrifluoroethane	µg/L	50	100	EPA Method 8260
O,O,O-Triethyl phosphorothioate	µg/L	81	162	EPA Method 8270
1,2,4-Trimethylbenzene	µg/L	5	10	EPA Method 8260
1,3,5-Trimethylbenzene	µg/L	5	10	EPA Method 8260
1,3,5-Trinitrobenzene	µg/L	81	162	EPA Method 8270
Tritium	µCi/mL	1E-05	2E-05	Final DWS (CFR, 1996a)
Turbidity ^e		No flag	No flag	Set by EPD/EMS
Uranium	µg/L	10	20	Proposed DWS (EPA, 1991a)
Uranium alpha activity	µCi/mL	1.5E-08	3E-08	Proposed DWS (EPA, 1991a)
Uranium, dissolved	µg/L	10	20	Proposed DWS (EPA, 1991a)
Uranium, total recoverable	µg/L	10	20	Proposed DWS (EPA, 1991a)
Uranium-233/234 ^c	µCi/mL	6.9E-09	1.38E-08	Proposed DWS (EPA, 1991a)
Uranium-234	µCi/mL	6.95E-09	1.39E-08	Proposed DWS (EPA, 1991a)
Uranium-235	µCi/mL	7.25E-09	1.45E-08	Proposed DWS (EPA, 1991a)
Uranium-238	µCi/mL	7.3E-09	1.46E-08	Proposed DWS (EPA, 1991a)
Vanadium	µg/L	66.5	133	EPA Method 6010
Vanadium, dissolved	µg/L	66.5	133	EPA Method 6010
Vanadium, total recoverable	µg/L	66.5	133	EPA Method 6010
Vinyl acetate	µg/L	50	100	EPA Method 8240
m/p-Xylene	µg/L	81	162	EPA Method 8260
o-Xylene	µg/L	5	10	EPA Method 8260
Xylenes	µg/L	5,000	10,000	Final DWS (CFR, 1996a)
Yttrium-88	µCi/mL	5E-08	1E-07	EPA Method 901.1
Zinc	µg/L	2,500	5,000	Secondary DWS (CFR, 1996b)
Zinc, dissolved	µg/L	2,500	5,000	Secondary DWS (CFR, 1996b)
Zinc, total recoverable	µg/L	2,500	5,000	Secondary DWS (CFR, 1996b)
Zinc-65	µCi/mL	1.5E-07	3E-07	Interim Final DWS (EPA, 1977)
Zirconium-95	µCi/mL	1E-07	2E-07	Interim Final DWS (EPA, 1977)
Zirconium/Niobium-95 ^a	µCi/mL	1E-07	2E-07	Interim Final DWS (EPA, 1977)

^a EMS discontinued monitoring this radionuclide because it is inappropriate for the SRS groundwater monitoring program.

^b EPD/EMS set this flagging criterion using the 1991 proposed DWS because the final DWS in 1977 may have been in error.

^c When radionuclide analyses are combined, the lower DWS of the two isotopes is used for flagging.

^d Will not trigger scheduling.

^e The primary maximum contaminant level range for turbidity is 1-5 NTU, which is inappropriate for the SRS groundwater monitoring program.

Appendix C

Hydrocone Sampling Results

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On April 28, 1997, WSRC submitted a plan for hydrocone sampling to SCDHEC. On May 5, 1997, SCDHEC granted approval number SW97-0018 for the installation of seven hydrocone samples designated ZCP 8, ZCP 9, ZCP 10, ZCP 11, ZCP 12, ZCP 13, and ZCP 14. The hydrocone samples were collected within the shallow aquifer to monitor groundwater quality at the facility. Figure C-1 shows the locations from which the hydrocone samples were taken, and Table C-1 presents the analytical results from this hydrocone sampling.

The nitrate results from the background sample (ZCP 8) are higher than the results from any of the other samples, indicating that the vaults are not affecting groundwater quality for nitrate.

Figure C-1. Location of Hydrocone Samples

Table C-1. Hydrocone Sampling Results

Analyte: Nitrate-Nitrite as Nitrogen

<u>Well name</u>	<u>Result</u>	<u>Sample Date</u>	<u>DF</u>	<u>Mod</u>	<u>ST</u>	<u>H</u>	<u>Flag</u>	<u>Lab</u>	<u>Unit</u>
ZCP 8	2.14	05/13/97	2					GE	mg/L
ZCP 9	1.93	05/13/97	1					GE	mg/L
ZCP 10	1.43	05/13/97	1					GE	mg/L
ZCP 11	1.66	05/14/97	1					GE	mg/L
ZCP 12	0.400	05/14/97	1					GE	mg/L
ZCP 13	1.14	05/14/97	1					GE	mg/L
ZCP 14	1.71	05/14/97	1					GE	mg/L

Note:

All analyses used method EPA353.1.

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