

DEPARTMENT OF ENERGY
SAVANNAH RIVER
OPERATIONS OFFICE
AIKEN, SOUTH CAROLINA
DOE/EIS-0303D

HIGH- LEVEL WASTE **TANK CLOSURE**

Draft Environmental Impact Statement

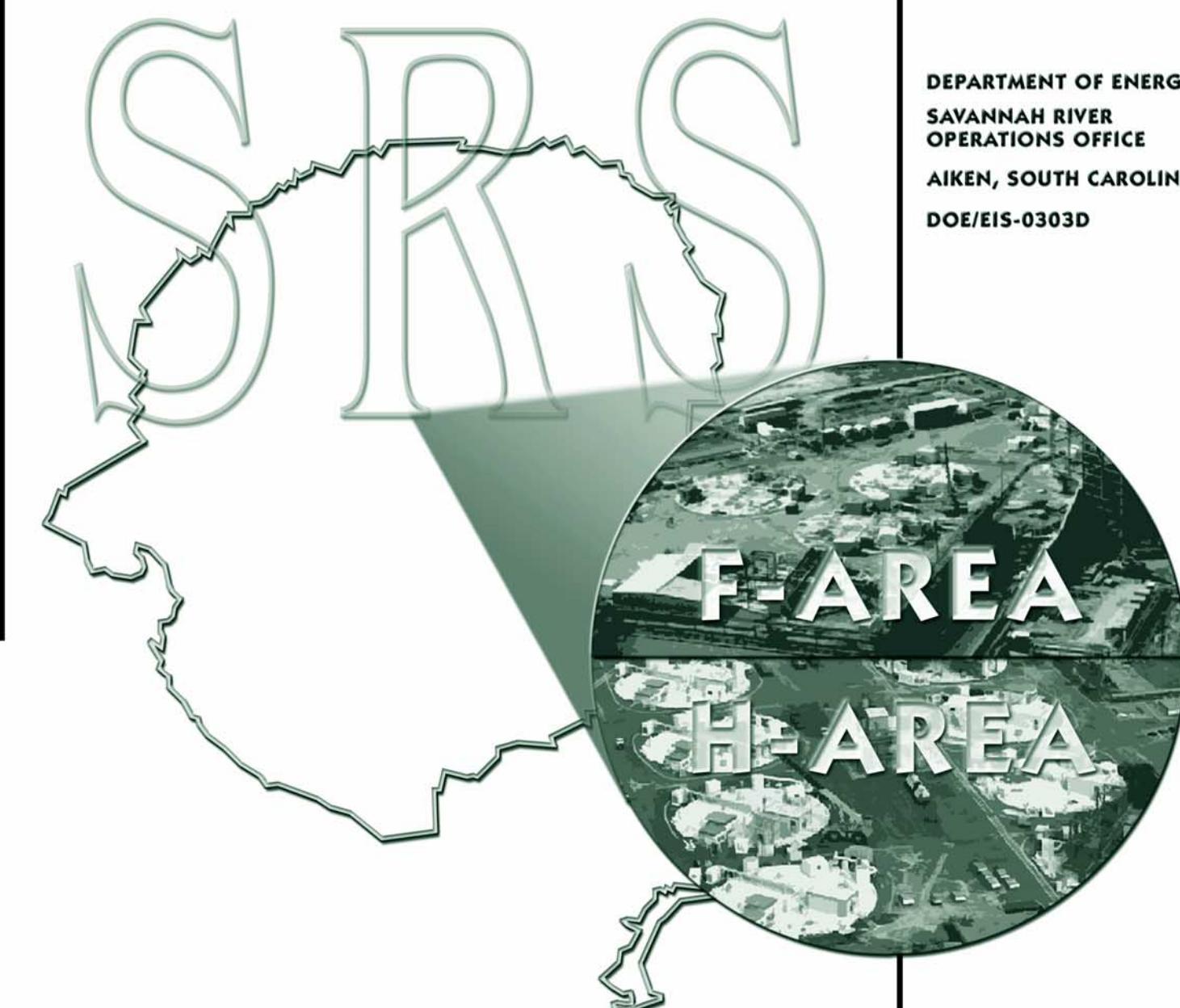
HIGH- LEVEL WASTE
TANK CLOSURE

Draft Environmental
Impact Statement

November 2000

DOE-SR
AIKEN, SC
DOE/EIS-0303D

Savannah River Site



November 2000

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Draft Environmental Impact Statement



DEPARTMENT OF ENERGY
SAVANNAH RIVER
OPERATIONS OFFICE
AIKEN, SOUTH CAROLINA
DOE/EIS-0303D

COVER SHEET

RESPONSIBLE AGENCY: U.S. Department of Energy (DOE)

TITLE: Savannah River Site, High-Level Waste Tank Closure Draft Environmental Impact Statement (DOE/EIS-0303D), Aiken, SC.

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ABSTRACT: DOE proposes to close the high-level waste (HLW) tanks at the Savannah River Site (SRS) in accordance with applicable laws and regulations, DOE Orders, and the *Industrial Wastewater Closure Plan for F- and H-Area High-Level Waste Tank Systems* (approved by the South Carolina Department of Health and Environmental Control), which specifies the management of residuals as waste incidental to reprocessing. The proposed action would begin after bulk waste removal has been completed. This EIS evaluates three alternatives regarding the HLW tanks at the SRS. The three alternatives are the Clean and Stabilize Tanks Alternative, the Clean and Remove Tanks Alternative, and the No Action Alternative. The EIS considers three options for tank stabilization: Fill with Grout (Preferred Alternative); Fill with Sand; and Fill with Saltstone.

Under each alternative (except No Action), DOE would close 49 HLW tanks and associated waste handling equipment including evaporators, pumps, diversion boxes, and transfer lines. Impacts are assessed primarily in the areas of water resources, air resources, public and worker health, waste management, socioeconomic impacts, and cumulative impacts.

PUBLIC INVOLVEMENT: In preparing this Draft EIS, DOE considered comments received by letter and voice mail and formal statements made at public scoping meetings in North Augusta, South Carolina, on January 14, 1999, and in Columbia, South Carolina, on January 19, 1999.

A 45-day comment period on the Draft High-Level Waste Tank Closure EIS begins with the U.S. Environmental Protection Agency's publication of a Notice of Availability in the *Federal Register*. Public meetings to discuss and receive comments on the Draft EIS will be held on December 11, 2000 at the North Augusta Community Center, North Augusta, South Carolina, and on December 12, 2000 at the Adams Mark Hotel, Columbia, South Carolina. Comments may be submitted at the public meeting and by voice mail, e-mail, and regular mail to the first address above. Comments received or postmarked by the end of the comment period will be considered in the preparation of the final EIS. Comments received or postmarked after the close of the comment period will be considered to the extent practicable.

FOREWORD

The U.S. Department of Energy (DOE) published a Notice of Intent to prepare this environmental impact statement (EIS) on December 29, 1998 (63 FR 71628). As described in the Notice of Intent, DOE's proposed action described in this EIS is to close the high-level waste (HLW) tanks at the Savannah River Site (SRS) in accordance with applicable laws and regulations, DOE Orders, and the *Industrial Wastewater Closure Plan for F- and H-Area High-Level Waste Tank Systems* approved by the South Carolina Department of Health and Environmental Control. This closure plan specifies the management of residuals as waste incidental to reprocessing. The proposed action would begin after bulk waste removal has been completed and the tank system is turned over to the tank closure program. This EIS assesses the potential environmental impacts associated with alternatives for closing these tanks, as well as the potential environmental impacts of the residual radioactive and non-radioactive material remaining in the closed HLW tanks.

The Notice of Intent requested public comments and suggestions for DOE to consider in its determination of the scope of the EIS, and announced a public scoping period that ended on February 12, 1999. DOE held scoping meetings in North Augusta, South Carolina, on January 14, 1999, and in Columbia, South Carolina, on January 19, 1999. During the scoping period, individuals, organizations, and government agencies submitted 36 comments that DOE considered applicable to the SRS HLW tank closure program.

Transcripts of public testimony, written comments received, and reference materials cited in the EIS are available for review in the DOE Public Reading Room, University of South Carolina at Aiken, Gregg-Graniteville Library, University Parkway, Aiken, South Carolina.

DOE has prepared this EIS in accordance with the National Environmental Policy Act (NEPA) regulations of the Council on Environmental Quality (40 CFR Parts 1500-1508) and DOE

NEPA Implementing Procedures (10 CFR Part 1021). This EIS identifies the methods used for analyses and the scientific and other sources of information consulted. In addition, it incorporates, directly or by reference, available results of ongoing studies. The organization of the EIS is as follows:

- Chapter 1 provides background information related to SRS HLW tank closures and describes the purpose and need for DOE action regarding HLW tank closure at the SRS.
- Chapter 2 identifies the proposed action and alternatives that DOE is considering for HLW tank closure at the SRS.
- Chapter 3 describes the existing SRS environment as it relates to the alternatives described in Chapter 2.
- Chapter 4 assesses the potential environmental impacts of the alternatives for both the short-term (from the year 2000 through final closure of the existing high-level waste tanks) and long-term (10,000 years post closure) timeframes.
- Chapter 5 discusses the cumulative impacts of HLW tank closure actions in relation to impacts of other past, present, and foreseeable future activities at the SRS.
- Chapter 6 identifies irreversible or irretrievable resource commitments.
- Chapter 7 discusses applicable statutory and regulatory requirements, DOE Orders, and agreements.
- Appendix A provides a description of the SRS HLW Tank Farms and the tank closure process.
- Appendix B provides detailed descriptions of accidents that could occur at SRS during HLW tank closure activities.

- Appendix C provides a detailed description of the fate and transport modeling used to estimate long-term environmental impacts.
- Appendix D describes public comments received during the scoping process and provides DOE responses.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
COVER SHEET	iii
FOREWORD	v
ACRONYMS, ABBREVIATIONS, AND USE OF SCIENTIFIC NOTATION	xv
1 BACKGROUND AND PURPOSE AND NEED FOR ACTION	1-1
1.1 Background	1-1
1.1.1 High-Level Waste Description	1-1
1.1.2 HLW Management at SRS	1-1
1.1.3 Description of the Tank Farms	1-3
1.1.4 HLW Tank Closure.....	1-10
1.1.4.1 Closure Process	1-10
1.1.4.2 Waste Incidental to Reprocessing.....	1-11
1.2 Purpose and Need for Action	1-11
1.3 Decisions to be Based on this EIS	1-11
1.4 EIS Overview.....	1-12
1.4.1 Scope.....	1-12
1.4.2 Organization	1-13
1.4.3 Stakeholder Participation.....	1-13
1.4.4 Related NEPA Documents.....	1-13
References.....	1-16
2 PROPOSED ACTION AND ALTERNATIVES	2-1
2.1 Proposed Action and Alternatives	2-1
2.1.1 Clean and Stabilize Tanks Alternative.....	2-3
2.1.2 Clean and Remove Tanks Alternative	2-6
2.1.3 No Action.....	2-6
2.1.4 Alternatives Considered, but not Analyzed	2-7
2.1.4.1 Management of Tank Residuals as High-Level Waste.....	2-7
2.1.4.2 Other Alternatives Considered, but not Analyzed	2-8
2.2 Other Cleaning Technologies	2-8
2.3 Considerations in the Decision Process	2-8
2.4 Comparison of Environmental Impacts Among Alternatives.....	2-9
2.4.1 Short-Term Impacts	2-10
2.4.2 Long-Term Impacts	2-17
References.....	2-29
3 AFFECTED ENVIRONMENT	3-1
3.1 Geologic Setting and Seismicity	3-1
3.1.1 General Geology	3-1
3.1.2 Local Geology and Soils.....	3-1
3.1.3 Seismicity.....	3-5
3.2 Water Resources	3-7
3.2.1 Surface Water	3-7
3.2.2 Groundwater resources	3-9
3.2.2.1 Groundwater Features	3-9
3.2.2.2 Groundwater Use.....	3-12

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
3.2.2.3 Hydrogeology	3-12
3.2.2.4 Groundwater Quality	3-13
3.3 Air Resources.....	3-13
3.3.1 Meteorology.....	3-13
3.3.1.1 Local Climatology	3-17
3.3.1.2 Severe Weather.....	3-20
3.3.2 Air Quality	3-20
3.3.2.1 Nonradiological Air Quality.....	3-20
3.3.2.2 Radiological Air Quality	3-23
3.4 Ecological Resources	3-26
3.4.1 Natural Communities of the Savannah River Site	3-26
3.4.2 Ecological Communities Potentially Affected by Tank Farm Closure Activities.....	3-29
3.5 Land Use	3-32
3.6 Socioeconomics and Environmental Justice	3-32
3.6.1 Socioeconomics	3-35
3.6.2 Environmental Justice.....	3-36
3.7 Cultural Resources	3-37
3.8 Public and Worker Health.....	3-37
3.8.1 Public Radiological Health	3-37
3.8.2 Public Nonradiological Health.....	3-42
3.8.3 Worker Radiological Health.....	3-42
3.8.4 Worker Nonradiological Health.....	3-42
3.9 Waste and Materials.....	3-43
3.9.1 Waste Management.....	3-43
3.9.1.1 Low-Level Radioactive Waste	3-44
3.9.1.2 Mixed Low-Level Waste	3-44
3.9.1.3 High-Level Waste.....	3-45
3.9.1.4 Sanitary Waste.....	3-49
3.9.1.5 Hazardous Waste	3-49
3.9.1.6 Transuranic and Alpha Waste.....	3-49
3.9.2 Hazardous Materials	3-49
References.....	3-51
4 ENVIRONMENTAL IMPACTS	4-1
4.1 Short-Term Impacts	4-1
4.1.1 Geologic Resources	4-2
4.1.2 Water Resources	4-2
4.1.2.1 Surface Water	4-2
4.1.2.2 Groundwater	4-3
4.1.3 Air Resources.....	4-3
4.1.3.1 Nonradiological Air Quality.....	4-4
4.1.3.2 Radiological Air Quality	4-10
4.1.4 Ecological Resources.....	4-11
4.1.5 Land Use	4-13
4.1.6 Socioeconomic Impacts	4-14
4.1.7 Cultural Resources.....	4-14

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
4.1.8 Worker and Public Health.....	4-15
4.1.8.1 Radiological Health Effects.....	4-15
4.1.8.2 Nonradiological Health Effects	4-18
4.1.8.3 Occupational Health and Safety	4-19
4.1.8.4 Environmental Justice	4-19
4.1.9 Transportation.....	4-22
4.1.10 Waste Generation and Disposal Capacity.....	4-24
4.1.10.1 Liquid Waste	4-24
4.1.10.2 Transuranic Waste	4-26
4.1.10.3 Low-Level Waste	4-26
4.1.10.4 Hazardous Waste	4-26
4.1.10.5 Mixed Low-Level Waste.....	4-26
4.1.10.6 Industrial Waste.....	4-26
4.1.10.7 Sanitary Waste.....	4-26
4.1.11 Utilities and Energy	4-27
4.1.11.1 Water Use	4-27
4.1.11.2 Electricity Use	4-28
4.1.11.3 Steam Use.....	4-28
4.1.11.4 Diesel Fuel Use.....	4-28
4.1.12 Accident Analysis.....	4-28
4.2 Long-Term Impacts	4-30
4.2.1 Geologic Resources	4-30
4.2.2 Water Resources	4-31
4.2.2.1 Surface Water	4-31
4.2.2.2 Groundwater.....	4-33
4.2.3 Ecological Resources	4-40
4.2.3.1 Non-radiological Contaminants.....	4-40
4.2.3.2 Radionuclides	4-41
4.2.4 Land Use.....	4-42
4.2.5 Public Health	4-44
References.....	4-51
5 CUMULATIVE IMPACTS.....	5-1
5.1 Air Resources.....	5-6
5.2 Water Resources	5-8
5.3 Public and Worker Health.....	5-9
5.4 Waste Generation and Disposal Capacity	5-9
5.5 Utilities and Energy	5-11
5.6 Closure – Near-Term Cumulative Impacts	5-12
5.7 Long-Term Cumulative Impacts.....	5-12
References.....	5-16
6 RESOURCE COMMITMENTS	6-1
6.1 Unavoidable Adverse Impacts	6-1
6.2 Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity	6-2
6.3 Irreversible and Irretrievable Resource Commitments	6-3

TABLE OF CONTENTS (Continued)

<u>Section</u>		<u>Page</u>
6.4	Waste Minimization, Pollution Prevention, and Energy Conservation	6-5
6.4.1	Waste Minimization and Pollution Prevention	6-5
6.4.2	Energy Conservation.....	6-5
Reference		6-6
7	APPLICABLE LAWS, REGULATIONS, AND OTHER REQUIREMENTS	7-1
7.1	Closure Methodology.....	7-1
7.1.1	Closure Standards	7-1
7.1.2	Performance Objective	7-3
7.1.3	Incidental Waste	7-5
7.1.4	Environmental Restoration Program.....	7-6
7.2	Statutes and Regulations Requiring Permits or Consultations.....	7-7
7.2.1	Environmental Protection Permits	7-7
7.2.2	Protection of Biological, Historic, and Archaeological Resources.....	7-12
7.3	Statutes and Regulations Related to Emergency Planning, Worker Safety, and Protection of Public Health and the Environment	7-13
7.3.1	Environmental Protection	7-13
7.3.2	Emergency Planning and Response and Public Health	7-14
7.4	Executive Orders.....	7-17
7.5	DOE Regulations and Orders.....	7-18
References.....		7-21

APPENDIX A - TANK FARM DESCRIPTION AND CLOSURE PROCESS

APPENDIX B - ACCIDENT ANALYSIS

APPENDIX C - LONG-TERM CLOSURE MODELING

APPENDIX D - PUBLIC SCOPING SUMMARY

LIST OF PREPARERS	LP-1
CONTRACTOR DISCLOSURE STATEMENT.....	CDS-1
DISTRIBUTION LIST	DL-1
GLOSSARY	GL-1

List of Tables

<u>Table</u>		<u>Page</u>
1-1	Summary of high-level waste tanks.	1-9
2-1	Tank 16 waste removal process and curies removed with each sequential step.	2-3
2-2	Summary comparison of short-term impacts by tank closure alternative.	2-11
2-3	Estimated accident consequences by alternative.	2-18
2-4	Summary comparison of long-term impacts by tank closure alternative	2-20
2-5	Maximum nonradiological groundwater concentrations from contaminant transport from F- and H-Tank Farm, 1-meter well.....	2-25

TABLE OF CONTENTS (Continued)

List of Tables (Continued)

<u>Table</u>		<u>Page</u>
2-6	Maximum nonradiological groundwater concentrations from contaminant transport from F- and H-Tank Farm, 100-meter well.....	2-25
2-7	Maximum nonradiological groundwater concentrations from contaminant transport from F- and H-Tank Farm, seepline.....	2-26
3.1-1	Formations of the Floridan aquifer system in F- and H-Areas.....	3-4
3.2-1	Potential F- and H-Area contributors of contamination to Upper Three Runs and Fourmile Branch.....	3-10
3.2-2	SRS stream water quality (onsite downstream locations)	3-11
3.2-3	E-Area maximum reported groundwater parameters in excess of regulatory and SRS limits.....	3-17
3.2-4	F-Area maximum reported groundwater parameters in excess of regulatory and SRS limits.....	3-18
3.2-5	H-Area maximum reported groundwater parameters in excess of regulatory and SRS limits.....	3-19
3.2-6	S-Area maximum reported groundwater parameters in excess of regulatory and SRS limits.....	3-20
3.2-7	Z-Area maximum reported groundwater parameters in excess of regulatory and SRS limits.....	3-20
3.3-1	Criteria and toxic/hazardous air pollutant emissions from SRS (1997)	3-24
3.3-2	SCDHEC ambient air monitoring data for 1997	3-24
3.3-3	SRS baseline air quality for maximum potential emissions and observed ambient concentrations.....	3-25
3.3-4	Radioactivity in air at the SRS boundary and at a 25-mile radius during 1998 (picocuries per cubic meter)	3-26
3.3-5	1998 Radioactive atmospheric releases by source	3-27
3.6-1	Population projections and percent of region of influence	3-36
3.6-2	General racial characteristics of population in the Savannah River Site region of influence	3-37
3.6-3	General poverty characteristics of population in the Savannah River Site region of interest	3-40
3.8-1	SRS annual individual and collective radiation doses.....	3-43
3.8-2	Potential occupational safety and health hazards and associated exposure limits.....	3-43
3.8-3	Comparison of 1997 rates for SRS construction to general industry construction.....	3-44
3.8-4	Comparison of 1997 rates for SRS operations to private industry and manufacturing....	3-44
3.9-1	Total waste generation forecast for SRS (cubic meters).	3-45
3.9-2	Planned and existing waste storage facilities.	3-46
3.9-3	Planned and existing waste treatment processes and facilities.....	3-47
3.9-4	Planned and existing waste disposal facilities.....	3-48
4.1.3-1	Nonradiological air emissions (tons per year) for tank closure alternatives	4-5
4.1.3-2	Estimated maximum concentrations (in micrograms per cubic meter) at the SRS boundary for SCDHEC Standard 2 Air Pollutants	4-7
4.1.3-3	Estimated maximum concentrations (in micrograms per cubic meter) at the SRS boundary for SCDHEC Standard 8 Toxic Air Pollutants.....	4-8

TABLE OF CONTENTS (Continued)

List of Tables (Continued)

<u>Table</u>	<u>Page</u>
4.1.3-4 Estimated maximum concentrations (in milligrams/cubic meter) of OSHA-regulated nonradiological air pollutants at hypothetical noninvolved worker location.	4-9
4.1.3-5 Annual radionuclide emissions (curies/year) resulting from tank closure activities.....	4-11
4.1.3-6 Annual doses from radiological air emissions from tank closure activities	4-11
4.1.4-1 Peak and attenuated noise (in dBA) levels expected from operation of construction equipment	4-12
4.1.6-1 Estimated HLW tank closure employment.....	4-14
4.1.8-1 Estimated radiological dose and health impacts to the public and noninvolved worker from SRS airborne emissions.	4-17
4.1.8-2 Estimated radiological dose and health impacts to involved workers by alternative.	4-18
4.1.8-3 Estimated Occupational Safety impacts to involved workers by alternative.	4-20
4.1.9-1 Estimated maximum volumes of materials consumed and round trips per tank during tank closure.....	4-23
4.1.9-2 Estimated transportation accidents, fatalities, and injuries during tank closure.....	4-24
4.1.10-1 Maximum annual generation for the HLW tank closure alternatives.....	4-25
4.1.10-2 Total estimated waste generation for the HLW tank closure alternatives	4-25
4.1.11-1 Total estimated utility and energy usage for the HLW tank closure alternatives.....	4-27
4.1.12-1 Estimated accident consequences by alternative.	4-29
4.2.2-1 Maximum concentrations of non-radiological constituents of concern in Upper Three Runs (milligrams/liter).	4-32
4.2.2-2 Maximum concentrations of non-radiological constituents of concern in Fourmile Branch (milligram/liter).	4-32
4.2.2-3 Maximum drinking water dose from radionuclides in surface water (millirem/year)....	4-32
4.2.2-4 Maximum radiological groundwater concentrations from contaminant transport from F-Area Tank Farm.	4-36
4.2.2-5 Maximum radiological groundwater concentrations from contaminant transport from H-Area Tank Farm	4-36
4.2.2-6 Maximum nonradiological groundwater concentrations from contaminant transport from F- and H-Area Tank Farm, 1-meter well	4-37
4.2.2-7 Maximum nonradiological groundwater concentrations from contaminant transport from F- and H-Area Tank Farm, 100-meter well	4-37
4.2.2-8 Maximum nonradiological groundwater concentrations from contaminant transport from F- and H-Area Tank Farm, seepline	4-38
4.2.3-1 Summary of maximum hazard indices for the aquatic assessment by tank closure alternative.	4-42
4.2.3-2 Summary of maximum hazard quotients for the terrestrial assessment by tank closure alternative.	4-43
4.2.3-3 Calculated maximum absorbed radiation dose to aquatic and terrestrial organisms by tank stabilization method (millirad/year)	4-44
4.2.5-1 Radiological results from contaminant transport from F-Area Tank Farm.....	4-48
4.2.5-2 Radiological results from contaminant transport from H-Area Tank Farm	4-49
4.2.5-3 Radiological results to downstream resident from contaminant transport from F- and H-Area Tank Farms.....	4-50

TABLE OF CONTENTS (Continued)

List of Tables (Continued)

<u>Table</u>		<u>Page</u>
5-1	Estimated maximum cumulative ground-level concentrations of nonradiological pollutants (micrograms per cubic meter) at SRS boundary.....	5-7
5-2	Estimated average annual cumulative radiological doses and resulting health effects to the maximally exposed offsite individual and population in the 50-mile radius from airborne releases.	5-8
5-3	Estimated average annual cumulative radiological doses and resulting health effects to offsite population and facility workers.....	5-10
5-4	Estimated cumulative waste generation from SRS concurrent activities (cubic meters). .	5-11
5-5	Estimated average annual cumulative water consumption.....	5-12
5-6	Summary of short-term cumulative effects on resources from HLW tank closure alternatives.....	5-13
6-1	Estimated maximum quantities of materials consumed for each Type III tank closed.....	6-4
6-2	Total estimated utility and energy usage for the HLW tank closure alternatives.....	6-4
7-1	Environmental permits and consultations required by law (if needed).	7-2
7-2	Nonradiological groundwater and surface water performance standards applicable to SRS HLW tank closure.	7-4
7-3	Radiological groundwater and surface water performance standards applicable to SRS HLW tank closure.	7-4
7-4	Comparison of modeling results to performance objectives at the seepline	7-6
7-5	Major state and federal laws and regulations applicable to high-level waste tank system closures.....	7-8
7-6	DOE Orders and Standards relevant to closure of the HLW tank systems.	7-20

List of Figures

<u>Figure</u>		<u>Page</u>
1-1	Savannah River Site map with F- and H-Areas highlighted	1-2
1-2	Process flows for Savannah River Site High-Level Waste Management System.....	1-4
1-3	General layout of F-Area Tank Farm.....	1-5
1-4	General layout of H-Area Tank Farm	1-6
1-5	Tank configuration.....	1-8
2.1-1	Typical layers of the fill with grout option.	2-5
3.1-1	Generalized location of Savannah River Site and its relationship to physiographic provinces of southeastern United States.....	3-2
3.1-2	Generalized geologic and aquifer units in SRS region.	3-3
3.1-3	Savannah River Site, showing seismic fault lines and locations of onsite earthquakes and their year of occurrence.....	3-6
3.2-1	Savannah River Site, showing 100-year floodplain and major stream systems.....	3-8
3.2-2	Calibrated potentiometric surface (ft) for the Water Table Aquifer.	3-14
3.2-3	Calibrated potentiometric surface (ft) for the Barnwell-McBean aquifer.....	3-15
3.2-4	Calibrated potentiometric surface (ft) for the Congaree aquifer.	3-16

TABLE OF CONTENTS (Continued)

List of Figures (Continued)

<u>Figure</u>		<u>Page</u>
3.2-5	Maximum reported groundwater contamination in excess of regulatory/DOE limits at Savannah River Site.....	3-21
3.5-1	F-Area Tank Farm (view toward the north, with 21 of the 22 F-Area liquid high-level waste tanks).....	3-33
3.5-2	H-Area Tank Farm (view toward the south, with 11 of the 29 H-Area liquid high-level waste tanks).....	3-34
3.6-1	Distribution of minority population by census tracts in the SRS region of analysis.....	3-38
3.6-2	Low income census tracts in the SRS region of analysis	3-39
3.8-1	Major sources of radiation exposure in the vicinity of the Savannah River Site.	3-41
4.2.2-1	Predicted Drinking Water Dose Over Time at the H-Area Seepline North of the Groundwater Divide in the Barnwell-McBean and Water Table Aquifers.....	4-38
4.2.4-1	Savannah River Site land use zones.....	4-45

ACRONYMS, ABBREVIATIONS, AND USE OF SCIENTIFIC NOTATION

Acronyms

AAQS	ambient air quality standard
AEA	Atomic Energy Act of 1954
ALARA	as low as reasonably achievable
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CLSM	controlled low-strength material
CO	carbon monoxide
D&D	decontamination and decommissioning
DBE	design basis event
DOE	U.S. Department of Energy
DWPF	Defense Waste Processing Facility
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FR	Federal Register
HEPA	high-efficiency particulate air (filter)
HLW	high-level waste
IMNM	Interim Management of Nuclear Material
INEEL	Idaho National Engineering and Environmental Laboratory
ISO	International Organization for Standardization
LCF	latent cancer fatality
LEU	low enriched uranium
LWC	lost workday cases
MCL	maximum contaminant level

MEI	maximally exposed (offsite) individual
NAAQS	National Ambient Air Quality Standards
NAS	National Academy of Sciences
NCRP	National Council on Radiation Protection and Measurements
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO _x	nitrogen oxides
NRC	U.S. Nuclear Regulatory Commission
O ₃	ozone
OSHA	Occupational Safety and Health Administration
PM10	particulate matter less than 10 microns in diameter
PSD	Prevention of Significant Deterioration
ROD	Record of Decision
ROI	Region of Influence
SCDHEC	South Carolina Department of Health and Environmental Control
SO ₂	sulfur dioxide
SRS	Savannah River Site
TRC	total recordable cases
TSP	total suspended particulates
WSRC	Westinghouse Savannah River Company

Abbreviations for Measurements

cfm	cubic feet per minute
cfs	cubic feet per second = 448.8 gallons per minute = 0.02832 cubic meter per second
cm	centimeter
gpm	gallons per minute
kg	kilogram
L	liter = 0.2642 gallon
lb	pound = 0.4536 kilogram
mg	milligram
μ Ci	microcurie
μ g	microgram
pCi	picocurie
$^{\circ}$ C	degrees Celsius = $5/9$ (degrees Fahrenheit – 32)
$^{\circ}$ F	degrees Fahrenheit = $32 + 9/5$ (degrees Celsius)

Use of Scientific Notation

Very small and very large numbers are sometimes written using “scientific notation” or “E-notation” rather than as decimals or fractions. Both types of notation use exponents to indicate the power of 10 as a multiplier (i.e., 10^n , or the number 10 multiplied by itself “n” times; 10^{-n} , or the reciprocal of the number 10 multiplied by itself “n” times).

For example: $10^3 = 10 \times 10 \times 10 = 1,000$

$$10^{-3} = \frac{1}{10 \times 10 \times 10} = 0.001$$

In scientific notation, large numbers are written as a decimal between 1 and 10 multiplied by the appropriate power of 10:

4,900 is written $4.9 \times 10^3 = 4.9 \times 10 \times 10 \times 10 = 4.9 \times 1,000 = 4,900$

0.049 is written 4.9×10^{-2}

1,490,000 or 1.49 million is written 1.49×10^6

A positive exponent indicates a number larger than or equal to one; a negative exponent indicates a number less than one.

In some cases, a slightly different notation (“E-notation”) is used, where “ $\times 10$ ” is replaced by “E” and the exponent is not superscripted. Using the above examples

$$4,900 = 4.9 \times 10^3 = 4.9E+03$$

$$0.049 = 4.9 \times 10^{-2} = 4.9E-02$$

$$1,490,000 = 1.49 \times 10^6 = 1.49E+06$$

Metric Conversion Chart

To convert into metric			To convert out of metric		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
sq. inches	6.4516	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.092903	sq. meters	sq. meters	10.7639	sq. feet
sq. yards	0.8361	sq. meters	sq. meters	1.196	sq. yards
acres	0.0040469	sq. kilometers	sq. kilometers	247.1	acres
sq. miles	2.58999	sq. kilometers	sq. kilometers	0.3861	sq. miles
Volume					
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.4536	kilograms	kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

Metric Prefixes

Prefix	Symbol	Multiplication Factor
exa-	E	$1\ 000\ 000\ 000\ 000\ 000\ 000 = 10^{18}$
peta-	P	$1\ 000\ 000\ 000\ 000\ 000 = 10^{15}$
tera-	T	$1\ 000\ 000\ 000\ 000 = 10^{12}$
giga-	G	$1\ 000\ 000\ 000 = 10^9$
mega-	M	$1\ 000\ 000 = 10^6$
kilo-	k	$1\ 000 = 10^3$
centi-	c	$0.01 = 10^{-2}$
milli	m	$0.001 = 10^{-3}$
micro-	μ	$0.000\ 001 = 10^{-6}$
nano-	n	$0.000\ 000\ 001 = 10^{-9}$
pico-	p	$0.000\ 000\ 000\ 001 = 10^{-12}$
femto-	f	$0.000\ 000\ 000\ 000\ 001 = 10^{-15}$
atto-	a	$0.000\ 000\ 000\ 000\ 000\ 001 = 10^{-18}$