

Environmental Requirements and Program Documents	Manual:	3Q1
	Procedure:	101
	Revision:	3
Environmental Monitoring Program Management Plan	Effective Date:	03/15/13
	Category:	Admin-Info
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Revision Log

Pages Affected	Description of Revision
All	Procedure was revised to roll up two recent Immediate Procedure Changes (IPC-1 and IPC-2) and as a result of an Annual Program Review
25	Section 5.8 , Modified and clarified the first sentence for DOE O 458.1 compliance. Removed conversion factors or and added “(1) standard EPA or DOE analytical models prescribed in statutes or regulations applicable to DOE sites, and (2) EPA or DOE approved dose coefficients”
29	Table 8.1 , removed TB-3 sample location
45	Table 8.7 , changed Frequency from “Quarterly” to “Annual” on K Disassembly Basin
51	Table 8.8 , added the following note at the end of the page: “Samples are provided to SRS by municipal water treatment plants”
61	Table 8.13 , removed West Jackson and Windsor Road locations
62	Table 8.14 , changed Frequency from “Monthly” to “Quarterly” for River Channel Markers 42 and 78
65	Table 8.17 , added the parenthetical statement “(backup to Lower Three Runs 2)” immediately after “Lower Three Runs 1-A”

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1.0 PURPOSE [S/RID 1, 2, 3, 4, 5]

This Environmental Monitoring (EM) Program Management Plan documents the rationale, objectives, and activities associated with the routine monitoring and surveillance program at the Savannah River Site (SRS). The SRS EM Program serves two main purposes:

- Shows compliance with applicable federal, state, and local regulations, as well as with the U.S. Department of Energy (DOE) orders
- Monitors any effects of SRS operations on the environment, both on and off site.

2.0 SCOPE

In February 2011 DOE Order 458.1, *Radiation Protection of the Public and the Environment*, replaced the previous DOE Order 5400.5 (of the same title). The main objectives of the Order are: (1) to develop and implement an Environmental Radiological Protection Plan; (2) to conduct DOE radiological activities so that exposure is maintained within established dose limits; (3) to control the release and clearance of DOE real, personal and residual property with proper controls; (4) to ensure that potential exposures to the public are As Low As Reasonably Achievable (ALARA); (5) to ensure that DOE sites have the capabilities to monitor radiological releases and to assess the dose to members of the public; and (6) to provide protection of the environment from the effects of radiation and radioactive material. Under the Environmental Radiological Protection Plan radiological monitoring is integrated with environmental effluent surveillance using a graded approach.

Revisions of the SRS EM Program are reviewed by annually Department of Energy-Savannah River (DOE–SR) Operations Office but do not receive formal concurrence.

3.0 DEFINITIONS AND ABBREVIATIONS

A list of terms, definitions, and abbreviations associated with this procedure can be found in Manual 3Q1, *Glossary*. Other pertinent terms and abbreviations are expanded within the text.

4.0 RESPONSIBILITIES

4.1 Environmental Compliance and Area Completion Projects (EC&ACP)

The EC&ACP Group has overall responsibility for executing all requirements in this program management plan. EC&ACP is further responsible for anticipating, planning, and providing exemplary environmental management services that support the needs of the SRS.

EC&ACP support includes the following:

- Working with community stakeholders and regulatory agencies to proactively identify potential issues and compliant solutions
 - Providing technical expertise to support satisfaction of regulatory requirements and compliance milestones
 - Developing and executing a site-wide regulatory integration process that meets the needs of regulators and stakeholders
-

4.1 Environmental Compliance and Area Completion Projects (EC&ACP), (cont.)

- Executing effective permitting strategies that provide operational flexibility while ensuring environmental stewardship
- Using historic surveillance and monitoring data to make critical environmental decisions
- Maintaining an industry recognized staff that actively supports the requests of DOE, the U.S. Environmental Protection Agency (EPA), South Carolina Department of Health and Environmental Control (SCDHEC), and the public

EC&ACP provides the following Environmental Monitoring and Compliance Services:

- Environmental Monitoring Program
- Environmental Data Integration
- Groundwater Monitoring
- SRS Policy & Site Strategy for SCDHEC Permit and EPA Closure Actions
- National Environmental Policy Act Analysis & Documentation
- Environmental Data Collection & Reporting

4.1.1 Environmental Compliance (EC)

The EC function of EC&ACP has primary responsibility for coordinating and providing environmental support and compliance-based oversight of SRS operations to ensure that site activities are conducted in accordance with all applicable state and federal environmental regulations, as well as DOE Directives and Orders, in a manner that will have minimal impact on workers, the public, and the environment.

EC has a team of highly qualified environmental professionals, including Environmental Compliance Authorities (ECAs), available for support. Value-added environmental solutions include:

- Providing subject matter expertise to support environmental monitoring compliance in the areas of air emissions, liquid effluent, and storm water and drinking water surveillance and monitoring
 - Assigning a representative to support completion of the assigned areas of the Annual Environmental Report
 - Assigning a representative to the Environmental ALARA Committee to assist site organizations in complying with federal and state regulations, DOE Orders, and SRS management policies governing site operations involving contaminant releases to the environment
 - Providing assistance to ensure that site contaminant releases are monitored using equipment, sampling regimes, and analytical methods consistent with applicable regulatory permits
-

4.1.1 Environmental Compliance (EC), (cont.)

- Facility and construction oriented environmental compliance experts to support seamless operations
- Industry-recognized staff to satisfy regulatory/permit requirements and operational compliance milestones
- Effective, schedule-compliant permitting strategies that provide operational flexibility and ensure environmental stewardship
- Strong, working relationships with regulatory agencies (SCDHEC, EPA) and community stakeholders
- Detailed, historic knowledge of the SRS operational experience and environmental conditions
- Established surveillance and monitoring program to support critical environmental decisions.

4.1.2 Environmental Compliance Authority (ECA)

The ECA is responsible for:

- Having a working knowledge of their facility operations and processes
 - Providing direct, day-to-day, environmental support to the management of line organization facilities and/or projects
 - Having a working knowledge of the environmental regulations applicable to their facility(s)/project(s)
 - Assisting their organization to ensure compliance with all applicable federal, state and local environmental regulations, DOE Orders, and environmental procedures
 - Identifying, interpreting, and implementing environmental compliance requirements as applicable to their facility(s)/project(s)
 - Ensuring timely submittal of environmental regulatory documentation and permit applications
 - Communicating with other facilities/projects on environmental-related issues, as applicable
 - Recommending work or processes be stopped immediately upon observance of an actual or imminent hazard to the environment. Such action must be taken by contacting the facility management having immediate jurisdiction over the work/process
 - Identifying environmental protection improvement opportunities and supporting environmental program assessments
 - Developing the necessary environmental compliance programs and strategies for their facility(s) in conjunction with other EC&ACP staff, as appropriate.
-

4.1.3 Sample Data Management (SDM)

The SDM group of EC&ACP is primarily responsible for:

- Characterizing and defining trends in the physical, chemical, and biological environs
- Supporting facilities in the identification and quantification of new or existing environmental problems
- Assessing actual or potential contaminant exposures to critical groups and populations
- Conducting studies aimed at improving knowledge of the transfer of contaminants in the environment
- Designing and overseeing programs for sampling and analysis of environmental media
- Providing assistance to ensure that site contaminant releases are monitored using equipment, sampling regimes, and analytical methods consistent with applicable DOE, EPA, SCDHEC permits, Environmental Radiation Protection Program (ERPP) requirements, and referenced national standards. Ownership responsibility for all, active and passive, air effluent monitoring systems remains with Facility Operations/Line Management
- Ensuring, when notified that facility changes affecting contaminant releases are made, that appropriate changes are made to the ERPP
- Identifying monitoring, sampling, and analytical equipment deficiencies; and ensuring proper maintenance, repair, and calibration of the effluent monitoring and analytical equipment used by SDM
- Assigning a representative to the Environmental ALARA Committee to serve as the committee chairperson and ensuring that the committee's administrative requirements are met
- Issuing Monthly Radioactive Releases Reports that define each site operation's progress toward meeting its Environmental ALARA guide and remaining below DOE's Derived Concentration Technical Standards (DCS)
- Producing annual reports on monitored radiological effluents for the Effluent Information System/Onsite Discharge Information System (EIS/ODIS)
- Completing the annual review of the environmental monitoring program
- Producing annual reports on the status of environmental conditions on and around the site, and on yearly and cumulative contaminant releases at the site (i.e., Annual Site Environmental Report).

Other reports that utilize EM program include, but are not limited to, Weekly Enhanced Tritium Monitoring Report, Monthly Discharge Monitoring Reports required by the site NPDES permit, Quarterly Tritium Inventory Report, Water Treatment Plant Analysis Results Report, and various compliance reports as specified in DOE Order 458.1.

4.2 SRS Personnel

SRS personnel are responsible for:

- Actively supporting environmental protection policies
- Complying with environmental policies, regulations, procedures of this manual, applicable field organization manuals, and applicable work packages
- Ensuring work activities are conducted in accordance with approved training as practices supporting protection of the environment are incorporated
- Contacting their immediate supervisor, or ECA, on matters involving environmental compliance, including spills and unplanned releases
- Properly using and maintaining environmental protection and monitoring equipment.

5.0 REQUIREMENTS

5.1 General Requirements and Objectives of the SRS EM Program

The general requirements and objectives of the SRS EM Program are listed below.

- To assess actual or potential exposures to the public, critical groups and populations from the presence of radioactive and non-radioactive materials from normal site operations or from accidents
 - To demonstrate compliance with authorized limits and regulatory requirements
 - To verify the adequacy of facility containment of radioactivity and the effectiveness of effluent control
 - To notify proper officials of unusual or unforeseen conditions and, where appropriate, to activate a special environmental monitoring program
 - To communicate accurately and effectively the monitoring program's results to DOE, to other government agencies, and to the general public
 - To maintain a continuous record of the effects of SRS operations on the environment
 - To determine concentrations of radioactive and non-radioactive contaminants in environmental media for the purpose of assessing immediate and long-term consequences of normal operations and accidental releases
 - To distinguish between contributions from environmental contamination and the environmental effects of SRS operations and contributions from other sources
 - To evaluate and revise the SRS EM Program in response to changing conditions in transfer pathways and to the site's changing mission
 - To provide site-specific data for risk assessment and uncertainty analyses for human populations in the SRS vicinity and to determine the effectiveness of models in predicting the concentration of pollutants in the environment
 - To conduct scientific studies to identify radioactive and non-radioactive contaminants and their transfer pathways in the environment.
-

5.1.1 The Critical Radionuclide and Pathway Analysis for the Savannah River

The Critical Radionuclide and Pathway Analysis for the Savannah River (SRNL-STI-2011-00503) documents radiological releases through the performance of public radiation dose and risk assessments. The major steps in performing the aforementioned public radiation dose and risk assessments are as follows:

- Characterization and quantification of source terms
- Calculation of atmospheric and surface water transport (dispersion/dilution)
- Characterization and quantification of environmental pathway transport to humans (exposure pathways)
- Calculation of radiation dose and subsequent potential risk.

5.1.2 Site-specific Environmental Monitoring Criteria

Site-specific environmental monitoring criteria uses the Critical Radionuclide and Pathway Analysis as a basis for establishing and ensuring that representative measurements of quantities and concentrations of radiological contaminants are conducted and that the effects from DOE radiological activities on members of the public and the environment are monitored sufficiently to demonstrate compliance with DOE Order 458.1.

5.1.3 Monitoring of Non-Radioactive Constituents

Non-radioactive constituents in SRS liquid discharges are regulated by SCDHEC under the National Pollutant Discharge Elimination System program. The monitoring requirements vary from one outfall to another, depending on the type of facility (i.e., the types of materials that potentially are present) and on the known characteristics of the wastewater.

Monitoring of non-radioactive constituents in SRS atmospheric releases is designed to determine compliance with permits issued by SCDHEC under the National Emission Standards for Hazardous Air Pollutants.

In order to implement these objectives, the EM Program is divided into two categories:

Effluent Monitoring Objectives

- Determine compliance with federal state, and local regulations, DOE Orders, and commitments made in environmental impact statements and environmental assessments
 - Identify potential environmental problems and evaluate the need and/or effectiveness of effluent treatment and control practices
 - Provide support for permitting and compliance activities
 - Detect, characterize, quantify, and report unplanned releases.
-

5.1.3 Monitoring of Non-Radioactive Constituents, (cont.)

Surveillance Monitoring Objectives

- Verify compliance with DOE Orders, environmental commitments made by the site in environmental impact statements, environmental assessments, and other documents
- Characterize and define trends in the physical, chemical, and biological environs
- Establish baselines of environmental quality
- Continually assess pollution abatement and effluent control programs and the adequacy of plant operation or containment
- Identify and quantify new or existing environmental problems
- Verify or refine the predictions of environmental models
- Assess actual or potential contaminant exposures to the public, critical groups, and populations, and the environment
- Conduct studies aimed at improving knowledge of the transfer of contaminants in the environment.

5.2 Effluent Monitoring

Effluent monitoring is categorized in two categories in the EM Program, Liquid and Airborne. In general, the liquid effluent monitoring program is designed to directly monitor effluents and/or to collect and analyze samples from all site process outfalls that have the potential to release contaminants. The monitoring of airborne effluents is necessary because the atmosphere is a primary transport medium through which both site workers and individuals of the population surrounding SRS can be exposed to contaminants generated by SRS operations.

DCSs are quantities used in the design and conduct of environmental radiological protection programs at DOE facilities and sites. These quantities provide reference values to control effluent releases from DOE facilities and are used in implementing the ALARA process for the SRS environmental monitoring programs. These quantities represent the concentration of a given radionuclide in either water or air that results in a member of the public receiving one millisievert (mSv) (100 millirem (mrem)) effective dose following continuous exposure for one year for each of the following pathways: ingestion of water, submersion in air, and inhalation.

DCSs are provided to address the need to conduct Best Available Technology (BAT) analyses and to aid in performing dose estimates. The ALARA provisions are applicable to all liquid discharges containing radioactive material derived from DOE operations, including those that are less than the DCS values and meet BAT requirements. Radioactive waste streams that otherwise would contain radionuclide concentrations of more than the DCS reference values at the point of discharge to a surface waterway are required to implement BAT treatment to further reduce concentration. BAT treatment also may be required for waste streams with concentrations of radionuclides that are less than the DCSs, if the waste streams do not conform to other specific requirements.

5.2. Effluent Monitoring, (cont.)

BAT applies at the discharge point if:

- The average concentration of a given radionuclide is greater than the DOE-approved Derived Concentration Guide (DCG) value for water, or for multiple radionuclides, the composite DCG must be the sum of the fractional DCG values derived from DOE-approved DCG values
- The discharge contributes greater than 10 mrem annual TED to members of the public
- The collective dose from all DOE sources is greater than 100 person rem and the liquid discharge contributes 50 percent or more of this collective dose

Tritium and sanitary sewers are excluded from BAT at the point of discharge under the previously stated conditions. Tritium in liquid effluents is specifically excluded from BAT requirements, but not from the ALARA process. Discharges of waste water containing radioactivity into SRS sanitary sewer systems are controlled in accordance with Manual 3Q, Procedure 2.18, *Treatment of Non-Routinely Generated (Scavenger) Waste Water*. DCS values also are provided for airborne radionuclides, but there are no specific DOE Order requirements for their use. However, as part of the SRS Environmental ALARA Program, the airborne DCS values (except for tritium) are trended in a similar manner to the liquid DCS values.

5.2.1 Liquid Effluent Monitoring

A liquid effluent monitoring/sampling program must collect a representative sample so the results properly and accurately characterize the chemical and radiological emissions. Liquid effluent monitoring systems, both radiological and non-radiological, provide representative measurements of the streams being monitored.

To ensure such measurements, the effluent monitoring systems utilized at an emission point:

- Reflect the specific type and levels of contaminants present
 - Collect data at appropriate frequencies
 - Incorporate quality assurance measures at the collection and analysis phases.
-

5.2.1 Liquid Effluent Monitoring, (cont.)

Representative measurements provide acceptable data for meeting the following liquid effluent monitoring program objectives:

- Verify compliance with applicable federal, state, and local effluent regulations as well with DOE orders
- Determine compliance with commitments made in Environmental Impact Statements Environmental Assessments, or other official documents
- Evaluate effectiveness of effluent treatment
- Identify potential environmental problems and evaluate the need for remedial actions or mitigation measures
- Support permit revision and/or reissuing
- Detect, characterize, and report unplanned releases
- Provide data to ensure that radiological liquid releases remain ALARA.

SRS will conduct activities so that liquid releases of radioactive materials from the activities shall be treated by the BAT if any of the following conditions exist:

- The surface waters otherwise would contain, at the point of discharge to surface waters and prior to blending, an annual average concentration of a given radionuclide that is greater than the DCS value. For multiple radionuclides, the composite DCS must be the sum of the fractional DCS values.
- The total effective dose (TED) to the public would otherwise exceed 10 mrem (0.1 mSv), with the liquid discharge contributing a significant portion of that dose.

Notification of Planned Release

Planned and unplanned liquid releases will be characterized consistent with the potential for on- and off-site impacts. The SRS EM Program will initiate notification of proper officials of unusual or unforeseen conditions and, where appropriate, will activate special environmental monitoring programs. Notification may be based on monitoring data from Liquid Effluent and/or Enhanced Tritium Monitoring programs or notification from Facility Operations/Line Management as required by the Radiological Effluent Monitoring, Reporting, and Environmental ALARA Process. In the event of an unplanned release, a formal Courtesy Notification would be initiated through the SRS emergency response process and Sample Data Management would be contacted through this process.

5.2.1 Liquid Effluent Monitoring, (cont.)

Sanitary Sewers

NOTE

1. The discharge of liquid wastes from an SRS activity into a chemical or sanitary sewerage system owned by the U.S. Government is not subject to requirements stated above, if the system provides treatment according to an approved interim strategy prior to discharge of liquid wastes to surface waters, and if sludge from the system is disposed of according to all applicable federal regulations.
2. Liquid radiological effluent monitoring systems are based on the characterization of the source(s), pollutant(s), sample system(s), treatment system(s), and release points(s).
3. The details of this monitoring and collection are shown in Table 8.1, *Liquid Effluent Monitoring*.

An SRS activity shall be conducted in a manner such that the concentration of radionuclides in liquid wastes discharged from the activity into sanitary sewerage shall:

- Be treated by the BAT to reduce the concentration level to less than five times the DCS values listed in the *Derived Concentration Standards for the SRS Environmental ALARA Program* (Document # SRNL-L4310-2012-00007), if the average monthly level otherwise would be greater than five times the DCS values at the point of discharge into the sanitary sewer
- Not result in an annual discharge (above background) into public sewers in excess of five Ci (185 GBq) of tritium; 1 Ci (37 GBq) of C-14; or 1 Ci (37 GBq) of all other radionuclides
- Be evaluated through pathway analyses or environmental surveillance to verify that the total annual discharge of radioactive material to the sanitary sewer system will not cause members of the public to receive incremental doses of more than two mrem per year from that source.

SRS monitors non-radioactive releases to surface waters as required by the site's two National Pollutant Discharge Elimination System (NPDES) Permits, which are administered by SCDHEC under EPA authority. The program is designed to protect surface waters by limiting releases of non-radiological contaminants into streams, reservoirs, and wetlands by requiring the physical properties and concentrations of chemicals in SRS effluents meet specific requirements before being released to the environment.

The permits provide specific requirements for sampling locations, parameters to be tested, and monitoring frequency, as well as analytical, reporting, and collection methods. The EM Program NPDES monitoring locations and parameters are identified in Table 8.2, *NPDES Permit Monitoring*.

5.2.1 Liquid Effluent Monitoring, (cont.)

NOTE

Soil Column Exemption

1. Soil columns are prohibited at SRS in accordance with DOE Order 458.1. A soil column is defined as an in-situ volume of soil through which liquid waste streams percolate from ponds, cribs, trenches, drain fields, or other areas or facilities used for the primary purpose of removing or retaining the suspended or dissolved radionuclides contained within the liquid process waste stream.

The following interpretation, rendered by DOE Headquarters in Washington, D.C. (DOE-HQ) addressing construction modifications to convert Engineered Storm Surge Basins to Retention/Settling Basins, does not constitute the creation of a soil column.

2. Engineered storm surge basins at SRS collect storm water and storm water runoff. Storm water streams may contain small concentrations of radionuclides, as a result of contact with legacy contaminated areas of facilities and atmospheric washout. SRS retention/settling basins retard the flow of non-radioactive process water, to allow particulates to settle out and potentially retain non-radioactive metals. For example, basins may collect discharges of both types:
 - Non-contact cooling water, chiller steam condensate, and Air Handling Unit atmospheric and steam condensate, etc. All of these industrial streams may contain metals, but no radioactivity.
 - Storm water and storm water runoff. Most will contain extremely low, but measurable concentrations of radioactivity.
3. Accordingly, SRS has received an interpretation and concurrence from DOE-HQ that retention/settling basins meeting the following criteria are not considered soil columns:
 - The industrial process stream discharges continuously and does not contain any radioactive constituents.
 - Any retention effect is for settling of non-radioactive metals and solids.
 - Storm water runoff influent, that sporadically contains low quantities of radionuclides, is intermittent due to rainfall and acts of nature and not the result of operational processes.
 - Monitoring for radiological solids and sediments will be conducted.
 - Protocols to mitigate radioactive sediment buildup will be established, if necessary.

5.2.1 Liquid Effluent Monitoring, (cont.)

A subset of the NPDES monitoring program is the storm water program. Outfalls which can receive runoff from areas with industrial activity are subject to compliance requirements as outlined in the storm water general permits. Any storm water runoff with the potential to contain radionuclides from DOE activities will be evaluated as a possible pathway of exposure for on and offsite impacts using a graded approach. Retention basin releases with storm water components and potential for radionuclide impacts are monitored through the Liquid Effluent Monitoring program as identified in Table 8.1. An evaluation of possible changes in storm water runoff contribution and proposed monitoring revisions will be included in the Annual Program Review.

The EM Program storm water monitoring locations and parameters are identified in Table 8.3, *Storm Water Monitoring*. Storm water monitoring locations and parameters are reviewed annually for applicability for the upcoming year.

5.2.2 Airborne Effluent Monitoring

Responsibilities for airborne monitoring cross many organizational lines at SRS. Each facility manager is responsible for facility emissions. A variety of methods including, but not limited to, monitoring data, operational information, engineering evaluations, and standard calculations are utilized to develop the annual site Air Emissions Inventory (AEI) for chemical, non-radionuclide emissions. The data in the AEI files are used to demonstrate site compliance with emissions standards, to complete the SRS Title V permit application, and to determine future monitoring needs.

In accordance with WSRC-IM-2002-00014, *SRS Air Emissions Monitoring Graded Approach*, all new airborne radioactive sources and modifications to airborne radioactive sources must be evaluated by 40 CFR 61 Appendix D calculation or an approved alternative calculation to determine the potential to emit and monitoring criteria for each source.

The SDM group of EC&ACP supports the site airborne radioactive effluent program through the collection of filter paper and other media and also through management of analytical data to provide representative samples/analyses for the stacks and emission points identified in Table 8.4, *Airborne Effluent Monitoring*. Some airborne radioactive sources (not included in the table) with a lower potential for release, in lieu of monitoring, may have an annual administrative review of the facility to confirm absence of radioactive materials in forms and quantities not conforming to prescribed specifications and/or limits. The annual review includes estimating emissions based on the 40 CFR 61 Appendix D calculation or an approved alternative calculation.

5.3 Surveillance Monitoring

The environmental surveillance program conducted at SRS is designed to survey and quantify any effects that routine and non-routine onsite operations may have on the site, the surrounding area, or people living in the vicinity of SRS (the onsite and offsite environment). The program is conducted to meet the following criteria:

- Verify compliance with DOE Orders, environmental commitments made by the site in environmental impact statements, environmental assessments, and other documents
- Characterize and define trends in the physical, chemical, and biological environs
- Establish environmental baselines of environmental quality
- Continually assess pollution abatement programs
- Identify and quantify new or existing environmental problems.

To accomplish these goals, the program monitors both radioactive and non-radioactive constituents in a wide range of environmental media, including atmosphere, surface water, groundwater, drinking water, food products, wildlife, soil, sediment, vegetation, and biota. The program monitors gamma radiation through the use of Thermoluminescent Dosimeters (TLDs). In addition, the program includes two special monitoring programs developed for site-specific purposes: Enhanced Tritium Monitoring and the Steel Creek Plantation survey. Details of each of the program elements are discussed below.

5.3.1 Atmospheric Surveillance

The atmospheric surveillance program is divided into two main program areas:

- Air
- Rainwater

The goal of this program is to quantify the amount of radioactivity in the atmosphere resulting from routine and non-routine SRS releases. Air sampling is conducted biweekly at 15 sites located on and off site. Sampling of rain for tritium also is conducted at all locations, while sampling of rain for other radionuclides is conducted monthly at a subset of these sites comprising seven locations. The atmospheric surveillance stations are placed in the center of the site, in a ring around the site on the site perimeter, at a regional reference location assumed to be uninfluenced by site operations at approximately 25 miles, and in population centers at 25 and 100 miles. Placement on the site boundary was designed to ensure that at least one monitoring station is located in every 45-degree sector. These locations are identified in Table 8.5, *Atmospheric Surveillance*.

5.3.2 Surface Water Surveillance

The surface water surveillance program monitors onsite streams, basins, and the Savannah River. The objective of the surface water surveillance program is to work with the effluent monitoring program to:

- Determine compliance with all applicable environmental quality standards and public exposure limits
- Establish background levels and quantify site contributions of radioactive materials in the environment
- Verify the effectiveness of effluent treatment and controls in reducing effluents
- Accumulate trending information on the buildup and migration of radioactive materials in the environment
- Detect and quantify unplanned releases.

Tritium is introduced into SRS streams and the Savannah River from historical production areas on site. As part of Surface Water Surveillance and effluent monitoring, total direct tritium releases, including releases from facility effluent discharges and measured shallow groundwater migration of tritium from inactive waste units and Solid Waste Disposal Facility migration are estimated quarterly in the Quarterly Tritium Inventory Report and annually in the Site Environmental Report. Tritium transport in SRS streams is measured at the last sampling point before entry into the Savannah River (stream transport). Tritium transport in the Savannah River is measured downriver of SRS (near River Mile 118.8) after subtraction of any measured contribution above the site (river transport). Tritium transport and river transport are also reported in the Quarterly Tritium Inventory Report and annually in the Site Environmental Report.

Routine tritium monitoring includes weekly reporting of tritium concentration levels in the streams and river to the downstream water consumers, SC-DHEC, Southern Nuclear, DOE-SR and SRS management. For the Enhanced Tritium Monitoring (ETM) and River Monitoring Programs, the notification list is updated at the biannual Radiological Environmental Monitoring Programs meeting. Additional information on the ETM Program can be found in section 5.3.12 below.

Migration of the actinides uranium, plutonium, americium, and curium into site streams is no longer routinely quantified because of the actinides' historically low levels. However, the streams are sampled and analyzed annually for the presence of these actinides. The resulting concentrations are compared to those of previous years to identify any trends.

The surface water surveillance program consists of 37 locations on and off site. These sampling locations are identified in Table 8.6, *Surface Water Surveillance*.

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5.3.3 Groundwater Surveillance

The groundwater surveillance program gathers information to determine and document the effects of SRS operations on groundwater quality. SRS conducts extensive groundwater monitoring in support of Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), commonly known as Superfund, compliance. The EM Program conducts additional groundwater monitoring at the locations identified in Table 8.7, *Groundwater Surveillance*.

5.3.4 Drinking Water Surveillance

The drinking water surveillance program for radiological parameters monitors both on-site and offsite suppliers (municipal water treatment plants at three locations—one up-river and two down-river). All the onsite and most offsite surrounding communities sampled use groundwater as the water supply. Sampling these supplies provides a means to determine if any contamination from site operations has escaped into groundwater and the surrounding communities' water supply.

Two municipal water treatment plants, Beaufort-Jasper Water Treatment Facility near Beaufort, South Carolina, and City of Savannah Industrial and Domestic Water Supply Plant at Port Wentworth, Georgia, use the Savannah River as a water supply. Both raw and finished water are sampled at these locations monthly. Sampling these supplies provides a means to determine if any contamination from site operations has escaped into the Savannah River and ultimately into the municipal water supply. Samples are also collected from the North Augusta Water Treatment Plant in North Augusta, South Carolina.

The EPA has established maximum contamination levels (MCLs) for several radionuclides and a generic limit of four millirems per year for beta particle and photon radioactivity from man-made radionuclides in drinking water. The drinking water sampling locations are identified in Table 8.8, *Drinking Water Surveillance*. Drinking water surveillance results are compiled and distributed to downstream users in an annual Water Treatment Plant Analysis Results report which includes alpha, nonvolatile beta, and tritium results. In addition, as a part of the annual fee for permitted domestic water systems, SCDHEC samples major on-site drinking water systems for radiological and non-radiological constituents as required to support comparisons to MCLs provided in R61-58, *South Carolina Primary Drinking Water Standard*, which implements 40 CFR 141, *National Primary Drinking Water Regulations*. These results are provided to SRS and included in the drinking water surveillance information published in the annual Site Environmental Report, which includes a description of dose due to drinking water pathway and a comparison to EPA MCLs.

5.3.5 Food Product Surveillance

A variety of items are included in the food product surveillance program. The program is designed to determine any effects site releases may have on the food chain and quantify the exposure of the maximally exposed individual from the food pathway. Because of this, the program concentrates on locally produced food products. Food products are divided into two categories, terrestrial and aquatic.

Terrestrial Food Product Surveillance

Terrestrial food products include milk, beef, fruit, and vegetables (deer and hogs are included in the *Wildlife Surveillance* Section. Milk is collected quarterly. Beef, fruits, and collards are collected annually. Corn, soybeans, wheat, cabbage, pecans, and peanuts are collected on a three year rotational schedule. Where applicable, samples are collected from the farm or point of production during harvest. Samples of these items are collected in each of the four quadrants (northeast, southeast, southwest, and northwest) surrounding the site.

Collection takes place between 0 and 15 kilometers from the site, with one control collection taken between 15 kilometers and 25 miles from the site center in the southeast quadrant. Sampling frequency is adjusted if increasing concentration trends are observed.

Milk is a food product of special interest because, following deposition, radioactive materials ingested by cattle and goats are quickly transferred into their milk, and the time between production of that milk and its consumption by humans usually is short.

Additionally, milk is a major food product for children. Raw whole milk is collected from individual dairies within the 25-mile radius of the site. This is considered representative of milk produced within the Central Savannah River Area, which may or may not be influenced by SRS operations. All milk samples are preserved by chilling. Table 8.9, *Terrestrial Food Product Surveillance*, presents a list of terrestrial food products collected and the analyses performed.

Aquatic Food Product Surveillance

The aquatic food product surveillance program consists of both fish and shellfish. A variety of fish species are collected at locations near and downstream of the site in order to quantify possible impacts of fish consumption. The shellfish surveillance program is designed to quantify any effect of SRS operations on shellfish downstream of the site on the coast near Savannah, Georgia. Samples of oysters and crabs are collected annually and analyzed. Details of the program are identified in Table 8.10, *Aquatic Food Product Surveillance*. The fish monitoring plan is revised every five years and submitted for state concurrence.

5.3.6 Wildlife Surveillance

SRS provides a protected area in which many species of wildlife thrive. The wildlife surveillance program was established to monitor wildlife from SRS to help assess any impact of site operations on the wildlife populations. Field measurements are performed on deer, feral hogs, turkey, and beavers.

Monitoring of onsite deer, feral hogs, and turkeys is accomplished during site-sponsored, controlled hunts. These deer and hog hunts are conducted in the fall of the year and are open to members of the general public. Turkey hunts for the mobility impaired are conducted during the spring. The program uses a field detection system to monitor each animal and determine the hunter's cumulative committed effective dose equivalent prior to release of the animal. Animals with concentrations that would cause a hunter to exceed the Department of Energy-Savannah River (DOE-SR) administrative limit for wild game (annual limit of 22 mrem either a single animal or a combination of multiple animals) are not released to the hunter.

Deer and hog samples are collected during field monitoring activities (i.e., annual wildlife hunts) as follows:

- Tissue (i.e., meat) and bone samples are taken every 5 animals until twenty animals have been monitored.
- Once twenty animals have been monitored, tissue and bone samples are collected every 10 animals.
- Both front legs of the animals are taken from the animal for tissue and bone samples for every 50 animals monitored.

Feral hogs are also trapped by subcontractors throughout the year. Since these animals are not released off site, no monitoring is performed.

Occasionally, beavers are trapped throughout the year by the United States Department of Agriculture Forest Service-Savannah River (USDA FS-SR).

Because beavers live in and near bodies of water that potentially may be contaminated, they must be monitored prior to disposal. Each animal is monitored using the same detection system used for the deer hunts. Animals that have a concentration less than 2000 pCi/g may be disposed by burial in the sanitary landfill.

5.3.7 Soil Surveillance

The Soil Surveillance Program performs two functions:

- To observe and trend the deposition patterns of radioactive materials to the environment
- To provide an indication of concentrations of radioactive materials in the environment.

Radioactive materials deposited in the environment come from both SRS operations and worldwide fallout. Material is deposited by both dry and wet (rainfall) deposition processes. The soil surveillance program is designed to perform long-term trending of radioactive material levels in the environment, rather than quantifying regional concentrations of activity. Soil samples are collected annually from four onsite, four perimeter, and two offsite locations. Samples are collected from uncultivated and undisturbed areas. Locations are identified in Table 8.11, *Soil Surveillance*

5.3.8 Sediment Surveillance

Sampling and analysis of sediment provide a method to determine the movement, deposition, and accumulation of radioactive materials in stream systems. Radionuclide levels in the sediment may show significant changes from year to year as stream conditions change, resulting in increased deposition or remobilization. Sediment samples are collected annually at 27 locations on and off site including site streams and the Savannah River. These locations are identified in Table 8.12, *Sediment Surveillance*.

Settleable Solids

Liquid release from SRS activities shall not result in the release of settleable solids to natural waterways if the concentration of radioactive material in the solids in the waste stream exceeds either or both of the following:

- 5 pCi (0.2 Bq) per gram above background of settleable solids for alpha-emitting radionuclides
- 50 pCi (2 Bq) per gram above background of settleable solids for beta-emitting radionuclides.

An interpretation of the radioactivity levels in settleable solids requirement was provided to SRS by DOE in 1995. The interpretation indicated that Total Suspended Solids (TSS) levels below 40 parts per million (ppm) were considered to be in de-facto compliance with the DOE limits. Monitored natural waterways are identified in Table 8.6, *Surface Water Surveillance*.

5.3.9 Vegetation Surveillance

Vegetation can accumulate radioactive contamination from either fallout or uptake from soil and water by the roots. The vegetation surveillance program is divided into two groups:

- Timber
- Grassy vegetation

Timber sampling is conducted in support of USDA FS–SR activities.

Samples are collected at the request of the U.S. Forest Service (USFS) from areas designated for harvest; thus, sampling is conducted at infrequent intervals and from various areas. Samples are collected as wood chips or chain-sawdust. Approximately 1–2 kg of timber is collected from each tree. Samples are analyzed for gamma-emitting radionuclides and tritium.

Grassy vegetation samples are collected annually from seven locations on and off site. These locations are monitored for trends in radionuclide mobility and uptake by plants.

The five onsite locations are collocated with atmospheric surveillance air sampling sites. The two offsite locations also are collocated with atmospheric surveillance air sampling sites and represent control sites. Sample locations are identified in Table 8.13, *Vegetation Surveillance*.

5.3.10 Biota Surveillance

A variety of biological surveillance programs have been conducted at SRS since the site's beginning. The EM Program supports the ongoing Savannah River limnological study through the collection of macroinvertebrates, algae, and aquatic insects.

Diatoms are collected on a monthly basis and are sent to Academy of Natural Sciences of Philadelphia (ANSP) for archiving. Macroinvertebrates are collected late spring/early summer and again in late summer/early fall. The collection program is identified in Table 8.14, *Biota Surveillance*.

5.3.11 Gamma Radiation Surveillance

In general, the ambient gamma radiation surveillance program is conducted to characterize the radiation levels at SRS and to provide an indication of the effect, if any, of SRS operations on the environment. It is also available for emergency response actions and special environmental surveys. Specific program objectives are to:

- Provide ongoing environmental radiation dosimetry during routine operations
- Measure photon radiation levels at SRS and in areas surrounding SRS
- Provide an expedient and reliable means of establishing population exposure levels and doses in the event of a release of airborne radioactivity

To quantify the ambient gamma radiation environment, SRS uses TLDs. TLDs are placed in sets of seven: five indicator badges and two badges used for fade correction. The badge sets are placed in free air on hangers one meter above the ground. They are exposed for one calendar quarter prior to processing. TLD locations are identified in Table 8.15, *TLD Locations*.

5.3.12 Enhanced Tritium Monitoring (ETM) Surveillance

The ETM program was implemented to provide timely notification of abnormal tritium conditions to downstream users of Savannah River water. Site streams are sampled every week on Monday, Thursday, and Friday.

This schedule ensures that the maximum time between sampling and reporting is less than the average transport time from the site to downstream water users. ETM sample locations are identified in Table 8.16, *Enhanced Tritium Monitoring Program*

5.3.13 Steel Creek Plantation Surveillance

Steel Creek Plantation is a privately owned land area located on the southeastern border of the site. A portion of the area is a low-lying swamp which is used as an undeveloped wildlife habitat and for occasional private hunts. A portion of this swamp was contaminated due to historical site operations. A comprehensive survey is performed every five years. This contaminated area is monitored by the collection of soil and vegetation samples along with the placement and collection of TLDs. Soil and vegetation samples are collected along a series of transects that span the contaminated area and are analyzed for gamma-emitting radionuclides and strontium-89, 90. TLDs are also placed and collected along the series of transects for determination of ambient gamma exposure rates.

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5.3.13 Steel Creek Plantation Surveillance, (cont.)

Pre-Operational Monitoring

Pre-operational monitoring provides the framework from which an acceptable monitoring program would be established for a new SRS facility or activity. An SRS activity is defined as one taken for or by SRS that has the potential to release radioactive or non-radioactive contaminants to the environment and to result in the exposure of members of the public or the environment to the contaminated material. The activity may be – but is not limited to – design, construction, operation, or decommissioning. To the extent appropriate, the activity may occur in a single facility or across the entire site.

The need for a pre-operational monitoring will be determined – based upon review of the potential environmental impact of the new SRS activity – as per instructions for site environmental permitting in SRS Manual 3Q, *Environmental Compliance Manual*; 3Q1-Section 200, *SRS Environmental Permitting Requirements Documents*; and 3Q1-Section 9000, *Hydrogeologic Data Collection Procedures and Specifications*. The Environmental Monitoring Section is responsible for ensuring that pre-operational studies are documented in the SRS Environmental Monitoring Program.

As outlined in DOE Order 458.1 and 10 CFR 834, preoperational studies must be conducted prior to startup (at least one year) for new facilities or activities that have a potential for significant adverse environmental impact. Each study will serve to:

- Characterize existing physical, chemical, and biological conditions that could be affected
- Establish background levels of radioactive and chemical components
- Characterize pertinent environmental and ecological parameters
- Identify potential pathways for human exposure or environmental impact as a basis for determining the nature and extent of the subsequent routine operational and emergency effluent monitoring and environmental surveillance programs
- Determine the types and quantities of airborne effluents to be expected and will establish the associated airborne effluent monitoring needs
- Determine the types and quantities of effluents to be expected and will establish the associated environmental surveillance program

5.4 Flow monitoring

Monitoring of flow rates in surface water is used in both the effluent and surveillance elements of the EM Program to determine the impact on the environment. For most locations, flows are measured using stage-to-flow rating tables, area-velocity measurement and calculations, or a combination of the two methods. Flow locations are identified in Table 8.17, *Stream Flow Measurement Locations*.

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5.5 Environmental Monitoring Procedures

5.5.1 3Q, *Environmental Compliance Manual*

Environmental procedures/policies are presented in 3Q, *Environmental Compliance Manual*. The 3Q Manual provides guidance and detailed information concerning proper procedures and activities as prescribed by federal and state regulations, DOE Orders, and SRNS policies. Procedure Manual 3Q is divided into sections covering 14 specified topics including: groundwater; spills and discharges; wells and drinking water; air protection; environmental evaluation; wastes; insecticides, fungicides, and rodenticides; RCRA and Superfund documentation; reporting; relationships of land, water, chemicals, and health; appraisals, site coordination; systems certified operators; and quality control.

5.5.2 Manual 3Q1, *Environmental Requirements and Program Documents*

Manual 3Q1 includes implementing procedures that are applicable to the EM Program. These include the following categories:

- Administration
- Equipment Operation and Calibration
- Environmental Monitoring Sampling and Measurement
- Sample Receiving and Laboratory
- Waste Sampling and Shipping
- Data Reporting and Quality Control
- Hydrogeologic Data Collection Procedures and Specifications

5.6 Quality Assurance Program

The SRS comprehensive environmental QA program follows the QA requirements defined in the Quality Assurance Manual (Manual 1Q). Each environmental organization has developed and implemented QA procedures that address these requirements. The blueprint that EM uses to obtain the type and quality of environmental data needed for specific decisions or applications is documented in Manual 3Q1, Procedure 102, *Environmental Monitoring Quality Assurance Project Plan*.

In addition, a Cognizant Quality Function (CQF) from the site's independent QA organization is assigned responsibility for environmental program oversight for each organization.

The CQF periodically performs QA reviews and assessments on environmental programs to ensure compliance with site requirements. In addition, each organization assigns QA responsibilities to individuals to oversee daily QA activities for the organization. Site environmental professionals periodically conduct QA self-assessments on specific environmental program activities per the Integrated Environmental Protection Management Self-Assessment Plan. Results improvement opportunities and corrective actions from assessments and reviews are documented in the Site Tracking, Analysis and Reporting (STAR) system. Site management participates in the Management Field Observation process, and the results from these reviews also are documented in STAR.

5.7 Reports

NOTE

See Additional Reports-related Information in Records Section.

The primary report associated with the EM Program is the Annual Savannah River Site Environmental Report, which meets the reporting criteria required by DOE Order 231.1B, *Environment, Safety and Health Reporting*. This report is issued annually and includes a compliance summary for the site, program information for monitoring and surveillance, a discussion of potential doses to the public, and a summary of environmental data. The Annual SRS Site Environmental Report will also include public notification of clearance of property. Information on materials released containing residual activity is summarized in the Site Environmental Report and is managed in accordance with Manual 5Q1.1, Procedure 5.17, *Radiological Release of Material*, including use of approved Authorized Limits, surveys of cleared property with type and quantity of property cleared, and independent verification results, as appropriate.

A documented Annual Program Review of the SRS EM Program will be performed in the fourth calendar quarter of each year and submitted to DOE-SR. The review includes:

- Evaluation and proposed revisions to the program in response to changing conditions in transfer pathways and to the site's changing mission
- Evaluation of any storm water runoff with the potential to contain radionuclides from DOE activities as a possible pathway of exposure
- Proposed improvements and enhancements to the program
- Proposed scientific studies to identify radioactive and non-radioactive contaminants and their transfer pathways in the environment

Other reports that utilize EM program include, but are not limited to, Weekly Enhanced Tritium Monitoring report, weekly tritium concentration in the Savannah River report, monthly radiological release report, monthly Discharge Monitoring Reports required by the site NPDES permit, quarterly tritium inventory report, the air emissions inventory, and various compliance reports as specified in DOE Order 458.1.

Information on materials released containing residual activity is summarized in the Site Environmental Report and is managed in accordance with Manual 5Q1.1, Procedure 5.17, *Radiological Release of Material*, including the use of approved Authorized Limits, surveys of cleared property with type and quantity of property cleared, and independent verification results, as appropriate.

Unless otherwise specified, the quantities used in reports and records will be clearly indicated in special units of curie, rad, roentgen, or rem; including multiples and subdivisions of these units, or other conventional units, such as dpm, dpm/100 cm², or mass units. The SI units, and Becquerel (Bq), gray (GY), and Sievert (Sv) may be provide parenthetically for reference with scientific standards.

5.8 Dose Assessments

Radiological dose assessments and non-radiological exposure assessments will be performed at SRS using (1) standard EPA or DOE analytical models prescribed in statutes or regulations applicable to DOE sites, and (2) EPA or DOE approved dose coefficients.

These assessments will be utilized to:

- Demonstrate regulatory compliance of routine operations
- Determine the effects of unplanned releases
- Support the reporting requirements of the annual SRS Environmental Report
- Support the SRS Environmental ALARA Program

To demonstrate compliance with applicable dose standards, human doses will be assessed at SRS for all significant pathways of radiological exposure (i.e., plume, terrestrial, meat, milk, vegetation, inhalation, drinking water, aquatic foods, river recreation, and crop irrigation) for each dose receptor (individual or collective group). Appropriate pathway doses for receptors will be summed to provide total doses for atmospheric and liquid effluents.

Doses calculated for radioactive atmospheric and liquid effluents will include:

- Dose to maximally exposed individual or a representative person
- Collective Dose to 80-km (50-mile) population.

In addition, dose calculated for radioactive liquid effluents will also include:

- Dose to maximally exposed individual customer of downstream water treatment plants
- Collective dose to customers of downstream water treatment plants
- Potential individual and collective doses from irrigation with river water

Doses from radioactive atmospheric releases for the maximally exposed off-site individual will also be calculated with EPA-prescribed methods to demonstrate compliance with the 10 mrem per year dose standard of 40 CFR 61. Dose to aquatic organisms in SRS surface streams will be assessed at SRS using DOE recommended dose models.

Direct dose impact to members of the public and workers from radiation sources is achieved by measuring direct penetrating radiation exposures both on and off site. The direct measurements taken at onsite, plant perimeter, and offsite locations (direct penetrating gamma radiation) is measured using an extensive network of environmental radiation dosimetry (i.e., TLDs) strategically placed at designated environmental air surveillance stations, population centers, and Steel Creek Plantation. These devices measure direct, penetrating beta/gamma radiation originating from cosmic and terrestrial sources, as well as any contribution from SRS operations. The air surveillance stations TLDs' accuracy is verified by using TLDs exposed to known sources of radiation as controls, and by participating in inter-comparison testing programs.

5.8 Dose Assessments, (cont.)

Additionally, direct dose-measurements are obtained annually for determining the sportsman dose for an offsite hunter and an offsite fisherman (i.e., deer, hog, and fish consumption – also includes soil exposure).

The data obtained from these monitoring activities, are used for characterizing source terms, exposure trends, exposure modes, support for potential routine and emergency response calculation models, and other information associated with evaluating dose.

6.0 REFERENCES

1B, *Management Requirements and Procedures Manual*

1B, 3.31, *Records Management*

1Q, *Quality Assurance Manual*

3Q, *Environmental Compliance Manual*

3Q1, *Environmental Requirements and Program Documents*

3Q1, 102, *Environmental Monitoring Quality Assurance Project Plan*

5Q, Chapter 7, *Radiological Control Records*

5Q1.1, 5.17, *Radiological Release of Material*

5Q1.2, *Radiation Monitoring*

5Q1.4, *Water Monitoring*

5Q1.5, *Air-Effluent Monitoring*

10 CFR 834, *Radiation Protection of the Public and the Environment*

10 CFR 835, *Occupational Radiation Protection*

40 CFR Parts 141, *National Primary Drinking Water Regulations*

DOE Order 231.1B, *Environment, Safety and Health Reporting*

ESH-ESS-96-0086, DOE Order Requirements for Control of Settleable Solids

[S/RID 1] Standards/Requirements Identification Document 1], DOE Order 458.1, *Radiation Protection of the Public and the Environment*

[S/RID 2], 10 CFR 962, *Byproduct Material*

[S/RID 3], ANSI N42.18 – 1980, American National Standard, *Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents*

[S/RID 4], DOE450.1A, *Environmental Protection Program*

[S/RID 5], DOE231.1B, *Environment, Safety and Health Reporting*

SRNL-STI-2011-00503, *Critical and Radionuclide Pathway Analysis for the SRS*

SRNL-STI-2010-00447, *Land and Water Use Characteristics and Human Health Input Parameters for Use in Environmental Dosimetry and Risk Assessments at the Savannah River Site*

6.0 REFERENCES, (cont.)

SRNL-TR-2010-00274, *Environmental Dose Assessment Manual*

SRNS-RP-2012-00243, *Environmental Radiological Protection Program for DOE Order 458.1 Radiation Protection of the Public and the Environment (U)*

SRNS-TR-2012-00202, *Environmental Monitoring Program*

WSRC-IM-2002-00014, *SRS Air Emissions Monitoring Graded Approach*

7.0 RECORDS

The annual Savannah River Site Environmental Report provides a public record of SRS EM Program performance. It presents summary environmental data that characterize site environmental management performance, confirms compliance with environmental standards and requirements, and highlights significant programs and efforts. The report will be distributed each year to government officials, universities, public libraries, environmental and civic groups, news media, and interested individuals.

Records generated as a result of implementing this procedure include results of effluent monitoring and environmental surveillance, results of surveys for radiation, results used to determine dose, meteorological data used in assessing dose, and results of pre-operational monitoring. These records are maintained in accordance with Manual 1B, Procedure 3.31, *Records Management*. Analytical data records will be managed in accordance with Manual 3Q1, Procedure 102, *Environmental Monitoring Quality Assurance Project Plan*. Radiological release records will be managed in accordance with Manual 5Q, Chapter 7, *Radiological Control Records*.

8.0 ATTACHMENTS

Table 8.1	Liquid Effluent Monitoring
Table 8.2	NPDES Permit Monitoring
Table 8.3	Storm Water Monitoring
Table 8.4	Airborne Effluent Monitoring
Table 8.5	Atmospheric Surveillance
Table 8.6	Surface Water Surveillance
Table 8.7	Groundwater Surveillance
Table 8.8	Drinking Water Surveillance
Table 8.9	Terrestrial Food Product Surveillance
Table 8.10	Aquatic Food Product Surveillance

8.0 ATTACHMENTS, (cont.)

Table 8.11	Soil Surveillance
Table 8.12	Sediment Surveillance
Table 8.13	Vegetation Surveillance
Table 8.14	Biota Surveillance
Table 8.15	TLD Locations
Table 8.16	Enhanced Tritium Monitoring Program
Table 8.17	Stream Flow Measurement Locations

Table 8.1
Liquid Effluent Monitoring
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Location	Collection	Analyses	Frequency	Run
TB-2	Flow Proportional Composite	Gross alpha and Beta, tritium, gamma spec, and actinides	Monthly	Effluent and E-Basin
F-012 281-8F Retention Basin	Flow-proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, and total strontium	As required	Effluent Basins
F-013 200-F Cooling Water Basin	Flow-proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, and total strontium	As required	Effluent Basins
FMC-3	Flow-proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, total strontium, and iodine-129	Monthly	Effluent and E-Basin
U3R-2A	Flow Proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, and total strontium, I-129	Weekly	Effluent and E-Basin
FM-1C	Time - proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, total strontium, and iodine-129	Monthly	Effluent and E-Basin
H-004	Flow-proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, and total strontium	Monthly	Effluent and E-Basin
H-017 H Area Retention Basin	Flow-proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, and total strontium	As required	Effluent Basins
K Canal	Flow-proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, and total strontium	Monthly	Effluent and E-Basin

TABLE 8.1
Liquid Effluent Monitoring
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Location	Collection	Analyses	Frequency	Run
HP-52	Flow Proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, and total Strontium, I-129	Monthly	Effluent and E- Basin
L007	Flow Proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, and total strontium	Monthly	Effluent and E- Basin
S-004	Flow- Proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, and total strontium Cu, Pb, Mn, Ni, Zn	Monthly	Effluent and E- Basin
HP-15	Time- Proportional Composite	Gross alpha and beta, tritium, and gamma spec	Weekly	Effluent and E- Basin
F-05	Flow- Proportional Composite	Gross alpha and beta, tritium, gamma spec, actinides, Tc- 99, and total strontium	Monthly	Effluent and E- Basin

Table 8.2
NPDES Permit Monitoring
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Location	Collection	Analyses	Frequency
A-01	Grab & Composite	BOD, pH, TSS, O&G, Fe	1/Month
A-11	Grab & Composite	BOD, pH, TSS, Low Level Hg	1/Month
A-1A	Grab	TCE, PCE	1/Month
D-1A	Grab & Composite	DO, BOD, pH, TSS, Fecal Coliform	1/Month
F-01	Grab & Composite	pH, TSS, Cu, Zn	1/Month
F-02	Grab & Composite	pH, Cu, Zn	1/Month
F-05	Grab & Composite	pH, TSS, Cu, Pb, Zn, Low Level Hg	1/Month
F-08	Grab & Composite	pH, Pb, Zn	1/Month
G-10	Grab & Composite	DO, BOD, pH, TSS, Ammonia, Fecal Coliform	2/Month
H-02	Grab & Composite	pH, Cu, Pb, Zn	1/Month
H-07	Grab & Composite	pH, TSS	1/Quarter
H-12	Grab & Composite	pH, Cu, Zn	1/Month
TH-1&2 (H-16)	Grab & Composite	BOD, pH, TSS, Cd, Cr, Cu, Pb, Ni, Ag, Zn, Hg	1/Week
K-06	Grab & Composite	pH, Cu, Pb, Zn, Low Level Hg	1/Month
K-12	Grab & Composite	DO, BOD, pH, TSS, Fecal Coliform	1/Month
K-18	Grab & Composite	pH, TSS	1/Quarter
L-07	Grab & Composite	pH, TSS	1/Quarter
L-7A	Grab & Composite	DO, BOD, pH, TSS, Fecal Coliform	1/Month
M-05	Grab	TCE, PCE	1/Month
S-04	Grab & Composite	pH, Cu, Pb, Mn, Ni, Zn	1/Month
X-8C	Grab	TCE, PCE, Mn	1/Month
D-01	Grab & Continuous	Temp, pH, Mn, Al, TRC, Temp Diff, WET	1/Day 1/Occurrence 1/Month & 1/Quarter
01B (D-1B)	Grab	TSS, O&G, Cu, Ni, Zn	1/Occurrence
01C (D-1C)	Grab	TSS, O&G	1/Month
01D (D-1D)	Grab	TSS, O&G	1/Month
D-03	Grab	pH, TSS, O&G, Cu, Ni, Zn, Al, TRC	1/Month 1/Occurrence
D-06	Grab	pH, TSS, O&G, Cu, Ni, Al, Petrol Hydrocarbon, TRC	1/Month 1/Occurrence

**Table 8.3
Storm Water Monitoring
Page 1 of 2**

Storm Water Effluent Monitoring

Location	Collection	Analyses	Frequency
H-07B* (no discharge outfall)	Grab	pH	1/Year

Storm Water Benchmark Monitoring

Location	Collection	Analyses	Frequency
G-10A	Grab	Fecal Coliform	1/Quarter
G-21	Grab	TSS	1/Quarter
H-04B	Grab	TSS	1/Quarter
N-02	Grab	Zn	1/Quarter
N-12A	Grab	Cu, Zn	1/Quarter
N-15	Grab	Cd	1/Quarter
Z-01* (no discharge outfall)	Grab	TSS, NH3-N, COD, Ag, As,, Cd, Hg, Se, Pb & Cyanide	1/Quarter

* Outfalls H-07B and Z-01 are no discharge outfalls from basing. In the unlikely event of a discharge, sampling (including makeups) will be performed.

Storm Water Visual Monitoring

(Outfalls listed in parentheses are substantially identical and are rotated on a yearly basis)

Location	Collection	Analyses	Frequency
A-14	Grab	Visual analysis	1/Quarter
B-10	Grab	Visual analysis	1/Quarter
D-04 (D-06A & D-07)	Grab	Visual analysis	1/Quarter
E-02 (E-01, E-03 & E-04)	Grab	Visual analysis	1/Quarter
E-06	Grab	Visual analysis	1/Quarter
G-10A	Grab	Visual analysis	1/Quarter
G-21	Grab	Visual analysis	1/Quarter
H-04B	Grab	Visual analysis	1/Quarter
H-05 (H-06 & H-07C)	Grab	Visual analysis	1/Quarter
H-06A	Grab	Visual analysis	1/Quarter
H-07A	Grab	Visual analysis	1/Quarter
H-08	Grab	Visual analysis	1/Quarter
K-02	Grab	Visual analysis	1/Quarter
L-13 (A-08)	Grab	Visual analysis	1/Quarter

TABLE 8.3
STORM WATER MONITORING
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Storm Water Visual Monitoring, (cont)

(Outfalls listed in parentheses are substantially identical and are rotated on a yearly basis)

N-02	Grab	Visual analysis	1/Quarter
N-05 (C-08, F-10, FT-3, N-14 & N-16)	Grab	Visual analysis	1/Quarter
N-12 (H-02A & N-06)	Grab	Visual analysis	1/Quarter
N-12A	Grab	Visual analysis	1/Quarter
N-13A	Grab	Visual analysis	1/Quarter
N-15	Grab	Visual analysis	1/Quarter
Y-03 (Y-01& Y-04)	Grab	Visual analysis	1/Quarter

Storm Water Impaired Water Monitoring

(Outfalls listed in parentheses are substantially identical and are rotated on a yearly basis)

Location	Collection	Analyses	Frequency
E-06	Grab	Fecal Coliform	1/Year
G-10A	Grab	Fecal Coliform	1/Year
G-21	Grab	Fecal Coliform	1/Year
H-02A (N-06 & N-12)	Grab	Fecal Coliform	1/Year
H-04B	Grab	Fecal Coliform	1/Year
H-05 (H-06 & H-07C)	Grab	Fecal Coliform	1/Year
H-06A	Grab	Fecal Coliform	1/Year
H-07A	Grab	Fecal Coliform	1/Year
H-07B (no discharge outfall)	Grab	Fecal Coliform	1/Year
L-13 (A-08)	Grab	Fecal Coliform	1/Year
N-02	Grab	Fecal Coliform	1/Year
N-15	Grab	Fecal Coliform	1/Year
Z-01 (no discharge outfall)	Grab	Fecal Coliform	1/Year

Table 8.4
Airborne Effluent Monitoring
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Monitoring Program requirements are subject to change due to mission/process changes. Additional deletions to this list are documented in the NESHAPs Evaluation Group Document Library. Required sampling frequency can be found in the SRS Air Emissions Monitoring Graded Approach (WSRC-IM-2002-00014).

* The F- and H-Area tank farm tanks have discrete sampling points for each tank purge vent and for each tank annulus vent. They are, however, presented as combined entries in this table for conciseness.

Location	Collection	Analyses
735-A Stack	Paper Filter	Gross A/B, gamma spec
773-A B Stack	Paper Filter	Gross A/B, gamma spec
773-A C Stack	Paper Filter	Gross A/B, gamma spec
773-A F Wing	Paper Filter	Gross A/B
776-A Stack	Paper Filter	Gross A/B, gamma spec
791-A Sandfilter Discharge	Paper Filter & Charcoal	Gross A/B, gamma spec, I-129
235-F Sandfilter	Paper Filter	Gross A/B, gamma spec, actinides
292-F Main Stack	Paper Filter & Charcoal	Gross A/B, gamma spec, I-129, actinides, Sr-89/90
772-1F Stack	Paper Filter	Gross A/B, gamma spec
772-4F	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
F-Area Tank Farm (Tanks 1F-8F, 25F-28F, 33F, 34F, 44F-47F) Annulus*	Paper Filter	Gross A/B, gamma spec
F-Area Tank Farm (Tanks 1F-8F, 25F-28F, 33F, 34F, 44F-47F) Purge*	Paper Filter	Gross A/B, gamma spec
241-F 2F Evaporator	Paper Filter	Gross A/B, gamma spec
241-F DB2	Paper Filter	Gross A/B, gamma spec
241-F PP 2&3 DB4	Paper Filter	Gross A/B, gamma spec
241-84H ETF Lab Stack	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
241-81H ETF Process Stack	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
292-H Main Stack	Paper Filter & Charcoal	Gross A/B, gamma spec, I-129, actinides, Sr-89/90
H-Area Tank Farm (Tanks 9H-16H, 29H-32H, 35H-43H, 48H-51H) Annulus Exhaust*	Paper Filter	Gross A/B, gamma spec
H-Area Tank Farm (Tanks 9H-16H, 21H-24H, 29H-32H, 35H-43H, 48H-51H) Purge Exhaust*	Paper Filter	Gross A/B, gamma spec
241-278H Caustic Extraction	Paper Filter	Gross A/B, gamma spec
241-2H Mercury Stack	Paper Filter	Gross A/B, gamma spec
241-92H Stack	Paper Filter	Gross A/B, gamma spec

Table 8.4
Airborne Effluent Monitoring
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Location	Collection	Analyses
241-96H Stack East	Paper Filter	Gross A/B, gamma spec
241-96H Stack West	Paper Filter	Gross A/B, gamma spec
241-H 2-H Evap	Paper Filter	Gross A/B, gamma spec
241-H CTS Pit	Paper Filter	Gross A/B, gamma spec
241-H DB7	Paper Filter	Gross A/B, gamma spec
241-H DB2	Paper Filter	Gross A/B, gamma spec
241-H DB6	Paper Filter	Gross A/B, gamma spec
241-H DB8 Stack B	Paper Filter	Gross A/B, gamma spec
241-H PP 5&6	Paper Filter	Gross A/B, gamma spec
RHLWE PVS	Paper Filter	Gross A/B, gamma spec
RHLWE SVS	Paper Filter	Gross A/B, gamma spec
299-H Building Stack & HP Hood	Paper Filter	Gross A/B, gamma spec
K-Area Main Stack	Paper Filter & bubbler	Gross A/B, gamma spec, actinides, Sr-89/90, tritium
KIS Stack	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
L-Area Disassembly	Paper Filter & bubbler	Gross A/B, gamma spec, tritium
L-Area Main Stack	Paper Filter & bubbler	Gross A/B, gamma spec, tritium
221-S Personnel Area	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
250-S Building 1488	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
250-S Building 1509	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
250-S Building 3928	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
250-S Building 3940	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
251-S Vault A	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
251-S Vault B	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
251-S Vault C	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
251-S Vault D	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
291-S Vit Process	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90

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Airborne Effluent Monitoring
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Location	Collection	Analyses
511-S Low Pump Pit	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
512-S Late Wash	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
232-H Stack	Bubbler	Tritium
233-H	Bubbler & Kanne monitoring system	Tritium
234-H	Kanne monitoring systems	Tritium
238-H	Kanne monitoring system	Tritium
264-H Stack	Paper Filter & Kanne monitoring systems	Gross A/B, gamma spec, tritium
210-Z Building Stack	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
451-Z Saltstone Vaults	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90
Saltstone SDU-2	Paper Filter	Gross A/B, gamma spec, actinides, Sr-89/90

Table 8.5
Atmospheric Surveillance
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Location	Collection	Analyses	Frequency	Run
Burial Ground North	P, C, SG, RW, RIC	P, C, SG, RW, RIC	P,C,SG- Biweekly RW,RIC- Monthly	OP
Aiken Barricade	P, C, SG, RW	P, C, SG, RW	P,C,SG- Biweekly RW,RIC- Monthly	OP
Allendale Gate	P, C, SG, RW	P, C, SG, RW	P,C,SG- Biweekly RW,RIC- Monthly	OP
Barnwell Gate	P, C, SG, RW	P, C, SG, RW	P,C,SG- Biweekly RW,RIC- Monthly	OP
Dark Horse	P, C, SG, RW, RIC	P, C, SG, RW, RIC	P,C,SG- Biweekly RW,RIC- Monthly	OP
East Talatha	P, C, SG, RW	P, C, SG, RW	P,C,SG- Biweekly RW,RIC- Monthly	OP
Green Pond	P, C, SG, RW, RIC	P, C, SG, RW, RIC	P,C,SG- Biweekly RW,RIC- Monthly	OP
Hwys 21 & 167	P, C, SG, RW	P, C, SG, RW	P,C,SG- Biweekly RW,RIC- Monthly	OP
Jackson, SC	P, C, SG, RW	P, C, SG, RW	P,C,SG- Biweekly RW,RIC- Monthly	OP
Patterson Mill Road	P, C, SG, RW, RIC	P, C, SG, RW, RIC	P,C,SG- Biweekly RW,RIC- Monthly	OP
400-D	P, C, SG, RW, RIC	P, C, SG, RW, RIC	P,C,SG- Biweekly RW,RIC- Monthly	OP
Aiken Airport	P, C, SG, RW	P, C, SG, RW	P,C,SG- Biweekly RW,RIC- Monthly	25 Mile
Augusta, GA	P, C, SG, RW	P, C, SG, RW	P,C,SG- Biweekly RW,RIC- Monthly	25 Mile
Hwy 301	P, C, SG, RW, RIC	P, C, SG, RW, RIC	P,C,SG- Biweekly RW,RIC- Monthly	25 Mile
Savannah, GA	P, C, SG, RW, RIC	P, C, SG, RW, RIC	P,C,SG- Biweekly RW,RIC- Monthly	100 Mile

Key:

P = Particulate Filter analyzed for gamma spectrometry, and gross alpha/beta. Total strontium and Pu-238,239 are performed annually.

C = Charcoal Canister analyzed annually for gamma spectrometry

SG = Silica Gel analyzed for tritium oxide

RW = Rainwater analyzed for monthly tritium oxide

RIC = Rain Ion Column analyzed monthly for gamma spectrometry, gross alpha/beta, total strontium, and Pu-238,239

Table 8.6
Surface Water Surveillance
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Location	Collection	Analyses	Frequency	Run
Tims Branch - 5	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Tims Branch - 5	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Upper Three Runs – 1A	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Biweekly	Stream
Upper Three Runs – 1A	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Crouch Branch	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Crouch Branch	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Upper Three Runs - 3	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Upper Three Runs - 3	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Upper Three Runs – 4	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Upper Three Runs - 4	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Upper Three Runs-2F (F-02)	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Upper Three Runs-2F (F-02)	Grab	Sr-89/90, Tc-99, I-129, Np-237, actinides	Annual	Stream
Beaver Dam Creek @ River	Time Proportional Composite	Tritium	Weekly	Stream

TABLE 8.6
Surface Water Surveillance
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Location	Collection	Analyses	Frequency	Run
Beaver Dam Creek @ River	Grab	Tc-99, Gross alpha/beta, gamma spectrometry, Sr-89/90, actinides	Annual	Stream
F-01	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
F-01	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Four Mile – 2	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium, Tc-99, I-129, Sr-89/90	Monthly	Stream
Four Mile - 2	Grab	actinides	Annual	Stream
Four Mile – 2B	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium, Tc-99, I-129, Sr-89/90	Monthly	Stream
Four Mile – 2B	Grab	actinides	Annual	Stream
Four Mile – 3A	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium, Tc-99, I-129, Sr-89/90	Monthly	Stream
Four Mile – 3A	Grab	actinides	Annual	Stream
Four Mile – 6	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Four Mile - 6	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Four Mile – A7	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Four Mile – A7	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
G-10	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium, actinides, SR-89/90, Tc-99, I-129	Monthly	Stream
HP-52	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium, actinides, SR-89/90	Monthly	Stream

TABLE 8.6
Surface Water Surveillance
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Location	Collection	Analyses	Frequency	Run
Pen Branch – 3	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Pen Branch – 3	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Steel Creek – 2A	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Steel Creek – 2A	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Steel Creek – 4	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Steel Creek - 4	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Lower Three Runs – 1A	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Lower Three Runs – 1A	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Lower Three Runs – 2	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Lower Three Runs - 2	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
Lower Three Runs – 3	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Monthly	Stream
Lower Three Runs - 3	Grab	Sr-89/90, Tc-99, I-129, actinides	Annual	Stream
TNX-008	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium, actinides (w/o Cm & Am)	Monthly	Stream

TABLE 8.6
Surface Water Surveillance
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Location	Collection	Analyses	Frequency	Run
TNX-008	Grab	Tc-99	Annual	Stream
River Mile 118.8	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Weekly	River
River Mile 118.8	Grab	Sr-89/90, Tc-99, actinides	Annual	River
River Mile 141.5	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Weekly	River
River Mile 141.5	Grab	Sr-89/90, Tc-99, actinides	Annual	River
River Mile 150	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Weekly	River
River Mile 150	Grab	Sr-89/90, Tc-99, actinides	Annual	River
River Mile 150.4	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Weekly	River
River Mile 150.4	Grab	Sr-89/90, Tc-99, actinides	Annual	River
River Mile 160	Time Proportional Composite	Gross alpha/beta, gamma spectrometry, tritium	Weekly	River
River Mile 160	Grab	Sr-89/90, Tc-99, actinides	Annual	River
E-001	Grab	Gross alpha/beta, gamma spectrometry, tritium, Sr-89/90, Tc-99, I-129, actinides	Monthly	Storm Water Basins
E-002	Grab	Gross alpha/beta, gamma spectrometry, tritium, Sr-89/90, Tc-99, I-129, actinides	Monthly	Storm Water Basins

TABLE 8.6
Surface Water Surveillance
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Location	Collection	Analyses	Frequency	Run
E-003	Grab	Gross alpha/beta, gamma spectrometry, tritium, Sr-89/90, Tc-99, I-129, actinides	Monthly	Storm Water Basins
E-004	Grab	Gross alpha/beta, gamma spectrometry, tritium, Sr-89/90, Tc-99, I-129, actinides	Monthly	Storm Water Basins
E-005	Grab	Gross alpha/beta, gamma spectrometry, tritium, Sr-89/90, Tc-99, I-129, actinides	Monthly	Storm Water Basins
E-006	Grab	Gross alpha/beta, gamma spectrometry, tritium, Sr-89/90, Tc-99, I-129, actinides	Monthly	Storm Water Basins
Pond 400	Grab	Gross alpha/beta, gamma spectrometry, tritium, Sr-89/90, Tc-99, I-129, actinides	Monthly	Storm Water Basins
Z-Area	Grab	Gross alpha/beta, gamma spectrometry, tritium, Sr-89/90, Tc-99, I-129, actinides	Monthly	Storm Water Basins

TABLE 8.6
Surface Water Surveillance
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Location	Collection	Analyses	Frequency	Run
Tims Branch - 5	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Upper Three Runs – 1A	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Tinker Creek – 1	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Upper Three Runs	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Upper Three Runs – 4	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Beaver Dam Creek	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Four Mile - 2	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Four Mile – 2B	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Four Mile – 6	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Pen Branch - 3	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Steel Creek – 4	Grab	Water Quality Parameters*	Monthly	Stream Water Quality
Lower Three Runs – 2	Grab	Water Quality Parameters*	Monthly	Stream Water Quality

TABLE 8.6
Surface Water Surveillance
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Location	Collection	Analyses	Frequency	Run
River Mile 118.8	Grab	Water Quality Parameters*	Monthly	River
River Mile 141.5	Grab	Water Quality Parameters*	Monthly	River
River Mile 129.1	Grab	Water Quality Parameters*	Monthly	River
River Mile 150.4	Grab	Water Quality Parameters*	Monthly	River
River Mile 160	Grab	Water Quality Parameters*	Monthly	River

*Water Quality Parameters: Aluminum, Cadmium, Chromium, Chemical Oxygen Demand, Conductivity, Copper, Dissolved Oxygen, Iron, Lead, Manganese, Mercury, Nickel, Nitrate-Nitrite, pH, Hardness, PO4-P, Temperature, Total Organic Carbon, Total Suspended Solids, and Zinc.

TSS levels below 40 parts per million (ppm) are considered to be in de-facto compliance with the DOE Limits for settleable solids radioactive releases.

Table 8.7
Groundwater Surveillance
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Location	Collection	Analyses	Field Parameters	Frequency
L disassembly basin	LDB 1, 2, 3, 4	Tritium	pH, conductivity, temperature, turbidity	Quarterly
K disassembly basin	KDB 1, 2, 3, 4, 5	Tritium	pH, conductivity, temperature, turbidity	Annual
Interim Sanitary Landfill	LFW 28, 30,31, 32, 32C, 34, 35, 43B, 43C, 43D, 44D, 74C, 74D, 75C, 75D, 76, 78	Appendix V Tritium	pH, conductivity, temperature, turbidity	1 st quarter
Interim Sanitary Landfill	LFW 28, 30,31, 32, 32C, 34, 35, 43B, 43C, 43D, 44D, 74C, 74D, 75C, 75D, 76, 78	Appendix II Tritium	pH, conductivity, temperature, turbidity	3 rd quarter
288 F Ash Basin	FAB 2, 5C, 5D, 6C, 6D, 7C, 7D, BGO 13DR	Ba, Cr, Cu, Pb, Ni, nitrate/nitrite as nitrogen Sulfate, Zn	pH, conductivity, temperature, turbidity	2 nd & 4 th quarter
N area fuel oil	NHO 1E, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	GCMS VOA (benzene and naphthalene)		2 nd & 4 th quarter
Z area	ZBG 1, 1A, 2, 3, 4, 5, 6, 7, 8,	Nitrate/nitrite, gross alpha, beta/photon emitters, I-129, tritium	pH, conductivity, temperature, turbidity	1 st & 3 rd quarter
488D ash basin	DCB 8. 13R. 16R. 75, 76	Sb, As, Ba, Cd, Cr, Cu, CN, F, Fe, Pb, Hg, Ni, Se, Ag, Tl, Zn, Cl, Nitrate/Nitrate as Nitrogen, Selenium, Sulfate, Total Dissolved Solids, Lab pH	pH, conductivity temperature, turbidity	1 st & 3 rd quarter

TABLE 8.7
Groundwater Surveillance
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Location	Collection	Analyses	Field Parameters	Frequency
C & D Landfill	CDL 1, 2, 3, 4, 5, 6, NEB 17DU, NPM 1	Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, chloride, nitrate/nitrate as nitrogen, sulfate, benzene, carbon tetrachloride, chlorobenzene, chloroform; trichloromethane, 1,1-Dichloroethylene: Ethylene chloride, 1,2-dichloroethane, Ethylene dichloride, 1,2-Dichloroethylene; cis-1-2-Dichloroethene, cis-1-2-Dichloroethylene; trans-1-2-Dichloroethene, ethylbenzene, methylene chloride, tetrachloroethylene, tetrachloroethene; perchloroethylene, toluene, 1,1,1-trichloroethane; methylchloroform, 1,1,2-trichloroethane, trichloroethylene, trichloroethene, vinyl chloride	pH, conductivity, temperature, turbidity	1st & 3rd quarter

TABLE 8.7
Groundwater Surveillance
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Location	Collection	Analyses	Field Parameters	Frequency
F & H Tank Farm	FTF 19, 20, 22, 23, 29; HAA 1A, 1C, 1D, 4A, 4B, 4D, 7A, 7B, 7D, 8A, 8B, 8D, 9AR, 9B, 9D, 10AR, 10B, 10D, 11A, 11B, 11D, 12A, 12B, 12D, 13A, 13B, 13D, 14A, 14B, 14D, 15A, 15B, 15D	Gross alpha, Non-volatile beta, tritium, Na, Cr, nitrate	pH, conductivity, temperature, turbidity	Semi-Annually
F & H Tank Farm	FTF 28	Gross alpha, Non-Volatile beta, tritium, Na, Cr, nitrate, Tec-99	pH, conductivity, temperature, turbidity	Semi-Annually
F & H Tank Farm	FAL-1, 2, 2D, 9DR, 10A, 10D, 16A, 16D, 19D; NBG-1,2,3,4,5; HCA-1,2,3,4,4A, 4AA,4B, 4C	Gross alpha, Non-volatile beta, tritium, TCE	pH, conductivity, temperature, turbidity	3 rd Quarter
F & H Tank Farm	HC 1A, 1B, 1C, 1D	Gross alpha, Non-volatile beta, tritium, nitrate	pH, conductivity, temperature, turbidity	3 rd Quarter
F & H Tank Farm	FBG 1C, 1D; FTF 30	Gross alpha, nonvolatile beta, alpha/beta/gamma speciation (1), Tc-99 (3), tritium,sodium, chromium, cadmium, maganese, nitrate/nitrite	pH, specific conductivity, temperature, turbidity	Semi-Annually
F & H Tank Farm	FTF 9R, 12R, 31	Gross alpha, nonvolatile beta, alpha/beta/gamma speciation (1), tritium,sodium, chromium, cadmium, maganese, nitrate/nitrite	pH, specific conductivity, temperature, turbidity	Semi-Annually

TABLE 8.7
Groundwater Surveillance
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Location	Collection	Analyses	Field Parameters	Frequency
Georgia Tritium Wells	TR92-2A, TR92-2B, TR92-3A, TR92-3B, TR92-4A, TR92-4B, TR92-5A, TR92-5B, TR92-5C, TR92-6A2, TR92-6C, TR92-6D, TR92-1A, TR92-1B, TR92-1C, TR92-1D, TR92-1E, TR92-1F, TR92-1G, TR92-1H, TR92-1I, TR92-1J, TR92-1K, TR92-1L, TR92-1M; MPS-TW1, MPS-TW2, MPS-TW3, MPS-TW4, MPS-TW5, MPS-TW6, MPS-TW7; GSTW-1, GSTW-2, GSTW-3; BLSTW-1, BLSTW-2, BLSTW-3; MHSTW-1, MHSTW-2, MHSTW-3, MHSTW-4, MHSTW-5	Tritium	pH, conductivity, temperature, turbidity	Annually (1 st or 2 nd quarter)
Upper Three Runs	CBS 1, 2, 3; UTR 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	Tritium	None	Annually (1 st or 2 nd quarter)
JAX wells	JAX 1, 1LCB, 2, 2LCB	VOCs	pH, conductivity, temperature, turbidity	2 nd & 4 th quarter

Table 8.8
Drinking Water Surveillance
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Location	System	Analyses	Frequency	Run
617-G	Small Domestic	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
681-3G	Small Domestic	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
704-16G	Small Domestic	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
709-1G	Small Domestic	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
737-G	Small Domestic	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
905-112G	Production well for A-Area treatment facility	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
905-113G	Production well for A-Area treatment facility	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
905-67B	Production well for A-Area treatment facility	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
905-125B	Production well for A-Area treatment facility	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
905-3D	Production well for D-Area treatment facility	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
905-136D	Production well for D-Area treatment facility	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual

TABLE 8.8
Drinking Water Surveillance
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Location	System	Analyses	Frequency	Run
782-3A	Large Domestic	Gamma, gross alpha/beta, tritium	Quarterly	Quarterly
782-3A	Large Domestic	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
483-7D	Large Domestic	Gamma, alpha, beta, tritium, actinide, Sr-89-90	Annual	Annual
483-7D	Large Domestic	Gamma, gross alpha/beta, tritium	Quarterly	Quarterly

TABLE 8.8
Drinking Water Surveillance
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Location	System	Analyses	Frequency	Run
Beaufort-Jasper (Chelsea) Raw	Municipal	Gamma, alpha, beta, tritium, actinide, Sr-89-90*	Monthly	Off-Site Drinking Water
Beaufort-Jasper (Chelsea) Finished	Municipal	Gamma, alpha, beta, tritium, actinide, Sr-89-90*	Monthly	Off-Site Drinking Water
Port Wentworth Raw	Municipal	Gamma, alpha, beta, tritium, actinide, Sr-89-90*	Monthly	Off-Site Drinking Water
Port Wentworth Finished	Municipal	Gamma, alpha, beta, tritium, actinide, Sr-89-90*	Monthly	Off-Site Drinking Water
Beaufort-Jasper (Purrysburg) Raw	Municipal	Gamma, alpha, beta, tritium, actinide, Sr-89-90*	Monthly	Off-Site Drinking Water
Beaufort-Jasper (Purrysburg) Finished	Municipal	Gamma, alpha, beta, tritium, actinide, Sr-89-90*	Monthly	Off-Site Drinking Water
North Augusta Raw	Municipal	Gamma, alpha, beta, tritium, actinide, Sr-89-90*	Monthly	Off-Site Drinking Water
North Augusta Finished	Municipal	Gamma, alpha, beta, tritium, actinide, Sr-89-90*	Monthly	Off-Site Drinking Water

*Sr-89-90 analysis performed on annual basis for municipal water treatment plants.

*Samples are provided to SRS by municipal water treatment plants.

Table 8.9
Terrestrial Food Product Surveillance
Page 1 of 2

Location	Product	Analyses	Frequency	Run
NE 15 km	Collards Meat Fruit	Gamma, Tritium, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	Annual	Annual
SE 15 km	Collards Meat Fruit	Gamma, Tritium, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	Annual	Annual
SW 15 km	Collards Meat Fruit	Gamma, Tritium, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	Annual	Annual
NW 15 km	Collards Meat Fruit	Gamma, Tritium, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	Annual	Annual
SE 25 km	Collards Meat Fruit	Gamma, Tritium, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	Annual	Annual

Table 8.9
Terrestrial Food Product Surveillance
Page 2 of 2

Location	Product	Analyses	Frequency	Run
NE 15 km	Pecans, Peanuts, Soybeans, Corn, Cabbage, Wheat	Gamma, Tritium, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	Annual Rotational	Annual
Local Dairies	Milk	Gamma, Tritium, Am-241, Cu-244, Np-237, Tc-99, Pu-238/239, Sr-89/90, U-234/235/238	Quarterly	Annual

Table 8.10
Aquatic Food Product Surveillance
Page 1 of 2

Location	Product	Analyses	Frequency	Run
Savannah Bluff Lock and Dam	Bass, catfish, bream	Alpha, beta, gamma, Am- 241, Cu-244, Sr-89-90, Pu- 238-239, U- 234-235-238, Np-237, Tc-99, tritium	Three composites per year per product	Fish
Upper Three Runs Mouth	Bass, catfish, bream	Alpha, beta, gamma, Am- 241, Cu-244, Sr-89-90, Pu- 238-239, U- 234-235-238, Np-237, Tc-99, tritium	Three composites per year per product	Fish
Beaver Dam Creek Mouth	Bass, catfish, bream	Alpha, beta, gamma, Am- 241, Cu-244, Sr-89-90, Pu- 238-239, U- 234-235-238, Np-237, Tc-99, tritium	Three composites per year per product	Fish
Four Mile Creek Mouth	Bass, catfish, bream	Alpha, beta, gamma, Am- 241, Cu-244, Sr-89-90, Pu- 238-239, U- 234-235-238, Np-237, Tc-99, tritium	Three composites per year per product	Fish
Steel Creek Mouth	Bass, catfish, bream	Alpha, beta, gamma, Am- 241, Cu-244, Sr-89-90, Pu- 238-239, U- 234-235-238, Np-237, Tc-99, tritium	Three composites per year per product	Fish

TABLE 8.10
Aquatic Food Product Surveillance
Page 2 of 2

Location	Product	Analyses	Frequency	Run
Lower Three Runs Mouth	Bass, catfish, bream	Alpha, beta, gamma, Am-241, Cu-244, Sr-89-90, Pu-238-239, U-234-235-238, Np-237, Tc-99, tritium	Three composites per year per product	Fish
Hwy 301 Bridge	Bass, catfish, bream	Alpha, beta, gamma, Am-241, Cu-244, Sr-89-90, Pu-238-239, U-234-235-238, Np-237, Tc-99, tritium	Three composites per year per product	Fish
Stoke's Bluff Landing	Bass, catfish, bream	Alpha, beta, gamma, Am-241, Cu-244, Sr-89-90, Pu-238-239, U-234-235-238, Np-237, Tc-99, tritium	Three composites per year per product	Fish
Hwy 17 Bridge	Bass, catfish, bream, mullet, redfish, sea trout	Alpha, beta, gamma, Am-241, Cu-244, Sr-89-90, Pu-238-239, U-234-235-238, Np-237, Tc-99, tritium	Three composites per year per product	Fish
Savannah River below Hwy 17 Bridge	Oyster	Alpha, beta, gamma, Am-241, Cu-244, Sr-89-90, Pu-238-239, U-234-235-238, Np-237, Tc-99, tritium	Annual	Annual

Five individual fish from each product and each location are also analyzed for mercury, antimony, cadmium, and manganese on an annual basis.

Table 8.11
Soil Surveillance
Page 1 of 1

Location	Collection	Analyses	Frequency	Run
F-Area W	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
H-Area E	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Z-Area #3	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Burial Ground North	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Patterson Mill Road	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
D-Area	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Darkhorse	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Green Pond	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Savannah, GA	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Hwy 301 Bridge	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Jackson	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
West Jackson	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Allendale Gate	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Aiken Airport	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Augusta Lock and Dam	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Barnwell Gate	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Hwy 21/167	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Windsor Rd	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
East Talatha	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Talatha Gate	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual
Steel Creek Plantation Trail 1	Grab	Gamma, Sr-89-90, Pu-238-239	Annual	Annual

Table 8.12
Sediment Surveillance
Page 1 of 3

Location	Collection	Analyses	Frequency	Run
Upper Three Runs – 1A	Grab	Gross alpha, gross beta, gamma, TCLP	Annual	Annual
Tims Branch - 5	Grab	Gross alpha, gross beta, gamma, TCLP	Annual	Annual
Tinker Creek TC-1	Grab	Gross alpha, gross beta, gamma, TCLP	Annual	Annual
E-001 Basin	Grab	Gross alpha, gross beta, gamma	Annual	Annual
E-002 Basin	Grab	Gross alpha, gross beta, gamma	Annual	Annual
E-003 Basin	Grab	Gross alpha, gross beta, gamma	Annual	Annual
E-004 Basin	Grab	Gross alpha, gross beta, gamma	Annual	Annual
E-005 Basin	Grab	Gross alpha, gross beta, gamma	Annual	Annual
E-006 Basin	Grab	Gross alpha, gross beta, gamma	Annual	Annual
FM-2	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
FM-3A	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
FMC-A7A	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
FM Swamp	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
PB Swamp	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
SC-2A	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual

TABLE 8.12
Sediment Surveillance
Page 2 of 3

Location	Collection	Analyses	Frequency	Run
FMC-A7	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
Z-Basin	Grab	Gross alpha, gross beta, gamma,	Annual	Annual
SC-4	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
R Canal	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
L3R-1A	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
River Mile 160.5	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
River Mile 160	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
River Mile 157.2	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
River Mile 150.4	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
River Mile 151.0	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
River Mile 150.2	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
River Mile 134.0	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
River Mile 129.0	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
River Mile 118.7	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual

Table 8.12
Sediment Surveillance
Page 3 of 3

Location	Collection	Analyses	Frequency	Run
BDC River Mile	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
BDC at Rd A	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
L3R-2, Patterson Mill Road	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
Pen Branch at Rd A	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
Four Mile Creek at Rd A	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual
U3R-4	Grab	Gross alpha, gross beta, gamma, TCLP*	Annual	Annual

*TCLP Parameters include: aluminum, arsenic, barium, cadmium, chromium, cyanide, copper, iron, lead, manganese, magnesium, mercury, nickel, selenium, silver, uranium, zinc, aldrine, alpha-BHC, beta-BHC, lindane, alpha-chlordane, tech-chlordane, 4,4-DDD, 4,4-DDE, 4,4-DDT, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, enfrin aldehyde, heptachlor, heptachlor epoxide, and methoxychlor.

Table 8.13
Vegetation Surveillance
Page 1 of 2

Location	Collection	Analyses	Frequency	Run
Burial Ground North	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Dark Horse	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Green Pond	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Patterson Mill Road	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
400-D	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Hwy 301	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Savannah, GA	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Jackson	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual

TABLE 8.13
Vegetation Surveillance
Page 2 of 2

Location	Collection	Analyses	Frequency	Run
Allendale Gate	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Barnwell Gate	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Augusta Lock and Dam	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Aiken Airport	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Hwy 21/167	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
East Talatha	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual
Talatha Gate	Grab	Gamma, gross alpha, gross beta, Sr-89-90, actinides, tritium	Annual	Annual

Table 8.14
Biota Surveillance
Page 1 of 1

Location	Collection	Analyses	Frequency	Run
River Channel Markers 42 and 78	Diatom Collection	Sent to Academy of Natural Sciences for archiving	Quarterly	River
River Channel Markers 42 and 78	Macroinvertebrates	Picked and archived	Late Spring/Early Summer, Late Summer/Early Fall	River

Table 8.15
TLD Locations
Page 1 of 1

Site Perimeter Stations (9 Locations)

SITE PERIMETER TLD 15	SITE PERIMETER TLD 61.25
SITE PERIMETER TLD 42	SITE PERIMETER TLD 65.75
SITE PERIMETER TLD 48	SITE PERIMETER TLD 72.25
SITE PERIMETER TLD 51	SITE PERIMETER TLD 75.75
SITE PERIMETER TLD 57.75	

Air Monitoring Stations (17 Locations)

400 D	HWY 301
AIKEN AIRPORT	INTERSECTION OF HWYS 21 & 167
ALLENDALE GATE	JACKSON
AUGUSTA LOCK & DAM	PATTERSON MILL RD.
BARNWELL GATE	SAVANNAH (TLD 1 and TLD 2)
BURIAL GROUND-	NORTH TALATHA GATE
DARKHORSE	WEST JACKSON
EAST TALATHA	WINDSOR ROAD
GREENPOND	

Population Centers (9 Locations)

BARNWELL	MCBEAN
BEECH ISLAND	NEW ELLENTON
GIRARD	WILLISTON
JACKSON	WINDSOR
MARTIN	

Vogle Electric Generating Plant Vicinity (18 Locations)

GEORGIA POWER TLD 1 HIGH	GEORGIA POWER TLD 5 LOW
GEORGIA POWER TLD 1 LOW	NRC TLD 1
GEORGIA POWER TLD 2 HIGH	NRC TLD 2
GEORGIA POWER TLD 2 LOW	NRC TLD 3
GEORGIA POWER TLD 3 HIGH	NRC TLD 4
GEORGIA POWER TLD 3 LOW	NRC TLD 5
GEORGIA POWER TLD 4 HIGH	NRC TLD 6
GEORGIA POWER TLD 4 LOW	NRC TLD 7
GEORGIA POWER TLD 5 HIGH	NRC TLD 8

Table 8.16
Enhanced Tritium Monitoring Program
Page 1 of 1

Location	Collection	Analyses	Frequency	Run
Upper Three Runs – 3	Time proportional composite	Tritium	Three times per week	ETM
Four Mile A-7	Time proportional composite	Tritium	Three times per week	ETM
Pen Branch 3	Time proportional composite	Tritium	Three times per week	ETM
Steel Creek 4	Time proportional composite	Tritium	Three times per week	ETM
Lower Three Runs 1-A	Time proportional composite	Tritium	Three times per week	ETM

Table 8.17
Stream Flow Measurements Locations
Page 1 of 1

Daily monitoring, using area-velocity measurements at 15-minute intervals. The measurements are taken weekly, biweekly, or monthly depending on flow conditions.

Four Mile 6

Four Mile 3-A

Four Mile 2-B

Steel Creek 4

HP-52

Four Mile A-7

Lower Three Runs 1-A (backup to Lower Three Runs 2)

Lower Three Runs 2

Pen Branch 3

Upper Three Runs 4

D-01

Periodic Measurements are taken at other locations, as follows:

Daily: Sanitary Wastewater Treatment Plants (D-1A, G-10, K-12 and L-7A)

Weekly: H-16 (ETP - batch discharge)

Quarterly: 002 (D-Area outfall that was never constructed), H-07, K-18 and L-07