

## **CONTENTS**

---

	<u>Page</u>
8.0 HAZARDOUS MATERIAL PROTECTION .....	8.1-1
8.1 INTRODUCTION.....	8.1-1
8.1.1 Objective .....	8.1-1
8.1.2 Scope .....	8.1-1
8.2 REQUIREMENTS .....	8.2-1
8.3 HAZARDOUS MATERIAL PROTECTION AND ORGANIZATION .....	8.2-1
8.3.1 Overall Organization .....	8.3-1
8.4 AS LOW AS REASONABLY ACHIEVABLE (ALARA) POLICY AND PROGRAM .....	8.4-1
8.4.1 Industrial Hygiene Policy .....	8.4-1
8.4.2 Industrial Hygiene Program.....	8.4-2
8.4.2.1 Program Objective.....	8.4-2
8.4.2.2 Program Elements .....	8.4-3
8.4.2.3 Program Implementation.....	8.4-3
8.4.2.4 Special Program Requirements .....	8.4-3
8.5 HAZARDOUS MATERIAL TRAINING.....	8.5-1
8.5.1 Industrial Hygiene Training.....	8.5-1
8.5.1.1 General Requirements.....	8.5-1
8.5.1.2 Training Frequencies.....	8.5-2
8.5.1.3 Training Topics .....	8.5-2
8.6 HAZARDOUS MATERIAL EXPOSURE CONTROL .....	8.6-1

---

**CONTENTS (continued)**

---

	<u>Page</u>
8.6.1 Hazardous Material Identification Program .....	8.6-1
8.6.1.1 Hazard Assessment Program.....	8.6-1
8.6.2 Exposure Control Administrative Limits .....	8.6-4
8.6.3 Occupational Medical Programs .....	8.6-4
8.6.3.1 Site Medical Policy .....	8.6-4
8.6.3.2 Medical Department Industrial Hygiene Responsibilities .....	8.6-5
8.6.4 Respiratory Protection.....	8.6-6
8.6.4.1 Selection of Respiratory Protection Equipment .....	8.6-7
8.6.4.2 Inspection of Equipment .....	8.6-8
8.6.4.3 Cleaning, Repair, and Maintenance .....	8.6-9
8.6.4.4 Control, Issuance and Use of Respirators .....	8.6-9
8.6.4.5 Training .....	8.6-10
8.6.4.6 Fit and Medical Testing.....	8.6-10
8.6.4.7 Associated Records .....	8.6-11
8.7 HAZARDOUS MATERIAL MONITORING .....	8.7-1
8.7.1 Hazardous Material Monitoring .....	8.7-1
8.7.2 Air Monitoring .....	8.7-1
8.7.2.1 Air Monitoring in the Workplace.....	8.7-1
8.7.2.2 Air Monitoring Outside of the Facility.....	8.7-3
8.7.3 Hazard Prevention and Control .....	8.7-3

---

**CONTENTS (continued)**

---

	<u>Page</u>
8.7.3.1 Hierarchy of Hazard Prevention and Control Measures.....	8.7-3
8.7.3.2 Hazard Prevention and Control Measures for New Facilities.....	8.7-4
8.7.3.3 Hazard Prevention and Control Measures for Existing Facility Modifications .....	8.7-4
8.7.3.4 Hazard Prevention and Control Measures for Existing Operations.....	8.7-5
8.7.3.5 Engineering Control Design Projects .....	8.7-5
8.8 HAZARDOUS MATERIAL PROTECTION INSTRUMENTATION.....	8.8-1
8.9 HAZARDOUS MATERIAL PROTECTION RECORDKEEPING.....	8.9-1
8.9.1 Records Content and Accessibility.....	8.9-1
8.9.2 Controlling Inventory, Retention, and Disposition of Records and Reports.....	8.9-1
8.9.3 Document Control of Plans and Procedures .....	8.9-1
8.10 HAZARD COMMUNICATION PROGRAM.....	8.10-1
8.10.1 Written Program Locations .....	8.10-1
8.10.2 Hazard Evaluation .....	8.10-1
8.10.3 Hazardous Chemical List .....	8.10-2
8.10.4 Hazard Warning Labeling .....	8.10-2
8.10.5 Material Safety Data Sheets .....	8.10-3
8.10.6 Information and Training .....	8.10-3

---

**CONTENTS (continued)**

---

	<u>Page</u>
8.10.7 Notification Of Hazards To Contractors .....	8.10-3
8.11 OCCUPATIONAL CHEMICAL EXPOSURES .....	8.11-1
8.12 REFERENCES.....	8.12-1

---

## ACRONYMS AND ABBREVIATIONS

---

ACM	Asbestos-Containing Material
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
CCMC	Chemical Commodity Management Center
CFR	Code of Federal Regulations
CPC	Chemical Protective Clothing
DOE	Department of Energy
ELSA	Emergency Life Support Apparatus
ESH&QA	Environment, Safety, Health, and Quality Assurance
IH	Industrial Hygiene
MRP	Management Requirement and Procedure
MSDS	Material Safety Data Sheet
NFPA	National Fire Protection Association
OS&HT	Occupational Safety and Health Technology
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Act
QA	Quality Assurance
QAP	Quality Assurance Procedure
RC	Radiological Control
REF	Respiratory Equipment Facility
S&HO	Safety and Health Operations
SAR	Safety Analysis Report
SCBA	Self-Contained Breathing Apparatus
S/RID	Standards/Requirements Identification Document
SRS	Savannah River Site
USQ	Unreviewed Safety Question
WSRC	Westinghouse Savannah River Company

---

This page intentionally left blank.

## 8.0 HAZARDOUS MATERIAL PROTECTION

### 8.1 INTRODUCTION

#### 8.1.1 OBJECTIVE

The purpose of this chapter of the Safety Analysis Report (SAR) for Department of Energy (DOE) nuclear facilities and operations at the Savannah River Site (SRS) is to provide information that satisfies paragraph 8.b.(3)(j) of DOE Order 5480.23. The requirements of this paragraph pertain to nonradioactive hazardous material protection. This chapter also includes information that partially satisfies paragraphs 8.b.(3)(b), (f), and (u) of the DOE Order (Ref. 1, 2).

#### 8.1.2 SCOPE

This chapter describes the hazardous material protection provisions for SRS workers, and the public. The chapter summarizes the hazardous material concerns from the hazard analysis in Chapter 3 of this SAR, and describes the relationship to other SAR chapters that contain requested information. The products of this chapter are as follows (Ref. 2):

- An overall description of the hazardous material protection policy and program
- A summary of design and administrative controls used by the hazardous material protection program
- Information, as appropriate, on equipment and controls supporting hazardous material protection

When required information is provided in another chapter of this SAR, that chapter is referenced to limit repetition. In those cases where policies, programs, and practices important to safe operation are described in detail in facility-specific SARs or other site documents, the salient features are summarized for inclusion in this chapter and the documents are referenced (Ref. 2).

This page intentionally left blank

## 8.2 REQUIREMENTS

The Westinghouse Savannah River Company (WSRC) Industrial Hygiene (IH) program is designed to comply with various requirements. These requirements form part of the safety basis of each SRS facility that is required to implement the site IH program. Standards/Requirements Identification Documents (S/RIDs) state the codes, standards, and regulations governing the management, organization, and institutional safety provisions, policies and program elements for the SRS (Ref. 3). Programmatic compliance assessment has been performed against the S/RIDs and documented as specified in the WSRC Procedure Manual 8B (Ref. 4). The Standards Management/Compliance Section maintains records of the programmatic compliance assessments.

This page intentionally left blank.

### 8.3 HAZARDOUS MATERIAL PROTECTION AND ORGANIZATION

WSRC is committed to providing a place and condition of employment that is free from or protected against, recognized hazards that cause, or are likely to cause, sickness, impaired health and well-being, or significant discomfort and inefficiency among workers. This occupational health objective is achieved through a professional, comprehensive IH program based on management commitment and employee involvement, worksite analysis, hazard identification, hazard prevention and control, and safety and health training (Ref. 5).

The organizational elements and associated responsibilities outlined in this section provide the framework by which the site IH policy is implemented. This section is not intended to list all the organizational elements involved in implementing the site IH policy, but to list the major elements that ensures its implementation. Additional elements are indicated in later sections of this chapter. For example, the facility industrial hygienist is responsible for completing the baseline hazard assessment (see Section 8.6.1.1) prior to the startup of a new facility.

#### 8.3.1 OVERALL ORGANIZATION

IH programmatic functions are managed by the Safety and Health Programs (S&HP) Occupational Safety and Health Technology (OS&HT) Department, and IH field activities are managed by the Safety and Health Operations (S&HO) Department. Both departments are in the Environment, Safety, Health, and Quality Assurance (ESH&QA) Division. Organizational responsibilities are discussed in the IB Manual and WSRC 1-01 Manual (Ref. 5, 6). Staffing levels in the facility are addressed in the facility-specific SAR.

This page intentionally left blank.

## **8.4 AS LOW AS REASONABLY ACHIEVABLE (ALARA) POLICY AND PROGRAM**

The As Low As Reasonably Achievable (ALARA) concepts are integrated into the WSRC IH program, as it relates to known carcinogens. The purpose of the program is to prevent occupational illnesses and preserve the health of SRS employees, while striving to achieve compliance beyond what is required by DOE Orders and DOE-prescribed Occupational Safety and Health (OSH) standards. This section describes the following aspects of the SRS IH program:

- SRS IH policy
- Program objective
- Program elements
- Program implementation
- Program implementation oversight
- Special program requirements

### **8.4.1 INDUSTRIAL HYGIENE POLICY**

The WSRC policy on IH, which includes hazardous material protection, consists of the following statements (Ref. 5):

- WSRC provides a place and condition of employment that is free from or protected against recognized hazards that cause, or are likely to cause, sickness, impaired health and well-being, or significant discomfort and inefficiency among workers.
- This occupational health objective will be achieved through a professional, comprehensive IH program based on management commitment and employee involvement, worksite analysis, hazard identification, hazard prevention and control, and safety and health training.
- The IH program complies with applicable DOE Orders and DOE-prescribed OSH standards. The IH program is directed and implemented by qualified personnel who coordinate IH program elements with other organizations as a component of the OSH program.

The following responsibilities are associated with the IH policy (Ref. 5):

- Executive management will demonstrate commitment by providing the motivational direction and resources for organizing, documenting, and managing the IH program; ensure that the program is directed by qualified personnel; and promote line management commitment and employee involvement in the IH program.

- Operations organizations will conduct operations consistent with established health and safety procedures; implement control measures whenever IH determines that a hazardous exposure exists; include the IH staff in the design review process for new facilities or modifications/additions to existing facilities; develop procedures for the safe use of hazardous materials at the request of IH; and request that the IH staff evaluate the effectiveness of proposed personnel exposure control equipment.
- Site Training is responsible for developing and delivering site common training as requested by line organizations and/or IH.
- IH or IH staff are responsible for developing and implementing an IH program that complies with DOE Orders and DOE-prescribed OSH standards; developing and administering support of new and existing IH hazard-specific programs; providing technical support of the implementation of IH programs and practices at all facilities; informing facility management of control measures required to reduce identified hazardous employee exposures; and exercising stop-work authority when aware of a situation that poses immediate danger.
- Line management is responsible for maintaining places and conditions within their respective work environments free from, or protected against, recognized IH hazards; implementing applicable IH programs; training employees to perform assignments in a knowledgeable and safe manner, and following administrative procedures to allow appropriate disciplinary action to be taken when health and safety procedures are not properly executed; and planning, budgeting, and providing for materials and equipment necessary to support a comprehensive IH program.
- Employees are responsible for observing safety and health rules; using prescribed personal protective equipment; following established health and safety practices and procedures; immediately notifying supervisors of suspected exposures to harmful agents or conditions; and performing all tasks so as not to endanger themselves or others.

## 8.4.2 INDUSTRIAL HYGIENE PROGRAM

### 8.4.2.1 Program Objective

The site IH program, which includes hazardous material protection, is implemented through WSRC Procedure Manual 4Q (Ref. 7). The WSRC Procedure Manual 4Q satisfies the program requirements in DOE Order 440.1A (Ref. 8). The purpose of the IH program is to prevent occupational illnesses and preserve the health of SRS employees while striving to achieve compliance beyond what is required by DOE Orders and DOE-prescribed OSH standards. The IH program exemplifies management's commitment to the overall site OSH program by establishing essential program elements to address identification, evaluation, and control of chemical, physical, and biological hazards within the workplace (Ref. 7, 8).

#### **8.4.2.2    Program Elements**

The WSRC Procedure Manual 4Q provides comprehensive direction for the six IH program elements described in this chapter as follows (Ref. 7):

- Hazard assessment
- Hazard prevention and control
- Training
- Self-assessments
- Record keeping
- Special DOE/Occupational Safety and Health Act (OSHA) control programs

These program elements, as well as occupational medical programs and occupational chemical exposures monitoring, are described in the latter sections of this chapter. The IH program complies with the occupational safety and health standards in 29 Code of Federal Regulations (CFR) 1910 and 29 CFR 1926 (Ref. 9).

#### **8.4.2.3    Program Implementation**

The IH program is implemented through the WSRC Procedure Manual 4Q (Ref. 7).

#### **8.4.2.4    Special Program Requirements**

The ALARA concepts are integrated into the WSRC IH program, as it relates to known carcinogens. The purpose of the program is to prevent occupational illnesses and preserve the health of SRS employees. WSRC implements DOE/OSHA special control programs to maintain occupational exposures ALARA. These programs include, but are not limited to, the following activities (Ref. 7):

- Hazardous material exposure control
- Chemical control
- Asbestos control
- Laboratory and radiological bench hoods and local exhaust systems

Hazardous material exposure control is addressed in Section 8.6.

The chemical control program provides requirements for control of hazardous chemicals in the workplace and includes the following program elements, which are established in WSRC Procedure Manuals 4Q, 7B, and 8Q, and (Ref. 7, 10, 11):

- Chemical Commodities Management Center purchase approval program for chemical agents (Ref. 10)

- Handling materials that pose a potential carcinogenic hazard (Ref. 7)
- Chemical monitoring (Ref. 7)
- Chemical protective clothing (Ref. 11)
- SRS hazard communication program (Ref. 7)

The asbestos control program provides requirements for identification, surveillance, and control of work-related exposures to asbestos or Asbestos-Containing Materials (ACMs) in order to meet the intent of DOE Order 440.1A and the following requirements in the CFR: 29 CFR 1910.1001, 29 CFR 1926.1101, and 40 CFR 61, Subpart M. The requirements ensure that SRS work operations involving asbestos or ACM are conducted in such a manner that personnel receive an adequate level of protection and that regulatory requirements are met. Environmental Protection Department develops, implements, and maintains an asbestos program. The asbestos control program includes the following program elements (Ref. 12, 9, 13):

- Asbestos identification and assessment
- Planning and control of asbestos work
- Asbestos abatement/removal requirements
- Asbestos disposal requirements
- Asbestos training and communication requirements
- Asbestos medical surveillance requirements

The IH program establishes operating requirements for laboratory and radiological bench hoods and local exhaust systems used in controlling the emission of nonradiological particulates, gases, vapors, mists, and fumes in the breathing zone of employees. The requirements address the following areas (Ref. 7):

- Design of laboratory hoods and local exhaust systems
- Design control velocities for laboratory hoods and local exhaust systems
- Laboratory hood or local exhaust system variance requests

These programs are addressed within the IH program and comply with applicable DOE Orders, DOE-prescribed OSH standards, and OSHA standards. Where feasible, engineering controls are the primary method used to minimize worker exposure and to prevent releases into the work environment (Ref. 7).

## 8.5 HAZARDOUS MATERIAL TRAINING

The WSRC IH training criteria, which include hazardous material protection training, specify IH training requirements for WSRC personnel and subcontractors.

This section describes the training requirements and guidelines established by the IH program for this category.

On-shift training, equipment, and systems status are covered in Chapter 11 of this SAR. Chapter 12 of this SAR describes the development, maintenance, and modification of site training programs.

The training of personnel on the configuration of equipment used to store, handle, transport, or process hazardous material, and the training of personnel in the use of up-to-date drawings and other documentation of system design and operation depend on the facility. This and other facility-specific training are addressed in the facility-specific SAR.

Training records satisfy the requirements relating to records management procedures described in Section 8.9.

### 8.5.1 INDUSTRIAL HYGIENE TRAINING

It is WSRC policy to inform its employees and the employees of other groups at SRS of known and potential health hazards encountered in the workplace and the appropriate protective measures to control these hazards. The basic guideline is to inform each employee who has a reasonable potential for exposure of the potential health effects of the hazard, the content of applicable standards and procedures, and the required control measures (i.e., engineering controls, administrative procedures, and/or personnel protective equipment). All training and dissemination of information is, therefore, commensurate with duties, workplace assignment, and responsibilities of employees.

#### 8.5.1.1 General Requirements

Each employee having an exposure potential to a toxic chemical or harmful physical agent receives instruction on operations that may lead to exposure, the potential health effects of the hazard, the content of applicable standards or procedures, and required control measures (i.e., engineering controls, administrative controls, and/or protective equipment). Training and information dissemination are commensurate with the duties, workplace assignment, and responsibilities of the employee. All topics are not required to be addressed with every employee. When the potential for exposure is low, training may not be warranted (Ref. 7).

Each WSRC organization is responsible for ensuring the appropriate training of its employees and its non-WSRC employees, subcontractors, and visitors. Other SRS contractors (e.g., University of Georgia and Wackenhut Security Incorporated) train their employees,

subcontractors, and visitors on the appropriate occupational health topics before they begin work in WSRC-operated facilities and environs (Ref. 7).

#### 8.5.1.2 Training Frequencies

Training and retraining frequencies are listed in WSRC Procedure Manual 4Q and WSRC-IM-92-57. Area-specific training for new or transferred employees is provided at their initial assignment to any department (Ref. 7, 14).

#### 8.5.1.3 Training Topics

The following site-level training topics associated with hazardous material protection are presented at SRS in the courses/formats indicated (Ref. 7):

- Respiratory protection: Section 8.6.4 of this SAR addresses respiratory protection training and the associated training courses.
- Employee medical monitoring and medical exposure records: The consolidated annual training conducted for all site personnel provides a review of DOE policy concerning employee monitoring consistent with the OSHA requirements of DOE Order 440.1A and 29 CFR 1910.20. One portion of the review covers the right of employees to access monitoring and medical exposure records within 15 days of submitting a written request to the Medical Department (Ref. 8, 9).
- Hazard communication: Section 8.10 addresses hazard communication and the associated training courses.
- Carcinogenic hazards: Area-specific training is provided for each chemical present in the workplace, and to which employees are potentially exposed, that is identified in the WSRC Procedure Manual 4Q as a potential carcinogenic, reproductive, or developmental hazard (Ref. 7).
- Asbestos control: Asbestos control training is provided for SRS employees who may be required to conduct activities that can cause an exposure to ACMs. Additional training is provided for asbestos work crew supervisors.
- Lead: Lead training is provided for employees who may be required to conduct activities that can cause an exposure to lead.
- Hearing conservation training is provided for all employees who wear hearing protection in performance of their normal work activities.
- Heat stress training is provided for employees and their supervision who perform work outdoors, near heat sources, or in indoor non-air conditioned areas.

## 8.6 HAZARDOUS MATERIAL EXPOSURE CONTROL

### 8.6.1 HAZARDOUS MATERIAL IDENTIFICATION PROGRAM

This section addresses the hazardous material identification program, referred to as the hazard assessment program, within the WSRC IH program. The information includes descriptions of the methods used for identifying and evaluating health and chemical hazards and for determining the adequacy of and the need for hazard prevention or control measures (Ref. 7).

Prior to the construction of a new facility or modification of an existing facility, hazard prevention and control measures are identified and specified during the design review process. For operating facilities, the adequacy of existing hazard prevention and control measures and/or the need for additional measures is determined during the periodic hazard assessments described in this section (Ref. 7). Additional information concerning hazard prevention and control measures is provided in Section 8.10.

Chemical hazards resulting from postulated accidents such as fires and explosions are identified and quantified in the hazard and accident analyses presented in Chapter 3 of the facility-specific SAR. If a proposed change, test, or experiment could potentially affect the results of the analyses, then an Unreviewed Safety Question (USQ) is involved. The USQ determination process is described in Chapter 17 of this SAR.

#### 8.6.1.1 Hazard Assessment Program

The IH program establishes the requirements for performing and documenting periodic hazard assessments to anticipate, recognize, evaluate, and control occupational health and chemical hazards as required by DOE Orders and DOE-prescribed OSH standards. The following sections describe the guidance and requirements provided for hazard assessments.

#### OVERVIEW

The occupational health hazard assessment program consists of worker and workplace surveillance activities that include baseline hazard assessments, workplace surveys (surveillances), and periodic workplace assessments. Workplaces are surveyed to identify potential occupational exposures, investigated to establish workplace exposure profiles, and periodically assessed for changes to operations, engineering controls, and/or work practices. An industrial hygienist from the S&HO directs hazard assessments and routine surveillance activities (Ref. 7).

The Medical Department simultaneously monitors the health of exposed workers while conducting occupational health examinations that include worker medical histories, biological screenings, and physical examinations. The occupational medical program is described in Section 8.6.3.

## BASELINE HAZARD ASSESSMENTS

The initial comprehensive baseline hazard assessment for facilities at SRS is completed by an industrial hygienist. New facilities or equipment are required to have baseline hazard assessments completed prior to operational startup (Ref. 7).

The industrial hygienist completes a baseline hazard assessment by preparing an initial inventory of the occupational hazards within the facility, completing a facility walkthrough survey, and determining the need for additional IH surveys. The elements of the baseline hazard assessment are described in the following paragraphs (Ref. 7).

### Initial Inventory of Hazards of Concern

An initial inventory of occupational hazards for a facility or work area is generated using the following types of resources (Ref. 7):

- Facility design drawings, specifications, and process descriptions
- Chemical inventory
- Historical IH data found within IH data management system
- Facility safety authorization basis documentation

### Facility Walkthrough Survey

The industrial hygienist notifies facility management that a baseline hazard assessment will be conducted. The industrial hygienist subdivides the facility into discrete units, or work areas according to type of equipment, operation, or physical location to facilitate the assessment. The facility walkthrough survey is performed in a manner that precludes unreasonable disruption to operations of the workplace and includes the following activities (Ref. 7):

- Identifying chemical, physical, ergonomic, and biological hazards associated with processes, materials, or equipment
- Identifying the various work activities, items, or tasks involved in completing a process and their potential for producing mists, dusts, vapors, noise, non ionizing radiation, and heat stress
- Identifying existing engineering, work practice, and administrative controls, or the lack thereof

### Quantitative Assessment

The Industrial hygienist conducts quantitative assessments to further characterize potential health risk under workplace conditions. Any agent determined to pose a potential health risk will be

further evaluated using quantitative exposure monitoring. Exposures are quantified in accordance with WSRC Procedure Manuals 4Q1.1 and 4Q1.2 (Ref. 15, 16).

Results are evaluated by an industrial hygienist, and recommendations are included in the summary report.

### Summary Report

Within 30 days of completing field work, the field industrial hygienist transmits a summary report to facility management that includes the following information (Ref. 7):

- Purpose of the baseline assessment
- Conclusions
- Recommendations

### Medical Surveillance

Based on the results of quantitative exposure monitoring, an employee may be placed in the Medical Surveillance Program (Ref. 7).

## WORKPLACE SURVEYS

SRS operations involve a wide range of tasks, materials, equipment, and facilities. As a result, the site IH program establishes a generalized process for performing surveillance activities with the primary objective being to determine whether or not occupational exposures pose a potential health risk (Ref. 7).

Special workplace surveys are performed by the field industrial hygienist (or a designee) under the following conditions (Ref. 7):

- A request or complaint is received from an employee or facility management.
- An incident or illness is attributed to an occupational exposure to a physical, chemical, or biological agent.
- A follow-up is required for a baseline hazard assessment, or annual workplace survey.
- A survey for a particular process, or activity is required as a routine IH assessment function.
- A survey is required prior to operation of a new process or piece of equipment.

The industrial hygienist follows the following basic steps (Ref. 7):

- Identify agent(s) of concern and perform qualitative assessment(s)

- Based on qualitative assessment, perform quantitative assessment of the hazards per WSRC Procedure Manuals 4Q1.1 and 4Q1.2 (Ref. 15, 16)
- Evaluate monitoring results
- Document and report results to facility management and employee supervision

## PERIODIC WORKPLACE ASSESSMENTS

The field industrial hygienist performs a periodical workplace assessment to verify, or update the previous assessments. Changes in processes, tasks, materials, and/or equipment will be evaluated to determine changes in exposure potential.

### 8.6.2 EXPOSURE CONTROL ADMINISTRATIVE LIMITS

Exposure limits are promulgated by OSHA and the American Conference of Government Industrial Hygienists. A discussion of administrative control levels pertinent to a facility is provided in the facility-specific SAR.

### 8.6.3 OCCUPATIONAL MEDICAL PROGRAMS

This section describes the WSRC occupational medical program at SRS, especially as it relates to hazardous material protection (Ref. 2).

#### 8.6.3.1 Site Medical Policy

The WSRC policy on medical programs states that WSRC shall implement an employee medical program in compliance with DOE requirements, and applicable federal and state regulations. Additionally, it is WSRC policy to provide a quality occupational health program that promotes the physical and mental well-being of WSRC workers while maintaining medical information in a confidential, ethical, and legal manner (Ref. 5).

The WSRC medical program satisfies the following requirements (Ref. 5):

- Assist site management in protecting employees from health hazards in their work environment
- Assist site management in ensuring the placement of employees in work that they can perform without undue hazards to themselves, their fellow workers, plant facilities, the plant site and general environments, and the public consistent with the requirements of the Americans with Disabilities Act of 1990
- Provide continuing medical surveillance of employees, job tasks, and work environments
- Ensure the early detection, treatment, and rehabilitation of ill or injured employees

- Apply preventive medical measures toward the maintenance of good physical and mental health of employees
- Encourage employees to maintain their physical and mental health, and educate employees in health and safety by providing them with professional guidance and counseling
- Contribute to the maintenance of good employee health through the application of preventive medical measures, such as immunizations, substance abuse programs, health counseling, and proper prescription safety eye wear
- Provide professional guidance and consultation to contractor management on all health-related issues
- Provide support to contractor management in the medical, mental, and substance abuse aspects of personnel reliability and fitness for duty
- Protect the privacy of employees and the confidentiality of their medical records.
- Manage the substance abuse and rehabilitation programs of site employees in accordance with site and department policies and procedures
- Maintain a Medical Information System to meet growing surveillance and epidemiological needs

The WSRC medical program involves the following responsibilities (Ref. 5):

- Employees are responsible for reporting to the Medical Department when scheduled for examination, testing, and/or counseling. In addition, any employee who incurs an on-the-job injury will immediately report the incident to management and the Medical Department.
- WSRC management is responsible for ensuring that employees seek medical attention for on-the-job injuries/illnesses or other situations when an employee's performance suggests the need for medical consultation. In addition, management is responsible for ensuring that employees comply with site medical policies and procedures.
- The Medical Department is responsible for implementing this policy through the development of Medical Department operating procedures.

#### 8.6.3.2 Medical Department Industrial Hygiene Responsibilities

Programmatic responsibilities, specified in the WSRC IH program for the Medical Department, are listed in Section 8.6.3.1. The Medical Department has the following specific IH responsibilities (Ref. 7):

- Conducting occupational health examinations to include worker medical histories, biological screenings, and physical examinations

- Assisting IH and chemical custodians in performing hazard assessments for chemicals that do not have a manufacturer's Material Safety Data Sheet (MSDS)
- Contacting manufacturers in the event of an emergency to obtain hazard information on chemicals identified as "trade secrets"
- Providing, at the manufacturer's request, a written statement of need and a confidentiality agreement when inquiring about chemicals designated "trade secrets"
- Assisting employees and supervisors in completing the site "Allegation of Significant Adverse Reaction Form" described in Section 8(c) of the Toxic Substances Control Act
- Providing medical consultation for employees associated with an allegation of significant adverse reaction
- Assisting IH in assessing the technical merit of an allegation of significant adverse reaction
- Notifying IH of health trends that require notification of the Environmental Protection Agency as described in Section 8(e) of the Toxic Substances Control Act
- Reporting clusters of "sick building syndrome" symptoms, such as headaches and watering eyes, of three or more people from the same work location, to IH for investigation
- Assisting in indoor-air-quality investigations related to employee illness, confirming diagnosis of attending physicians, and assisting in conducting epidemiological investigations having major impact on worker health
- Advising facility management, employees, and IH on medical efforts used to address exposures to indoor-air-quality contaminants
- Evaluating personnel to determine which types of respirators they are physiologically and psychologically capable of wearing
- Verifying that medical evaluations comply with the standards (e.g., American National Standards Institute [ANSI] Z88.6-1984, "Respirator Use - Physical Qualifications for Personnel") specified by the IH program

#### 8.6.4 RESPIRATORY PROTECTION

It is WSRC policy to protect employees from exposure to atmospheric contaminants (radioactive or nonradioactive) by using facilities and equipment with engineering controls incorporated into their design. When effective engineering controls are not feasible, or while they are being initiated, protection is provided through the use of approved respirators.

DOE Order 440.1A specifies adherence to ANSI standard Z88.2 and 29 CFR 1910.134, which requires that the responsibility and authority for the respirator program be assigned to a single

person (Ref. 8, 9). The Respirator Program Administrator is designated by the OS&HT Manager and has overall responsibility and authority for the respiratory protection program (Ref. 17). An evaluation of the program is performed annually (Ref. 7).

Engineering controls are the preferred method to protect employees from exposure to airborne contaminants, both radioactive and nonradioactive, within the workplace. Personal protective equipment, such as a respirator, is only used under the following conditions (Ref. 7):

- During the time period necessary to install engineering controls, evaluate controls, or repair controls
- In work situations such as maintenance and repair activities in which engineering controls are not feasible
- In work situations in which engineering controls and supplemental work practice controls are insufficient to reduce exposures to within allowable levels (however, the use of personal protective equipment to comply with exposure limits must be justified)
- In emergencies

#### **8.6.4.1     Selection of Respiratory Protection Equipment**

The site Respiratory Equipment Facility (REF) provides many types of respirators for the protection of employees. Adequate protection for the user is available only if the proper respirator (and cartridge combination for air-purifying respirators) is used. The IH has the responsibility for assessing nonradiological hazards and specifying the respiratory device needed. Radiological Control (RC) has responsibility for assessing radiological hazards and specifying respirator protections. OS&HT is responsible for maintenance of the program.

At SRS, WSRC uses the various various types of respirators, all of which are approved by the National Institute for Occupational Safety and Health, or DOE (Ref. 7):

- Negative-pressure, air-purifying respirators (half mask and full-facepiece)
- Powered, air-purifying respirators
- Full-facepiece, airline respirators
- Abrasive blasting hoods
- Plastic hood, airline respirators
- Plastic suit, airline respirators
- Self-Contained Breathing Apparatus (SCBA)
- Combination airline-type respirator and SCBA
- Escape-only respirators

#### 8.6.4.2 Inspection of Equipment

Respiratory protection equipment must be inspected regularly to ensure that the equipment functions properly when worn. Individuals performing inspections are trained to have a thorough knowledge of respirator operation and inspection procedures.

Routine-use respirators must be inspected before, and after each use. The inspection made before each use is performed by the wearer; the inspection made after each use is performed at the REF.

The individual facilities are responsible for inspecting emergency-use respirators in their possession in accordance with site procedures (Ref. 17).

#### EMERGENCY USE AIR PURIFYING/ATMOSPHERE SUPPLIED RESPIRATOR INSPECTION

Air purifying respirators stored for emergency use must be inspected monthly by persons responsible for the emergency equipment to ensure that these devices are in good condition and are ready for use. This inspection includes checking for distortion of face pieces, integrity of the sealed bag, and general condition of the respirator. An Emergency-Use Respirator Inspection Record Tag is attached to the container bag and signed if the respirator is in good condition. Air purifying respirators for emergency use are returned to the REF once per year for inspection and Quality Assurance (QA) testing (Ref. 17).

Emergency-use atmosphere-supplied respirators are the SCBA type, or the combination airline/SCBA. These respirators must be inspected after each use and at least monthly while in storage. In an emergency, the user will not have time to make a proper inspection; therefore, the custodians of these respirators must ensure that the devices are maintained in good condition and will function properly when needed. An Emergency-Use Respirator Inspection Record tag indicating the condition of the device is attached to the respirator and signed after each monthly inspection.

In addition to the above monthly inspection, SCBA component parts are inspected and tested at the frequencies listed below (Ref. 17):

- 2-year inspection of diaphragms
- 1-year inspection of face pieces
- 2-year inspection of regulator valves
- 5-year hydrostatic test of air cylinders

## EMERGENCY LIFE SUPPORT APPARATUS ESCAPE RESPIRATOR INSPECTION

The Emergency Life Support Apparatus (ELSA) escape respirator is a 5-minute air-supplied respiratory protection device used for escape only. A monthly inspection of ELSA units is performed by the custodians (Ref. 17).

In addition to the above monthly inspection, ELSA components are inspected and tested at the following frequencies:

- Annual inspection of ELSA units
- 5-year hydrostatic test of air cylinders

### 8.6.4.3 Cleaning, Repair, and Maintenance

Replacement of parts or repairs must be done only by properly trained persons in the REF. Replacement parts must be only those designated for the specific respirator being repaired.

Proper care during storage of respirators in the facilities is important. Respirators should not be piled in bins. Respirator storage should be in clean, dry locations away from direct sunlight. To prevent deformation of the face pieces and exhalation valves, respirators should be stored on shelving in a single layer with the lens in the down position or in the receiving container. Full facepiece air purifying canisters can be stored standing vertically.

The REF assembles, tests, inspects, and maintains respirator face pieces, plastic hoods, and plastic suits. High Efficiency Particulate Air/P-100 filter cartridges are leak-tested prior to initial use and prior to reuse. They are only reused if they are not contaminated and they pass the leak and resistance testing. SCBAs, excluding face pieces, and escape-only respirators are maintained through Central Services Works Engineering.

Radioactively contaminated respirators must be disposed of in accordance with RC operations guidelines, if they cannot be decontaminated. RC monitors respirators used in radiological controlled areas prior to shipment to the laundry facility.

### 8.6.4.4 Control, Issuance and Use of Respirators

If respiratory protection is required to perform a task, the user must reference the applicable work permit, or procedure, and present his/her Respirator Qualification Card to a facility issuer. The issuer will issue only the equipment specified on the applicable permit, or procedure after verifying that the user has current medical qualifications, training, and appropriate fit-testing. Upon issuing a respirator, the issuer must complete an entry on the Respiratory Protection Equipment Log Sheet.

If a respirator becomes contaminated during the shift, it should be replaced with a clean device. Respirators may be used repeatedly during a single shift by an individual in an approved location, provided they are kept free of contamination and approved by S&HO. Air purifying respirators

and abrasive blasting hoods may be used by the same person for up to one week with S&HO approval. To ensure cleanliness, reused respirators must be identified with the user's name, date, shift/time, and placed in a clean closed container for temporary storage in an approved storage location.

Employees must guard against damage to assigned respirators. Employees must report any respirator malfunction to their supervisor, who in turn ensures that the REF Manager is notified (Ref. 17).

#### 8.6.4.5 Training

Wearers of respirators must receive training relating to the application and use of these devices and to the hazards associated with airborne contaminants. Respirator users are required to pass the General Respiratory Protection course prior to attending respirator-specific training. Retraining for all types of respirators is conducted in accordance with site procedures.

Supervisors who either use respirators, or supervise personnel who use respirators, must complete the General Respiratory Protection Course offered by site training and be retrained every 12 months (Ref. 17). Supervisors must complete respirator-specific course(s) for those devices their workers wear. Retraining is conducted in accordance with site procedures.

IH trains its technicians in the selection of respiratory protection. S&HO trains its supervisors in the selection of respiratory protection. Respiratory protection equipment issuers are trained by Site Training in the proper method of storing, handling, and issuing respirators. In each case, retraining is every two years (Ref. 17).

#### 8.6.4.6 Fit and Medical Testing

##### GENERAL

Since a given respirator will not fit all employees, devices from several manufacturers in several sizes must be available, so employees may be fitted with the device that provides the best fit. Employees must be clean shaven in respirator seal areas before a fit test will be given. Employees must be given medical clearance for respirator use and receive training, before they are given fit tests (Ref. 17).

##### FIT TESTING METHOD

Quantitative fit tests employ a challenge atmosphere (condensation nuclei in ambient atmosphere) in a Port-A-Count. The employee being fitted dons a modified respirator. A sampling tube extends from the inside of the respirator and is connected to the Port-A-Count (Ref. 17).

A computer printout is provided. The printout is labeled to include employee identification, brand of respirator being tested, exercise being performed, and fit factor provided by the respirator. A copy of the printout is given to the employee for his/her supervisor. Each employee's fit test results are filed by the OS&HT Department. A respirator qualification card is completed and given to the employee as a personal record of his/her quantitative test fitting (Ref. 17).

Personnel using air-purifying respirators, full-facepiece airline-type respirators, or SCBAs are quantitatively fit tested. Special fit test protocols are required for asbestos and benzene in accordance with 29 CFR 1910 (Ref. 9). In the case of asbestos, lead, and arsenic, fit testing is repeated semiannually. All other fit testing is repeated annually (Ref. 17).

#### 8.6.4.7 Associated Records

Records generated as part of the Respiratory Protection Program, such as fit testing results, training, log sheets, and tags, are maintained in accordance with procedures and the department Records Inventory and Disposition Schedule (Ref. 2, 7, 17).

This page intentionally left blank.

## 8.7 HAZARDOUS MATERIAL MONITORING

This section describes the hazardous material monitoring and controls programs conducted inside, and outside, the boundaries of the facility (Ref. 2). Records associated with the hazardous material monitoring and control programs satisfy the requirements relating to records management listed in Section 8.9.

### 8.7.1 HAZARDOUS MATERIAL MONITORING

Air monitoring for determining chemical exposures of facility personnel is addressed in Section 8.7.2. Medical Department responsibilities concerning hazardous material monitoring are listed in Section 8.6.3. Information addressing other aspects of hazardous material monitoring, such as facility monitoring equipment and the associated equipment locations, is provided in the facility-specific SAR.

### 8.7.2 AIR MONITORING

This section describes the airborne hazardous material sampling and monitoring programs conducted inside and outside the boundaries of the facility (Ref. 2). Section 8.7.2.1 describes the program for air monitoring in the workplace. Section 8.7.2.2 describes the program for air monitoring outside of the facility.

#### 8.7.2.1 Air Monitoring in the Workplace

The WSRC IH program specifies requirements for workplace air sampling and data analysis. The specified requirements ensure that the information necessary to characterize potential personnel exposure to airborne hazardous materials is generated. Samples must be representative of the conditions to which the employee is normally exposed. Personal or breathing zone sampling is one of the best methods to characterize employee exposure (Ref. 7). The objective is to control each employee's exposure in routine work situations so that the maximum probability of exposure above exposure limits is less than 5 percent (Ref. 15).

The following sections describe the guidance and requirements provided for air monitoring in the workplace. Records associated with the workplace air monitoring program satisfy the requirements relating to records management listed in Section 8.9.

The facility-specific SAR addresses the following items related to air monitoring in the workplace (Ref. 2):

- Equipment selection, location, and surveillance requirements
- Instrumentation
- Alarms

## REASONS FOR AIR MONITORING

Air monitoring is performed with the following objectives (Ref. 15):

- To identify situations where exposures are significant
- To measure the extent of exposure to determine if improved controls are needed to reduce airborne concentrations
- To measure the extent of exposure to determine if implementation of improved controls has reduced airborne concentrations
- To confirm that exposures are below established standards, or guidelines on a continuing basis
- To meet existing regulations

## ASSESSMENT OF EXPOSURE

The following basic steps are taken in the assessment of exposure (Ref. 15):

- Sampling results are evaluated by the field IH, ensuring that approved sampling methods are used.
- If the workspace does not meet the control objective (i.e., the sampled concentration is greater than the exposure limit), then additional samples are taken and/or additional control measures are used.
- If the workspace does meet the control objective (i.e., the sampled concentration is less than the exposure limit), then a routine sampling frequency is established.
- If the results of the evaluation are inconclusive (i.e., a clear-cut conclusion cannot be reached based on uncertainties in the evaluation process), then sampling is continued.

## SAMPLING FREQUENCY

Resampling is used under the following conditions:

- On a regular basis to confirm that previously acceptable concentrations are still being maintained
- Whenever a significant process change occurs that affects workspace exposure to ensure that concentrations are still acceptable
- After corrective actions are made to demonstrate that concentrations are now acceptable

If resampling data reveal that a concentration is not acceptable, then action is taken to control the concentration.

Resampling schedules mandated by regulatory agencies in the form of rules and regulations are followed in all cases.

## DOCUMENTATION OF RESULTS

The IH field office completes the appropriate IH data form for each sample. The statistical parameters are completed by IH as necessary (Ref. 7).

### 8.7.2.2 Air Monitoring Outside of the Facility

This section provides the following information concerning the airborne hazardous material sampling and monitoring programs conducted outside the boundaries of the facility (Ref. 2):

- Equipment selection, location, and surveillance requirements
- Instrumentation
- Alarms
- Records and reports generated by these programs
- Any programs for continuing meteorological data collection and the rationale for the programs

This information is provided in the facility-specific SAR. Chapter 1 of this SAR describes site meteorology.

### 8.7.3 HAZARD PREVENTION AND CONTROL

The WSRC IH program establishes guidance for identifying and recommending effective engineering, work practice, and administrative controls to reduce employee exposure to occupational hazards (Ref. 7). This hazard prevention and control process is associated with the hazard assessment process described in Section 8.6.1.1.

The following sections describe the guidance and requirements provided for the control of hazardous materials in the workplace. Additional information is provided in the facility-specific SAR.

#### 8.7.3.1 Hierarchy of Hazard Prevention and Control Measures

WSRC achieves regulatory compliance with DOE Orders and DOE-prescribed OSH standards for controlling occupational exposures to specific chemical, physical, and/or biological hazards by using the following hierarchy of hazard prevention and control measures (Ref. 7):

- Performing a process change or substituting a less hazardous material to create a less hazardous process

- Isolating or enclosing the process or operation to prevent worker exposure
- Using ventilation or other engineering controls to prevent or reduce worker exposure
- Following established work practices and procedures such as standard operating procedures and limited access protocols
- Using personal protective equipment
- Employing administrative controls such as employee rotation

Built-in protection, inherent in the design of a process, is preferable to a method that depends on continued employee implementation or intervention. Facility management must provide justification to the S&HO Department when personal protective equipment is chosen for protecting employees from occupational hazards in lieu of feasible engineering or work practice control measures (Ref. 7).

Personal protective equipment used onsite includes both respirators and Chemical Protective Clothing (CPC). Respirators provide protection from airborne contaminants, both radioactive and nonradioactive, and are used under the conditions specified for personal protective equipment in Section 8.6.4. CPC provides protection from chemicals that present a skin-contact hazard and is worn whenever the potential exists for contact with corrosive or toxic materials or for contact with materials of unknown toxicity (Ref. 7).

#### **8.7.3.2     Hazard Prevention and Control Measures for New Facilities**

The design authority technical engineer for a proposed facility is required to transmit project designs to OS&HT for review prior to facility construction. OS&HT reviews facility project designs to ensure that engineering controls have been integrated into the design of equipment or processes associated with the use or presence of chemical, physical, or biological hazards. OS&HT forwards the package to the field industrial hygienist for concurrence. OS&HT transmits a statement to the design authority technical engineer concurring with the proposed design, or submits recommendations for integrating engineering controls to minimize, or eliminate employee exposures to occupational hazards (Ref. 7).

#### **8.7.3.3     Hazard Prevention and Control Measures for Existing Facility Modifications**

The design authority technical engineer for existing facility or process modifications is required to transmit project designs to the field industrial hygienist for review prior to construction. The field industrial hygienist reviews the project designs to ensure that engineering controls have been addressed and potential health hazards have been accounted for. The project review includes an examination of chemical, physical, or biological agents with respect to specific equipment or processes undergoing modification. The field industrial hygienist transmits a statement to the design authority technical engineer concurring with the proposed design or submits recommendations for consideration for integrating engineering or work practice control

measures into the design to minimize, or eliminate, employee exposures to occupational hazards (Ref. 7).

#### 8.7.3.4 Hazard Prevention and Control Measures for Existing Operations

The field industrial hygienist reviews work control packages, maintenance instructions, and facility operating procedures in accordance with S&HO WSRC Procedure Manual 4Q1.1, and based on the results of these reviews, transmits any recommendations for minimizing, or eliminating, employee occupational exposures to the facility manager (Ref. 15). The facility manager implements engineering, or work practice controls for work areas, or process activities, characterized by levels of air contaminants, physical agents, or biological agents that represent potential exposure to workers (Ref. 7).

#### 8.7.3.5 Engineering Control Design Projects

S&HO assigns a risk assessment code for recommended engineering control design projects. The risk assessment code is assigned using a hazard severity/accident probability matrix. Facility management uses the risk assessment code assigned by the respective IH staff as a tool to establish priorities for new engineering control design projects during the budgeting process (Ref. 7).

This page is intentionally left blank.

## 8.8 HAZARDOUS MATERIAL PROTECTION INSTRUMENTATION

This section provides the following information concerning hazardous material protection instrumentation in the facility (Ref. 2):

- The types and quantities of detectors and monitoring equipment
- The sensitivity and range of the equipment
- The calibration methods and frequencies for the equipment

This section also provides descriptions of the following additional items (Ref. 2):

- Selection and placement criteria for equipment and instrumentation (e.g., fixed, portable, laboratory)
- Hazardous material surveys, sampling, area monitoring, and personnel monitoring during normal operations and accidents
- The plans and procedures for control and QA of the calibration and maintenance processes
- The program used to ensure that all fixed and portable monitoring and sampling equipment is calibrated

This information is provided in the facility-specific SAR.

This page intentionally left blank.

## **8.9 HAZARDOUS MATERIAL PROTECTION RECORDKEEPING**

This section addresses the records requirements of the WSRC IH program at SRS (Ref. 2).

### **8.9.1 RECORDS CONTENT AND ACCESSIBILITY**

WSRC maintains the following records to support health surveillance activities (Ref. 7):

- Hazard assessment reports
- Exposure monitoring data
- Survey reports
- Fit testing reports

This information is included, as required, as part of the hazard assessment and control records addressed in Section 8.6.4.7. IH records comply with the OSH standards in 29 CFR 1910 (Ref. 9).

### **8.9.2 CONTROLLING INVENTORY, RETENTION, AND DISPOSITION OF RECORDS AND REPORTS**

Management Requirement and Procedure (MRP) 3.31, "Records Management," establishes responsibilities and requirements for WSRC compliance with DOE requirements relating to records management. Quality Assurance Procedure (QAP) 17-1, "Quality Assurance Records Management," establishes responsibilities and requirements for generation, identification, validation, receipt, indexing, storage, preservation, retrieval, correction, and disposition of documents designated as QA records. Records associated with the IH program satisfy the requirements of MRP 3.31 and QAP 17-1 (Ref. 6, 18).

### **8.9.3 DOCUMENT CONTROL OF PLANS AND PROCEDURES**

WSRC Procedure Manual 4Q defines the plans and procedures that make up the IH program, including those governing operations involving hazardous materials (Ref. 7).

This section describes the process employed to ensure that IH plans and procedures, including changes, are reviewed for adequacy, approved for release by authorized personnel, and distributed to and used at the locations where hazardous materials are used, processed, or stored (Ref. 2). This process includes the following activities:

- ESH&QA review activities
- Document control activities
- QA activities

These elements of the IH plans and procedures process are described in the following chapters of this SAR:

- Chapter 12 presents the program for developing, maintaining, and modifying procedures.
- Chapter 14 describes the site QA program.
- Chapter 17 addresses the document control program implemented as part of the site configuration management program. Chapter 17 also describes the independent review, audit, and compliance determination responsibilities of ESH&QA applicable to the IH program.

## 8.10 HAZARD COMMUNICATION PROGRAM

Within its special program requirements, the WSRC IH program establishes the SRS hazard communication program. This program implements the provisions of the OSHA hazard communication standard for communicating chemical hazards to employees at SRS and applies to chemicals known to be present in the workplace that employees may be exposed to under normal conditions of use, or in a foreseeable emergency. The program includes the following elements described in this section (Ref. 7):

- Written program locations
- Hazard evaluation
- Hazardous chemical list
- Nonroutine tasks
- Hazard warning labeling
- MSDSs
- Information and training
- Notification of hazards to contractors

WSRC is the controlling employer at facilities addressed by this SAR. Therefore, no information is presented that addresses a multi-employer worksite as specified in the SAR content guide (Ref. 2).

The hazard communication requirements come from the CFR: 29 CFR 1910.1200, 1910.1450, and 29 CFR 1926.59 (Ref. 9). Records associated with the hazard communication program satisfy the requirements relating to record management listed in Section 8.9.

### 8.10.1 WRITTEN PROGRAM LOCATIONS

The SRS hazard communication program is maintained by the S&HO Department as a procedure within the WSRC Procedure Manual 4Q. A copy is included in the master, area-, and facility-specific sets of MSDS binders (Ref. 7).

### 8.10.2 HAZARD EVALUATION

Nonradioactive chemicals either manufactured onsite or imported from offsite are evaluated to determine if they are hazardous. WSRC determines the hazards of chemicals for which manufacturer MSDSs cannot be obtained. Hazard evaluations of chemicals are performed in accordance with the requirements of 29 CFR 1910.1200, Appendix B. MSDSs and warning labels are developed using current technical information (Ref. 7, 9).

### 8.10.3 HAZARDOUS CHEMICAL LIST

The Chemical Commodity Management Center (CCMC) maintains a sitewide list of all chemicals at SRS, which functions as the index to the master MSDS binder. Departmental chemical coordinators maintain optional area-specific chemical indexes for MSDS binders under their control (Ref. 7).

### 8.10.4 HAZARD WARNING LABELING

Each chemical received, delivered, or used by WSRC is labeled, tagged, or marked in English with the following information (Ref. 7):

- Identity of the chemical
- Appropriate hazard warning
- Name and address of the chemical manufacturer, importer, or other responsible party

The identity used on the label (i.e., chemical or trade name) must be traceable to an MSDS. Abbreviations and acronyms used on the label must be cross-referenced in the department's MSDS binder index to facilitate retrieval of the appropriate MSDS (Ref. 7).

A labeling system based on the National Fire Protection Association (NFPA) labeling system has been selected for use at SRS. The objective of the labeling system is to provide a system that characterizes a chemical by its health and physical hazards. In general, containers storing chemicals that are not considered for "immediate use" have a manufacturer's hazard warning label, or an SRS-generated chemical identity/NFPA label. The hazard-warning label is placed in a location on the container that is readily visible to the user. More than one label may be necessary on large tanks and vessels (Ref. 7).

In cases where chemical containers are not provided with the appropriate labeling information or where the label is torn, or defaced, the chemical's custodian performs the following actions (Ref. 7):

- Removes the chemical from, or prohibits its use in, the work area
- Contacts the departmental chemical coordinator for assistance in obtaining a new label from the manufacturer
- If the manufacturer cannot be reached, submits a request to the CCMC for assistance in generating an SRS hazard-warning label

#### 8.10.5 MATERIAL SAFETY DATA SHEETS

WSRC requires that all employees have access to MSDSs for the products they are required to use. Copies of MSDSs can be obtained from the following sources (Ref. 7):

- The SRS Intranet (ShRINE)
- Departmental chemical coordinator
- Master MSDS binder
- Manufacturer

The location of optional department MSDS binders and identification of the departmental chemical coordinator are displayed on colored posters throughout WSRC work areas (Ref. 7).

As MSDSs are obtained for chemicals currently used at SRS, they undergo the following process (Ref. 7):

- Reviewed for completeness
- Assigned an SRS tracking number
- Incorporated into the sitewide chemical listing
- Entered into the site MSDS system (i.e., master binders and ShRINE)

#### 8.10.6 INFORMATION AND TRAINING

WSRC provides employees with information and training on hazardous chemicals in their work area at the time of their initial assignment and annually thereafter, whenever a new hazard is introduced into the workplace, and for nonroutine tasks. This training consists of two programs supplemented by area-specific training (Ref. 7).

Employees who have been determined by line management to have a reasonable likelihood for exposure to hazardous chemical/materials during the performance of their work initially receive Basic Hazard Communication Training and annual retraining through attendance at Consolidated Annual Training. In addition, employees receive facility-specific hazard communication training provided by their individual organizations.

Employees who have been determined by line management to work with hazardous chemicals/materials in a laboratory scale in accordance with an approved Chemical Hygiene Plan will receive Laboratory Standard Training in lieu of Basic Hazard Communication Training.

#### 8.10.7 NOTIFICATION OF HAZARDS TO CONTRACTORS

The Subcontractor Technical Representative is responsible for informing subcontractors of the requirements specified in the SRS hazard communication program. Information, on the hazards of chemicals used onsite, is communicated through hazard communication training, MSDSs, and

hazard warning labels. Subcontractors are required to label and use chemicals as prescribed in site procedures and MSDSs (Ref. 7). Subcontractor compliance with requirements of the hazard communication program is ensured through contractual stipulations, audits, etc. |

## **8.11 OCCUPATIONAL CHEMICAL EXPOSURES**

Predicted exposure levels to facility workers from hazardous materials are provided in the facility-specific SARs (Ref. 2).

This page intentionally left blank.

## 8.12 REFERENCES

1. Nuclear Safety Analysis Reports. DOE Order 5480.23, U.S. Department of Energy, Washington, DC, March 1994.
2. Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports. DOE-STD-3009-94, U.S. Department of Energy, Washington, DC, July 1994.
3. Standards/Requirements Identification Document. WSRC-RP-94-1268-004. Westinghouse Savannah River Company, Aiken, SC, January 1999.
4. Compliance Assurance Manual. WSRC Procedure Manual 8B, Westinghouse Savannah River Company, Aiken, SC, June 1998.
5. Management Policies. WSRC-1-01, Westinghouse Savannah River Company, Aiken, SC, December 1998.
6. Management Requirements and Procedures Manual. WSRC Procedure Manual 1B, Westinghouse Savannah River Company, Aiken, SC, November 1998.
7. Industrial Hygiene Manual. WSRC Procedure Manual 4Q, Westinghouse Savannah River Company, Aiken, SC, January 1999.
8. Worker Protection Management for DOE Federal and Contractor Employees. DOE O 440.1A, U.S. Department of Energy, Washington, DC, March 1998.
9. Code of Federal Regulations; Title 29, "Labor"; Parts 1900-1999, "Occupational Safety and Health Administration." 29 CFR 1900-1999, U.S. Government Printing Office, Washington, DC, as of August 1995.
10. Procurement Management. WSRC Procedure Manual 7B, Westinghouse Savannah River Company, Aiken, SC, October 1998.
11. Employee Safety Manual. WSRC Procedure Manual 8Q, Westinghouse Savannah River Company, Aiken, SC, January 1999.
12. Environmental Compliance Manual. WSRC Procedure Manual 3Q, Westinghouse Savannah River Company, Aiken, SC
13. "Protection of Environment," Parts 1-799, Code of Federal Regulations. Title 40, U.S. Government Printing Office, Washington, DC, as of June 1995.
14. Site-Level Training Requirements. WSRC-IM-92-57, Westinghouse Savannah River Company, Aiken, SC, April 1993.
15. Industrial Hygiene Survey Procedures. WSRC Procedure Manual 4Q1.1, Westinghouse Savannah River Company, Aiken, SC, November 1998.

16. Industrial Hygiene Instruments. WSRC Procedure Manual 4Q1.2, Westinghouse Savannah River Company, Aiken, SC, December 1998.
17. Respiratory Protection Manual. WSRC Procedure Manual 4Q1.6, Westinghouse Savannah River Company, Aiken, SC, November 1998.
18. Quality Assurance Manual. WSRC Procedure Manual 1Q, Westinghouse Savannah River Company, Aiken, SC, October 1998.

# GENERIC SAFETY ANALYSIS REPORT

## CHAPTER 11 OPERATIONAL SAFETY

September 1999

Westinghouse Savannah River Company  
Aiken, SC 29808



#### DISCLAIMER

This document was prepared by Westinghouse Safety Management Solutions LLC (WSMS) under contract with Westinghouse Savannah River Company (WSRC), subject to the warranty and other obligations of that contract and in furtherance of WSRC's contract with the United States Department of Energy (DOE).

Release to and Use by Third Parties. As it pertains to releases of this document to third parties, and the use of or reference to this document by such third parties in whole or in part, neither WSMS, WSRC, DOE, nor their respective officers, directors, employees, agents, consultants or personal services contractors (i) make any warranty, expressed or implied, (ii) assume any legal liability or responsibility for the accuracy, completeness, or usefulness, of any information, apparatus, product or process disclosed herein or (iii) represent that use of the same will not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trademark, name, manufacture or otherwise, does not necessarily constitute or imply endorsement, recommendation, or favoring of the same by WSMS, WSRC, DOE or their respective officers, directors, employees, agents, consultants or personal services contractors. The views and opinions of the authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.



**CONTENTS (continued)**

---

	<u>Page</u>
11.3.2.2 Professional Behavior .....	11.3-5
11.3.2.3 Monitoring the Main Control Panels.....	11.3-5
11.3.2.4 Control Area Operator Ancillary Duties .....	11.3-5
11.3.2.5 Operation of Control Area Equipment.....	11.3-5
11.3.3 Communications .....	11.3-6
11.3.3.1 Written Communications .....	11.3-6
11.3.3.2 Verbal Communications.....	11.3-6
11.3.3.3 Public Address Communications .....	11.3-7
11.3.3.4 Radio Communications.....	11.3-7
11.3.3.5 Emergency Communications .....	11.3-7
11.3.4 Control of On-shift Training .....	11.3-7
11.3.4.1 On-shift Training Program Development.....	11.3-8
11.3.4.2 Adherence to Programs .....	11.3-8
11.3.4.3 Trainer/Evaluator Qualification .....	11.3-8
11.3.4.4 Control of Trainees.....	11.3-8
11.3.4.5 Operator Qualification Program Approval.....	11.3-9
11.3.4.6 Training Documentation .....	11.3-9
11.3.4.7 Suspension of Training.....	11.3-9
11.3.4.8 Maximum Number of Trainees .....	11.3-9
11.3.5 Control of Equipment and Systems Status .....	11.3-9
11.3.5.1 Status Change Authorization and Reporting .....	11.3-10

---

**CONTENTS (continued)**

---

	<u>Page</u>
11.3.5.2 Status Boards.....	11.3-11
11.3.5.3 Equipment and System Alignments .....	11.3-11
11.3.5.4 Equipment Locking for Administrative Control ....	11.3-11
11.3.5.5 Equipment Deficiency Identification and Documentation .....	11.3-12
11.3.5.6 Work Authorization and Documentation .....	11.3-12
11.3.5.7 Equipment Post-Maintenance Testing and Return to Service .....	11.3-12
11.3.5.8 Alarm Status.....	11.3-12
11.3.5.9 Temporary Modification Control .....	11.3-13
11.3.6 Lockouts and Tagouts .....	11.3-13
11.3.7 Independent Verification Practices.....	11.3-14
11.3.7.1 Components Requiring Independent Verification.....	11.3-14
11.3.7.2 Occasions Requiring Independent Verification.....	11.3-15
11.3.7.3 Verification Techniques .....	11.3-15
11.3.7.4 Guidelines for Personnel Performing Independent Verifications .....	11.3-15
11.3.8 Logkeeping.....	11.3-15
11.3.9 Operations Turnover .....	11.3-16
11.3.9.1 Document Review .....	11.3-16
11.3.9.2 Walkdowns.....	11.3-17
11.3.9.3 Discussion and Exchange of Information .....	11.3-17

---

**CONTENTS (continued)**

---

	<u>Page</u>
11.3.9.4 Relief Occurring During the Shift .....	11.3-17
11.3.10 Operations Aspects of Facility Chemistry and Unique Processes .....	11.3-18
11.3.11 Required Reading .....	11.3-18
11.3.12 Timely Orders to Operators.....	11.3-18
11.3.13 Operator Aid Postings .....	11.3-19
11.3.14 Equipment and Piping Labeling .....	11.3-20
11.4 Fire Protection .....	11.4-1
11.4.1 Fire Hazards .....	11.4-1
11.4.2 Fire Protection Program and Organization.....	11.4-1
11.4.2.1 Fire Protection Policy, Organizations, and Administrative Plans and Procedures.....	11.4-2
11.4.2.2 Fire and Explosion Protection Criteria.....	11.4-4
11.4.2.3 Fire Protection Requirements.....	11.4-4
11.4.2.4 Fire Protection Reviews .....	11.4-5
11.4.2.5 Fire Safety Deficiency Classification.....	11.4-5
11.4.3 Combustible Loading Control .....	11.4-6
11.4.3.1 Control of Combustibles .....	11.4-6
11.4.3.2 Control of Ignition Sources .....	11.4-7
11.4.3.3 Control of Special Hazards .....	11.4-7
11.4.4 FireFighting Capabilities.....	11.4-8

---

**CONTENTS (continued)**

---

	<u>Page</u>
11.4.4.1 Fire Protection Personnel and Training Requirements.....	11.4-8
11.4.4.2 Firefighting in Radiation and Hazardous Chemical Environments .....	11.4-10
11.4.4.3 Fire Response Procedures .....	11.4-11
11.4.4.4 Firefighting Equipment .....	11.4-11
11.4.5 Firefighting Readiness Assurance .....	11.4-11
11.4.5.1 Fire Prevention Inspection Program.....	11.4-11
11.4.5.2 Fire Safety Drills and Exercises .....	11.4-12
11.4.5.3 Fire Protection Program Reports and Record Keeping Practices .....	11.4-12
11.5 REFERENCES.....	11.5-1

---

**ACRONYMS AND ABBREVIATIONS**

---

AHJ	Authority Having Jurisdiction
ALARA	As Low As Reasonably Achievable
CA	Control Area
DNO	Do Not Operate
DOE	Department of Energy
ESH&QA	Environment, Safety, Health and Quality Assurance
FHA	Fire Hazards Analysis
FPC	Fire Protection Coordinator
FPPD	Fire Protection Program Department
FSD	Fire Safety Deficiency
GSAR	Generic Safety Analysis Report
MOU	Memorandum of Understanding
NFPA	National Fire Protection Association
ORR	Operational Readiness Review
OSHA	Occupational Safety and Health Administration
PA	Public Address
RRP	Required Reading Program
S/RID	Standards/Requirements Identification Document
SAR	Safety Analysis Report
SRS	Savannah River Site
T/E	Trainer/Evaluator
TSR	Technical Safety Requirement
UL	Underwriter Laboratories
WSRC	Westinghouse Savannah River Company

---

## 11.0 OPERATIONAL SAFETY

### 11.1 INTRODUCTION

#### 11.1.1 OBJECTIVE

The purpose of this chapter of the Safety Analysis Report (SAR) for Department of Energy (DOE) nuclear facilities and operations at the Savannah River Site (SRS) is to provide information that satisfies paragraph 8.b. (3)(q) of DOE Order 5480.23, as amplified in Attachment 1, paragraphs 4.f. (3)(d) 17 (Topic 17). The requirements of this DOE Order pertain to operational safety. This chapter also includes information that partially satisfies paragraphs 8.b. (3)(b), (f), and (u) of the DOE Order (Ref. 1, 2).

#### 11.1.2 SCOPE

This chapter discusses general aspects of operational safety and fire protection. It specifically focuses on the bases of operations programs specified by DOE Order 5480.19 (Ref. 3). DOE Order 5480.19 addresses many of the other topics covered in DOE Order 5480.23 (e.g., management, organization, the institutional safety provisions, procedures, training, and human factors) (Ref. 1, 3). Therefore, elements of conduct of operations are covered in other chapters. Specifically, major issues of operations organizations, administration, and training are covered in Chapter 12 and Chapter 17 of this Generic Safety Analysis Report (GSAR). Major issues of notification, reporting practices, and investigation of abnormal events are covered in Chapter 17. Control of procedures is covered in Chapter 12.

The scope of this chapter includes the following:

- Identification of aspects of the Conduct of Operations Program
- Integrated summary of the main features of the Conduct of Operations Program
- Description of the Fire Protection Program

When required information is provided in another chapter of this GSAR, that chapter is referenced to limit repetition. In those cases where policies, programs, and practices important to safe operation are described in detail in other site documents, the salient features are summarized for inclusion in this chapter and the documents are referenced (Ref. 2).

This page intentionally left blank

## **11.2 REQUIREMENTS**

Standards/Requirements Identification Documents (S/RIDs) state the codes, standards, and regulations governing operational safety at SRS (Ref. 4). Programmatic compliance assessment has been performed against the S/RIDs and documented as specified in the Westinghouse Savannah River Company (WSRC) Procedure Manual 8B (Ref. 5). The Standards Management/Compliance Section maintains records of the programmatic compliance assessments.

This page intentionally left blank.

### 11.3 CONDUCT OF OPERATIONS

WSRC, in accordance with S/RIDs, has established and maintains a Conduct of Operations Program to enhance the safe operation of its facilities at SRS (Ref. 4). Conduct of operations requirements apply to the programs and functions of SRS operations that may have an impact on the safety of the public, environment, and all site personnel.

Conduct of operations is defined here as the assurance of acceptable performance of all operations and support activities that may affect safety. These activities may vary widely in complexity and potential safety impact, ranging, for example, from the performance of a simple chemical analysis to the startup of a Hazard Category 2 nuclear facility. Regardless of the degree of complexity, the same quality level of performance is expected. Conduct of operations also requires a commitment to continuously improve operations by using total quality principles (Ref. 6).

The SRS Conduct of Operations Program is implemented through WSRC Procedure Manual 2S (Ref. 7). The WSRC Procedure Manual 2S describes an alternate implementation method for implementing the program requirements, the conditions under which the graded approach may be used, and the method for documenting and obtaining approval for the use of the graded approach (Ref. 7).

#### 11.3.1 SHIFT ROUTINES AND OPERATING PRACTICES

The Conduct of Operations Program specifies the shift routines and operating practices that apply to facility operations and support personnel. The program includes standards for professional conduct, good watch standing practices, equipment monitoring, and management responsibilities that are fundamental to operating a facility (Ref. 7).

The following sections describe the guidance and requirements provided for shift routines and operating practices. The facility-specific SAR may provide further details in this area.

##### 11.3.1.1 Facility Operating Practices

Various facility-operating practices are specified. For example, operation of mechanisms and apparatus, other than controls, that may indirectly affect the process is only accomplished with the knowledge and consent of the qualified operators on-shift and the shift manager. Also, operations personnel respond to instrument indications and alarms until such indications and alarms are proven to be false. The shift manager is promptly notified of changes in facility status, abnormalities, or difficulties encountered in performing assigned tasks (Ref. 7).

#### 11.3.1.2 Operation During Abnormal or Emergency Conditions

Operators believe instrument indications and alarms unless they are proven to be false. When process operations are not as expected, the process is returned to a known safe condition, and the shift manager is notified. If conditions warrant, the process is discontinued until the cause of the condition has been determined and safe conditions are restored. Operators manually shut down the process using approved procedures if system parameters for trips or safety systems exceed their actuation setpoint and automatic actuation does not occur (Ref. 7).

#### 11.3.1.3 Authority to Operate Equipment

The shift manager directs the overall operation of the facility. In general, Control Area (CA) operators (where assigned) and shift managers are aware of the activities affecting facility equipment. However, activities that do not affect safety, regulatory requirements, or operating capability can be performed without informing the CA operator or shift manager, if decided in advance of the activity and properly documented. In addition, during emergencies, operators are expected to take necessary immediate actions required to ensure personnel, facility, environmental, and general public safety without prior approval; however, the appropriate supervisors are informed promptly of this type of action (Ref. 7).

#### 11.3.1.4 Operator Rounds and Tours

Operators conduct tours of the areas within their responsibility on a regular basis. Each tour is of sufficient detail to ensure that the status of equipment is known. Equipment is inspected to ensure that it is operating properly or, in the case of standby equipment, that it is fully operable. Operators take appropriate action to correct or report deficiencies noted during tours. Supervision ensures that appropriate corrective action has been initiated for each abnormal condition noted in round sheets and logbooks (Ref. 7).

#### 11.3.1.5 Personnel Protection

Operations personnel must be appropriately qualified to follow good radiological protection practices to maintain personnel radiation exposure As Low As Reasonably Achievable (ALARA). They must also minimize exposure to chemicals, electromagnetic fields, toxic materials, and other personnel hazards. Operations supervisory personnel periodically review exposure trends of operations personnel under their supervision as part of the ALARA program (Ref. 7).

#### 11.3.1.6 Shift Operating Bases

Each facility establishes a base where an operator returns when not performing duties within the facility. The base is located at a convenient place within the operator's area of responsibility and is appropriately equipped with the office equipment necessary to maintain required procedures

and references for conducting administrative duties and to maintain adequate communications equipment. Shift turnovers are conducted at the operating base or at a central location in the case of group shift turnover briefings (Ref. 7).

#### 11.3.1.7 Shift Turnover

The purpose of the shift turnover process is to assure that relief personnel are provided with the knowledge required to accomplish their shift assignment responsibilities. Shift turnover is a critical period during which it is essential that the oncoming shift or relief personnel are provided with complete and accurate information regarding the facility's overall status (Ref. 7).

#### 11.3.1.8 Resetting of Alarms or Protective Devices

Personnel do not adjust or operate alarm, interlock, or equipment-operating setpoints unless such action is specifically authorized by approved operating procedures or work orders. Protective devices (e.g., circuit breakers, fuses) are not reset until the cause of the trip is understood with reasonable assurance. Reset criteria and associated requirements are described in the Conduct of Operations manual (Ref. 7).

Alarm status is addressed in Sections 11.3.5 and 11.3.9.

#### 11.3.1.9 Potentially Distractive Written Material and Devices

Written materials that do not relate to operation and entertainment devices such as radios, televisions, tape players, and computer games are prohibited from use by operations personnel to minimize distractions from their responsibilities. Operators may read training bulletins, technical manuals, or operating experience information, or they may review other written, audible, or visual materials that relate to operator duties (Ref. 7).

#### 11.3.1.10 Key Control

To facilitate control over keys that are used in day-to-day operations, a key accountability log is in place to record the keys being used and the individuals in possession of the keys. The key storage cabinet contains an inventory list to expedite the locating of keys. Key accountability is maintained by conducting routine inventories (Ref. 7).

#### 11.3.1.11 Overtime

General overtime guidelines are provided for operations and support personnel. Adequate shift coverage is maintained without relying on overtime. The use of overtime to cover for vacationing employees is avoided, if possible. Specific guidelines dictate the use of substantial amounts of overtime including the following:

- The scheduling of any operator for overtime will be limited in the event that fatigue, or lack of rest may impair the performance of the operator (Ref. 7).
- No person will be permitted to work more than 16 consecutive hours in a 24-hour period, excluding shift turnover time.
- No person will be allowed to work more than 24 cumulative hours in any 48-hour period, excluding shift turnover time.
- No person will be permitted to work more than 72 hours in a 7-day period, excluding shift turnover time.
- No person will be permitted to work more than 14 consecutive days without having two consecutive days off.

#### 11.3.2 CONTROL AREA ACTIVITIES

The Conduct of Operations Program establishes guidelines and requirements for performance of CA activities to ensure that the following conditions are maintained:

- CA activities are conducted in a businesslike manner, in a professional atmosphere that is conducive to safe and efficient operation.
- CA operators are not overburdened with administrative responsibilities.
- Distractions, such as CA access, are minimized so that operators may properly monitor facility parameters.

The guidelines and requirements apply to facility operations and support personnel and to activities conducted in the CAs of the facility. The following sections summarize the guidance and requirements provided for CA activities by the Conduct of Operations Manual (Ref. 7). The facility-specific SAR may provide further details in this area.

##### 11.3.2.1 Control Area Identification and Access

A CA is an area or room having an assemblage of control devices (e.g., switches, dials, breakers, and valves) and indicating/monitoring equipment (e.g., meters, gauges, recorders, digital and analog readouts) that are used for the control of a process or system, where interruption or misoperation of that process or system could jeopardize personnel safety, create a hazard to the environment, or result in significant financial loss. Requirements concerning the assignment of CA operators are determined by the facility manager.

The facility manager clearly defines the CAs within the facility. Each CA is physically identified by visible means such as floor markings, signs, barrier ropes, or chains. Entry requirements are posted at the entrance to the CA. Only designated personnel can grant entry.

The presence of personnel in the CA other than the assigned shift complement and other personnel designated by facility policies, procedures, or instructions is limited. The senior operations staff individual controls specific limits for the number of personnel allowed in the CA. During periods of abnormal or emergency operations, the shift manager normally directs nonessential personnel to exit the CA (Ref. 7).

#### 11.3.2.2 Professional Behavior

Activities in the CA are performed in a disciplined, formal, businesslike, and professional manner. Only activities essential to supporting operation and activities authorized by management are conducted. The noise level in the CA is kept to a minimum. Non-job-related discussions are minimized. Potentially distractive activities, such as reading non-job-related literature, are prohibited. Facility business is conducted at a location in the CA and in a manner that neither distracts on-duty control personnel nor compromises the professional atmosphere of the CA (Ref. 7).

#### 11.3.2.3 Monitoring the Main Control Panels

Operators monitor control panel indications and alarms, monitor control panel indications frequently, and take prompt action to determine the cause of and correct abnormalities. Emphasis is placed on closely monitoring and trending control panel data to detect problem situations early (Ref. 7).

#### 11.3.2.4 Control Area Operator Ancillary Duties

Secondary duties assigned to operators are not allowed to interfere with their primary responsibilities indicated in Section 11.3.2.3. Secondary duties include preparation of tagouts, review of operating procedures, required reading, and review of maintenance work activities. This administrative workload of operators responsible for monitoring and operating the control board is minimized (Ref. 7).

#### 11.3.2.5 Operation of Control Area Equipment

Only operations and support personnel specifically authorized by facility procedures operate CA equipment. When trainees operate this equipment, they are supervised and controlled by the qualified operator who normally performs the operation (Ref. 7).

### 11.3.3 COMMUNICATIONS

The Conduct of Operations Program establishes the methods for effective, reliable, and accurate transmission of information through both verbal and written means. The program specifies restrictions on the use of wireless communication devices. The requirements apply to facility operations and support personnel (Ref. 7).

The WSRC Procedure Manual 2S provides guidance and requirements for communications within the facility, including guidance and requirements for both individuals sending communications and individuals receiving communications. Each of the areas addressed represents an avenue for contacting facility personnel and communicating information to personnel during normal, abnormal, and/or emergency conditions. The facility-specific SAR may provide further details on communication equipment testing.

#### 11.3.3.1 Written Communications

Written communication consists of formalized, controlled documents such as procedures and standing orders and informal written material. The handling, review, and approval of formal written communication are conducted in accordance with administrative procedures (Ref. 7).

#### 11.3.3.2 Verbal Communications

Verbal communication is the most common form of communication and ranges from formal communications, such as performing the notifications required for an unusual event, to routine face-to-face communications. Operating directions are verbal instructions given to an operator that involves the operation of a system or piece of equipment. These instructions are brief and straightforward; otherwise, written communications must be used. Operating directions are to be explicit and understandable and may be given face to face, by telephone, by radio, or through the use of the Public Address (PA) system.

Excluding verbal operating directions given over the PA system, the recipient of verbal operating directions is to acknowledge the directions by repeating (verbatim or paraphrasing) the directions back to the person giving the instructions to ensure understanding. The recipient of the operating directions is responsible for reporting the completion of the activity and, if possible, the results. If the recipient of the directions is concerned that the associated actions cannot or should not be completed as directed, he/she should communicate those concerns to shift management. The person originating the operating directions is to observe any parameters available for confirmation that the activity is proceeding as intended.

The WSRC Procedure Manual 2S provides information and guidance on defining attributes of good verbal communications, and performing verbal communications. The practices described are used during both normal and emergency operations (Ref. 7).

#### 11.3.3.3 Public Address Communications

Normal use of the PA system is restricted to communications essential to operations and vital to personnel safety. As a result of the noise, volume, and distraction associated with the system, its use is minimized. In the event of emergencies or unusual situations, the PA system is used to instantly pass information to personnel. When the system is used to announce an emergency, personnel should be directed to report to specific locations, as applicable (Ref. 7).

#### 11.3.3.4 Radio Communications

The use of wireless communication devices in and around CAs or other areas where sensitive electronic equipment is installed is forbidden except as approved by the facility manager or during specified emergency situations. Personnel using wireless communication devices must be formally trained in their use and restrictions. The Facility Manager should require written instructions stating when and where transmissions shall not occur. This may be in the form of postings or standing orders. The Shift Manager shall provide instructions regarding radio frequency usage (channels) and location for use (postings) (Ref. 7).

#### 11.3.3.5 Emergency Communications

Emergency communication systems are required to ensure that individuals working in an area can be promptly alerted to facility emergencies. The emergency communication systems are tested periodically to ensure that they are functioning properly. To ensure that the proper notifications are made, CA personnel have the authority to override other users of the PA system.

Personnel working in areas where emergency communications cannot be heard make their presence in that area known to the shift manager so that, in the event of an emergency, alternate means of notification may be made (Ref. 8). If the facility has made provisions for area sweeps or other formal means of notifying personnel in areas not reached by emergency communications, the shift manager does not need to be contacted (Ref. 7).

#### 11.3.4 CONTROL OF ON-SHIFT TRAINING

The Conduct of Operations Program specifies requirements for control of on-shift training by facility personnel. On-shift training is the portion of a qualification program where the trainee receives training, within the work environment, with as much hands-on experience as possible. The requirements apply to operations personnel training and qualifications performed in the facility as part of the shift or normal work routine (Ref. 7).

The following sections describe the guidance and requirements provided for control of on-shift training. The facility-specific SAR may provide further details in this area. See Chapter 12 for information regarding compliance of training programs with DOE Orders.

#### 11.3.4.1 On-shift Training Program Development

Each facility ensures that on-shift-training programs are developed for its supervisors, operators, and trainees seeking certification/qualification. The site training program specifies the administrative requirements for on-shift training (Ref. 7, 9).

#### 11.3.4.2 Adherence to Programs

On-shift training is conducted in accordance with qualification programs that specifically identify items that the trainee must accomplish on-shift. The knowledge requirements for each item are defined, as well as what actions the trainee must do (i.e., perform, simulate, or discuss). Both the Trainer/Evaluator (T/E) and the trainee must understand what is required for each item (Ref. 7).

#### 11.3.4.3 Trainer/Evaluator Qualification

T/Es conduct on-shift training and are both qualified in on-shift instructional techniques, as specified in the site-training program, and currently or previously qualified as an operator in the duty area to be taught. T/Es are specifically selected, taking into account communication skills, technical knowledge, and ability to provide trainees with hands-on experience (Ref. 7, 9).

#### 11.3.4.4 Control of Trainees

Whenever a trainee operates equipment, the T/E observes the trainee to ensure that the trainee does not make an error. When trainees record entries on official documents (e.g., log sheets), the T/E co-signs to verify that the recorded information is correct. The T/E, as the qualified/certified operator, is responsible for actions taken by the trainee (if the T/E is not currently qualified/certified, equipment operation must be performed under the direction of a qualified/certified operator).

Trainees may be used to support operations work activities when approved by the facility manager and with a qualified operator present. Trainee participation in production functions is limited to those duties for which the trainee has been qualified. Satisfactory completion of a single performance item does not necessarily qualify a trainee for performing that function. The potential interrelationship of any function with other systems and equipment requires that a trainee be fully qualified for a position before being allowed to operate equipment without a supervisor or T/E present.

The T/E must receive control room approval from the shift manager or the control room supervisor prior to beginning any job performance measures that involve actual operation of equipment. Prior to actually performing activities that affect production or facility safety, the T/E informs the examinee and the control room supervisor or shift manager of the planned task (Ref. 7).

#### 11.3.4.5 Operator Qualification Program Approval

The facility manager approves the operator qualification program. The division training manager coordinates changes to the program (Ref. 6, 7).

#### 11.3.4.6 Training Documentation

Completion of the trainee qualification program must be formally documented. A qualified instructor documents classroom requirements and written examination results. On-shift training and system checkouts are conducted in accordance with the requirements of the site-training program and documented by T/Es. Job performance examination results are documented by the facility training coordinator. Documentation requirements, including training record retention, are addressed in the WSRC Procedure Manual 4B (Ref. 7, 9).

#### 11.3.4.7 Suspension of Training

Trainee operation of equipment is immediately suspended during unanticipated or abnormal events, accident conditions, or whenever qualified operations personnel or the T/E believe suspension is necessary to ensure safe and reliable facility operation. During abnormal or accident conditions, trainees do not participate in facility operations unless specifically directed to do so by the watchstander (Ref. 7).

#### 11.3.4.8 Maximum Number of Trainees

Limiting the trainee-to-instructor ratio ensures that the trainee is provided with effective instruction and that the instructor is not distracted by having too many trainees. The facility manager normally limits the number of trainees to no more than three trainees per T/E. The facility manager may specify changes to this limit. Shift managers and supervisors ensure that the specified limit is adhered to (Ref. 7).

### 11.3.5 CONTROL OF EQUIPMENT AND SYSTEMS STATUS

To satisfy design bases and operational limits, the proper component, equipment, and system configurations must be established and maintained. Site-level procedures contain guidelines and requirements for maintaining a configuration control program in SRS facilities and for ensuring that the current configuration of equipment is known to facility operators (Ref. 10).

The Conduct of Operations Program establishes requirements to ensure that the following conditions are maintained:

- Facility configuration control is maintained in accordance with procedural and design requirements.
- Operating shift personnel know the status of facility equipment and systems.

The requirements apply to facility operations and support personnel responsible for administrative controls, procedures, and requirements that govern equipment and systems status (Ref. 7).

The following sections describe the guidance and requirements provided for control of equipment and systems status. The facility-specific SAR may provide further details in this area.

WSRC Procedure Manuals 4Q and 8Q address control of equipment and systems status in terms of personnel protection (Ref. 11, 12). Various elements of the WSRC Procedure Manual 4Q are described in Chapter 8 of this SAR.

#### 11.3.5.1 Status Change Authorization and Reporting

Each facility is evaluated to identify equipment and systems subject to status control requirements. As a minimum, the following equipment is required to satisfy status control requirements:

- Safety-related equipment and systems (i.e., those equipment and systems, including their structures and components, identified in the facility safety documentation such as the SAR and Technical Safety Requirements (TSRs) as necessary to ensure safe facility operation)
- Equipment and systems used to monitor or control environmental releases

Changes in equipment and system configuration, such as the ones that result from maintenance, modification, and testing activities, are communicated from shift to shift through the shift turnover process (see Section 11.3.9). Turnover checklists and equipment status boards are used as aids for compiling and transmitting status information efficiently and accurately.

The shift manager is responsible for maintaining proper facility configuration and is the only individual allowed to authorize status changes to equipment and systems subject to status control requirements. The facility manager identifies equipment and systems that require shift manager approval prior to a status change.

Authorization of status changes to equipment and systems of lesser importance may be delegated by the shift manager to cognizant operators, but the shift manager retains responsibility. The shift manager is periodically advised of status changes to delegated equipment and systems.

The shift manager ensures that status changes to equipment and systems are communicated to facility operators. Normally, facility operators are in the line-of-information flow to and from the shift manager.

Status changes to equipment and systems are reported to the governing station (e.g., CA) or to the individual, or relief, who authorized the change. Obtaining the authorization for the performance of the procedure and then reporting the completion of the procedure, constitutes status change reporting (Ref. 7).

#### **11.3.5.2 Status Boards**

Status boards are used as aids for compiling and transmitting information efficiently and accurately. The status board provides a visual overview of the current status of selected equipment and systems for which a specific CA is responsible. Status boards are not normally developed for equipment and systems that undergo frequent status changes (i.e., several changes per shift). Status boards are kept current and reviewed at shift turnover (see Section 11.3.9) (Ref. 7).

#### **11.3.5.3 Equipment and System Alignments**

Individual components for facility equipment and systems are properly aligned or checked for proper alignment before the equipment or systems is initially placed into operation, which includes new equipment and systems. Alignment checklists or procedures with the same degree of control are used to establish the correct component positions. Alignments are only required for equipment and systems required to be operational.

An initial alignment establishes a baseline configuration upon which further operations are measured. Once the equipment or system is aligned and operating properly, frequent complete alignments may not be necessary. Typical situations that may require equipment and systems to be aligned include startup from major outages, changes in operational mode, and special alignments for portions of equipment or systems affected by maintenance or danger tag removal. The alignment of equipment and systems is normally verified completely at least every 2 years.

Status control requirements may be temporarily relaxed with the approval of the facility manager (Ref. 7).

#### **11.3.5.4 Equipment Locking for Administrative Control**

Control locks provide a physical restraint on the operation of equipment and provide assurance that equipment will only be operated by qualified personnel performing required evolutions. The facility operations manager develops, evaluates, and updates the list of equipment that require control locks. The shift manager authorizes removal of control locks and the repositioning of control-locked equipment before manipulation.

Control-locked equipment is periodically inspected. If at any time equipment that is normally locked is found unlocked or locked in the wrong position, the process is placed in a safe condition, and the shift manager is notified (Ref. 7).

Additional information concerning lockouts and tagouts is provided in Section 11.3.6.

#### 11.3.5.5 Equipment Deficiency Identification and Documentation

Deficiencies and malfunctions are logged and, when necessary, investigated. In some cases, a report is made. Equipment deficiencies are identified using a uniquely numbered and controlled tag. Equipment classified as out of service or inoperable is noted on the applicable equipment status boards (Ref. 7).

#### 11.3.5.6 Work Authorization and Documentation

The shift manager (or designee) gives initial written authorization on the document controlling work activities and continuing authorization for shift activities performed on facility areas under his/her cognizance. As a minimum, this authorization applies to work activities that affect equipment important to safety, equipment important to operations, or equipment that changes CA indications or alarms. Documentation of work status includes log entries and turnover checklists that are available in the CA for review by operations personnel (Ref. 7).

#### 11.3.5.7 Equipment Post-Maintenance Testing and Return to Service

Equipment is tested following maintenance to demonstrate that the equipment is capable of performing its intended function, that the maintenance was performed correctly, and that no problems were introduced during the maintenance. Required testing is specified on the maintenance work order or accompanying documentation and includes the equipment functions that may have been affected by the maintenance. Tests are conducted in accordance with written instructions or formal procedures. Unsatisfactory test results require evaluation, corrective action, and retesting.

Requirements for returning equipment to service are entered on the applicable work controlling documents. Prior to returning equipment to service, the shift manager ensures proper facility conditions including completion of required alignments and surveillance tests (Ref. 7).

#### 11.3.5.8 Alarm Status

The status of control area and local panel alarms must be readily available to operations personnel and included in the shift turnover process. Available information includes a list of the following alarms (Ref. 7):

- Alarms that are totally disabled
- Alarms with individual inputs disabled
- Alarms with temporarily changed setpoints
- Alarms that are normally illuminated during operation
- Multiple input alarms that do not re-indicate (i.e., reflash) when more than one input is activated

The shift manager shall ensure appropriate actions are taken to monitor equipment parameters for abnormal conditions that would be masked by deficient or non-re-indicating (i.e., non-reflashing) visual or audible alarms. The shift manager determines and implements the actions (Ref. 7).

#### 11.3.5.9 Temporary Modification Control

Temporary modifications to configuration items of facility equipment, components, and systems are controlled in accordance with the temporary modification requirements in the WSRC Procedure Manual E7. The WSRC Procedure Manual E7 specifies requirements concerning temporary modification initiation, technical evaluation, review and approval, installation, periodic reviews, removal, extensions, control form revisions, work package closure, and documentation (Ref. 7, 13).

#### 11.3.6 LOCKOUTS AND TAGOUTS

This section describes the guidance specified in the WSRC Procedure Manual 2S concerning the use of lockouts and tagouts for the purpose of hazardous energy control, performed in accordance with requirements specified in the WSRC Procedure Manual 8Q (Ref. 7, 12). Lockouts and tagouts for the purpose of hazardous material control are performed in a similar manner.

The Conduct of Operations manual specifies the use of lockouts/tagouts for hazardous energy control. Lockout/tagout is a method of hazardous energy control for the protection of site personnel. This is accomplished through the isolation and restoration of equipment and systems to protect personnel from injury, protect equipment from damage, and prevent the release of hazardous material to the environment during maintenance, inspections, testing, training, and similar activities (Ref. 7, 12).

The lockout/tagout program provides the primary means of controlling the position of energy isolation devices such as valves and circuit breakers, in order to protect personnel, equipment, and the environment from inadvertent release of energy or hazardous material. Locks are used in conjunction with the tagout system to provide additional protection against inadvertent movement of energy isolating devices except where equipment design or arrangement makes the use of a lock impractical (Ref. 12).

DANGER - DO NOT OPERATE (DNO) tags shall be regarded as inviolable by all personnel. No person shall change the position of an energy-isolating device that has a DNO tag affixed from the position specified on the tag, nor shall anyone direct or authorize such a change of position except as provided by procedure. No person shall remove a DNO tag from an energy-isolating device or direct or authorize, such removal except as provided by procedure. Any person who violates these rules is subject to disciplinary action, up to and including dismissal and may be subject to civil and criminal penalties as well (Ref. 12).

Control locks provide a physical restraint on the operation of equipment and provides assurance that only qualified personnel performing required evolutions will operate equipment. The facility operations manager develops, evaluates, and updates the list of equipment that require control

locks. The shift manager authorizes removal of control locks and the repositioning of control-locked equipment before manipulation (Ref. 12).

The facility-specific SAR may provide further details in this area.

#### 11.3.7 INDEPENDENT VERIFICATION PRACTICES

The Conduct of Operations Program provides uniform requirements for the site operations independent verification program and establishes a high degree of reliability in ensuring correct facility operation and correct positioning of components such as valves, switches, and circuit breakers. The requirements apply to facility operations and support personnel involved in the performance of independent verifications.

Independent verification is performed in those cases where a reasonable potential exists for component mis-positioning or where the consequence of error is great. The application of the program is dependent upon the safety and operations considerations of each process, system, or facility. Because the possibility of mis-positioning may be quite remote or because the effect of mis-positioning may not be significant to safe and reliable operation, not all components require independent verification. Those systems or components that require independent verification are designated by the facility (Ref. 7).

The following sections describe the guidance and requirements provided for independent verification practices. The facility-specific SAR may provide further details in this area.

Independent verifications involving hazardous energy control are performed in accordance with requirements specified in the WSRC Procedure Manual 8Q (Ref. 12).

##### 11.3.7.1 Components Requiring Independent Verification

The facility manager prepares and maintains a facility-specific list of systems and components requiring independent verification.

Safety-related systems require independent verification and are included on the facility-specific list of systems and components requiring independent verification. Safety-related systems are those systems, including their structures and components, identified in the facility safety documentation such as the SAR and TSRs as necessary to ensure safe facility operation. The facility-specific SAR may provide further details in this area. The need for independent verification of specific components in safety-related systems is evaluated on a case-by-case basis.

Independent verifications are performed for certain components in systems not related to safety that, if mis-positioned, could lead to challenges to safety systems or to inadvertent radioactive or chemical releases. In addition, the facility manager considers independent verification for non-safety-related components that, if mis-positioned, could lead to an unplanned shutdown (Ref. 7).

#### **11.3.7.2 Occasions Requiring Independent Verification**

Components receive independent verification when the equipment they serve must be available and a possibility exists that the components may have been mis-positioned. Independent verifications are performed to ensure that systems are properly aligned when equipment is returned to service following maintenance or testing. The site safety program often requires that independent verifications be performed when equipment is removed from service by a lockout/tagout. Independent verifications are performed during equipment and system lineups after extended shutdowns or major maintenance. To verify that associated equipment is fully functional, facilities often perform routine periodic verifications of certain critical components during normal operations (Ref. 7).

#### **11.3.7.3 Verification Techniques**

Specific techniques are used for independent verification of common components, such as manual valves and air-operated valves. General techniques that address items, such as valve position and valve position indicators, are also specified (Ref. 7).

#### **11.3.7.4 Guidelines for Personnel Performing Independent Verifications**

Guidelines for performing independent verifications include, but are not limited to, the following items:

- There must be no doubt as to the determination of the actual position of a component.
- Independent verifications are conducted in a manner such that each check constitutes an actual identification of the component and determination of both its required and actual positions.
- Unless otherwise specified in a procedure, individuals performing the initial action and those performing the independent verification, must be physically separated in location and time to ensure independence.
- The individual performing the independent verification must not rely upon the observed actions of the individual performing the initial action requiring the verification.
- If the actual position of a component cannot be verified due to unfamiliarity with the device, then the independent verifier is directed to seek assistance from the shift manager and/or appropriate manager to resolve the uncertainty (Ref. 7).

#### **11.3.8 LOGKEEPING**

The Conduct of Operations Program specifies the requirements for establishing and maintaining operating logs for key operations positions in order to fully record the data necessary to provide

 |

an accurate history of facility conditions. An operating log is defined as a narrative sequence of events or functions performed by a specific shift position. Operating logs provide a system for ensuring that pertinent information is passed from one shift to the next, allows the history of a key position to be reviewed in event reconstruction, and supports trending analysis.

Facility managers identify operations and support positions that are defined as key positions and develop a key position list for their facility. These are identified in facility standing orders. Each facility provides guidance to its operating personnel, which defines the scope of information unique to each key position's shift operating log. This may be described in standing orders.

Personnel making entries in operating logs fully document all data necessary to provide an accurate shift history. The types of information that should be recorded in operating logs are delineated in the WSRC Procedure Manual 2S (Ref. 7).

The facility-specific SAR may provide further details in this area.

#### 11.3.9 OPERATIONS TURNOVER

The Conduct of Operations Program defines the site shift turnover process. This process ensures that relief personnel are provided with the knowledge required to accomplish their shift assignment responsibilities. The program describes the controls necessary for conducting an orderly and accurate transfer of information regarding the overall status of the facility at shift turnover.

Shift turnover is a critical period during which it is essential that the oncoming shift or relief personnel are provided with a complete and accurate transfer of information regarding the facility's overall status. Requirements have been established to provide shift personnel with a standard format for documenting shift turnovers. The shift turnover process applies to those facility operations that will be continued by an oncoming or relief shift without interruption of the operation. The requirements apply to facility operations and support personnel (Ref. 7).

Each facility develops and maintains turnover checklists that are specific to the CAs and workstations of the facility. As a minimum, shift supervisory and key positions have a turnover checklist to be used in the turnover process. When completed, shift turnover checklists are reviewed for completeness, accuracy, and legibility; each checklist is authenticated by the person who completes it. Additional requirements regarding shift turnover checklists and responsibilities are delineated in the WSCR Procedure Manual 2S (Ref. 7).

The following sections describe the guidance and requirements provided for operations turnover practices. The facility-specific SAR may provide further details in this area.

##### 11.3.9.1 Document Review

Before shift turnover, the off-going shift reviews the turnover checklist. Before assuming responsibility for their shift position, the oncoming shift personnel review the turnover checklist

as intensively as necessary to understand important history, present status, and planned events. The oncoming shift also reviews status documents for their position, such as operating and system status logs (Ref. 7).

#### 11.3.9.2 Walkdowns

The purpose of a walkdown is to determine a facility's current status through observation of the system control indicators, such as status boards, and to verify that equipment is tagged/locked as indicated by the appropriate logbooks. Walkdowns are specified for oncoming personnel (accompanied by off-going personnel), supervisors, and shift test conductors (Ref. 7).

#### 11.3.9.3 Discussion and Exchange of Information

Sufficient time is allotted at turnover to allow the off-going shift to discuss and explain any important items that affect facility operations and safety with the oncoming shift or relief personnel. Oncoming and off-going shift personnel conduct a discussion that includes, but is not limited to, the following items:

- Safety and critical equipment status
- Status of individual systems
- Equipment in operation at turnover
- Inoperable and tagged equipment, including instrumentation and alarms
- Surveillance and equipment work in progress at turnover
- Reportable events
- Special procedures and temporary procedure changes generated during shift

Oncoming personnel ask questions at this time to satisfy the need for a complete understanding of their responsibilities. The off-going personnel are relieved only when the oncoming personnel verbally accept responsibility for the shift position, which is documented in writing in the appropriate operating log (Ref. 7).

#### 11.3.9.4 Relief Occurring During the Shift

Relief occurring during the shift as a result of situations such as meetings and lunch breaks must have a turnover that ensures that the oncoming person is at least as knowledgeable of the facility conditions as he/she would have been had the complete shift turnover process been conducted. Relief occurring during the shift is documented in the applicable operating log (Ref. 7).

#### 11.3.10 OPERATIONS ASPECTS OF FACILITY CHEMISTRY AND UNIQUE PROCESSES

Operational monitoring of facility chemistry or unique data and parameters should ensure that parameters are properly maintained. Monitoring parameters is important to verifying system operation in accordance with design expectations. In order to enhance proper process control of systems, operations personnel must have an understanding of all facility processes and must effectively coordinate operations activities with the respective technical support departments.

Facility managers are responsible for ensuring that each operation's specific responsibilities with respect to chemistry control are defined through approved operations procedures and that specific facility/process training is appropriately addressed. The facility manager shall also ensure that chemical parameters and requirements within the facility are properly identified and implemented. The WSRC Procedure Manual 2S provides additional guidance and requirements for the involvement of operations personnel in facility chemistry and other unique processes (Ref. 7).

The facility-specific SAR may provide further details in this area.

#### 11.3.11 REQUIRED READING

The Required Reading Program (RRP) is a site method for ensuring that individuals are kept informed of important information that will enhance their ability to effectively perform their job assignment. The RRP is required for all operations personnel and those organizations that provide direct support to operations organizations. This may also include information contained in video and audio media as well as written materials.

A designated manager ensures that all appropriate material is included in the RRP and properly completed by personnel. That manager is also responsible for determining if any required reading material is of such significance that affected personnel must read it and understand it before assuming shift or work station responsibilities. Only information that needs documentation indicating an individual has read and understood the material should be included in the RRP (Ref. 7).

The WSRC Procedure Manual 2S provides additional guidance and requirements regarding the establishment, maintenance, and records associated with the RRP (Ref. 7).

The facility-specific SAR may provide further details in this area.

#### 11.3.12 TIMELY ORDERS TO OPERATORS

Shift orders are issued to communicate short-term information and administrative instructions to shift personnel. Information, such as special operations, increased frequency in monitoring certain parameters, classification of administrative instructions, etc., should be conveyed in shift orders.

Standing orders are issued to communicate long-term information and administrative instructions to shift personnel. Special instructions, such as minimum shift manning requirements for all facility conditions, may be included in standing orders (Ref. 7).

Facility and facility operations managers are responsible for the approval and issuance of both standing and shift orders. Standing and shift orders are not to be used in lieu of approved operating procedures or as a means to circumvent necessary procedure changes. If the orders cannot be followed or completed as written, they should be revised only after approval by the issuing authority or designated alternate.

The facility-specific SAR may provide further details in this area.

### 11.3.13 OPERATOR AID POSTINGS

The operator aid posting program describes the requesting, authorization, documentation, placing, and reviewing required to ensure that operator aids are current, complete, and necessary. The use of informal, unauthorized, or out-of-date instructions, notes, graphs, drawings, and other documents in the facility can detract from proper operation or maintenance. Information used in the operation of facility systems must be properly controlled. This is achieved by the following:

- Ensuring that the number of aids are limited to only those considered essential
- Requiring facility management review and approval to issue and post aids
- Maintaining aids in good physical condition and ensuring their technical content is current and correct
- Removing aids when they are no longer required

Operator aids are in many forms, such as copies of procedures, system drawings, handwritten notes, curves, and graphs. Any facility employee may develop an operator aid; however, the operator aid must be approved before posting or use. Facility operations managers are responsible for approving both the need for and the content of operator aids.

CA operators frequently make use of information such as tables or graphs of tank volumes, chemical concentrations, etc. All such information must be controlled to ensure the information is the latest revision. Rather than posting operator aids in CAs, aids are filed in a CA Information Book. All operator aids contained in a CA Information Book are approved and controlled.

An Operator Aid File is maintained and includes an Operator Aid Record Sheet and a copy of each operator aid, either posted or contained in a CA Information Book. This file supports periodic reviews and provides a reference copy should the posted copy be damaged or lost. Shift managers are responsible for maintaining the Operator Aid File and the CA Information Book (Ref. 7).

The facility-specific SAR may provide further details in this area.

#### **11.3.14 EQUIPMENT AND PIPING LABELING**

The equipment and piping labeling program provides the general guidelines required to establish and maintain a standardized and consistent labeling program for permanent identification of plant equipment, valves, instruments, and piping. Implementation of this program is for the following purposes:

- Enhance personnel safety and productivity
- Prevent personnel error and confusion when involved in plant operations and maintenance
- Provide unique identification for use in procedures, records, drawings, Work Management System, and training

Facility managers designate Labeling Coordinators for facilities. Responsibilities of the Labeling Coordinator include:

- Coordinating the labeling program
- Obtaining unique identification numbers and other label information from cognizant individuals
- Maintaining the system or database for ordering labels
- Ensuring the consistency of label material whenever labels are replaced or new labels are added

The WSRC Procedure Manual 2S provides further details concerning this program, including labeling requests, temporary label approval and installation, label specifications, label ordering, label installation, and program maintenance (Ref. 7). The facility-specific SAR may provide further details in this area.

Labeling of piping, containers, and vessels containing hazardous materials for the purpose of hazard communication is in accordance with the Occupational Safety and Health Act (OSHA) requirements specified in the WSRC Procedure Manual 4Q (Ref. 11). Chapter 8 of this GSAR provides additional information concerning these requirements.

## **11.4 FIRE PROTECTION**

Fire protection activities are addressed under Conduct of Operations in this SAR. WSRC, in accordance with S/RIDs, ensures that the following general criteria are satisfied (Ref. 4, 6). The following criteria are not all inclusive of all required criteria:

- New construction conforms with the applicable building code supplemented with additional safety requirements associated with the facility in a graded manner.
- The potential for the occurrence of a fire and related event is minimized.
- Fire does not cause an unacceptable onsite or offsite release of hazardous or radiological material that will threaten health and safety of employees, the public, or the environment.
- Vital DOE programs will not suffer unacceptable interruptions as a result of fire and related hazards.
- Property losses from fire and event perils does not exceed defined limits established by DOE.
- The potential for critical process controls and Safety Class systems being damaged as a result of a fire and related events is minimized.
- Requirements are established that will provide an acceptable degree of life safety to DOE and contractor personnel and the public from fire in DOE facilities.

The specific requirements of this policy are met through the implementation and enforcement of a comprehensive Fire Protection Program based on applicable DOE Orders, nationally recognized codes and standards, and accepted industry practices (Ref. 6). The site Fire Protection Program is implemented through WSRC Procedure Manual 2Q (Ref. 14). Major elements of the program are described in Section 11.4.2.

### **11.4.1 FIRE HAZARDS**

The facility-specific SAR summarizes, as appropriate, the results of overall assessments such as Fire Hazards Analyses (FHAs) and actual facility walkdowns. Section 11.4.3 discusses administrative fire prevention controls used to identify and control potential fire hazards.

### **11.4.2 FIRE PROTECTION PROGRAM AND ORGANIZATION**

This section discusses the WSRC Fire Protection Program. Program requirements are specified in WSRC S/RIDs. The program is procedurally implemented at the site level through the WSRC Procedure Manual 2Q (Ref. 14).

The facility-specific SAR provides additional information for elements of the Fire Protection Program. Chapter 2 of the facility-specific SAR provides detailed information concerning facility fire protection systems.

#### 11.4.2.1 Fire Protection Policy, Organizations, and Administrative Plans and Procedures

The objectives of the WSRC fire protection policy are implemented by the site Fire Protection Program, which establishes minimum requirements for ensuring compliance with the higher-level-of-protection criteria as outlined in DOE Order 420.1 (Ref. 15). The program meets applicable building codes and National Fire Protection Association (NFPA), or exceeds them (when necessary to meet safety objectives) unless written relief is explicitly granted by DOE. This program is characterized by the inclusion of a continuing, sincere interest on the part of management and employees in minimizing losses from fire and related perils and by the inclusion of preventive features necessary to ensure that objectives related to safety are met (Ref. 6).

Implementation of the site Fire Protection Program involves many specific activities by multiple organizations as summarized in MP 4.16, "Fire Protection," in the WSRC 1-01 Manual. These activities and responsibilities are summarized in the following sections (Ref. 6, 14):

#### **FIRE PROTECTION ADMINISTRATION PROGRAM AND FIRE PROTECTION PROGRAM DEPARTMENT**

The Fire Protection Program Department (FPPD) has the primary programmatic responsibility for fire protection at SRS and serves as the primary technical resource for all company-level fire protection matters. FPPD responsibilities include the following activities (Ref. 6):

- Assist facility managers in the consistent application of the Fire Protection Program.
- Provide lesson plans for Fire Protection Program training activities and fire protection engineering support services (excluding design).
- Provide input to support documentation of S/RIDs, FHAs, Criticality Safety Analysis, Exemptions and Equivalencies relative to fire protection.
- Manage fire protection projects and serve as technical agents for fire protection systems, structures and components unless otherwise identified by the Design Authority.
- Operate and maintain the Site Fire Alarm System.
- Assist the SRS Fire Department and facility managers in performing periodic self-assessments and develop and maintain the WSRC company-level reporting system that measures program effectiveness.
- Conduct programmatic assessments.

## FACILITY MANAGERS

Each facility manager has primary responsibility for facility fire protection. Responsibilities include ensuring that:

- The facility complies with the procedures, instructions and requirements of the WSRC Procedure Manual 2Q (Ref. 14)
- Periodic self-assessments are performed in accordance with the WSRC Procedure Manual 12Q (Ref. 16)

## PROJECTS, ENGINEERING AND CONSTRUCTION DIVISION

Projects, Engineering and Construction Division is responsible for approving those FHAs that are input to Fire Risk Assessments, SARs, and other authorization basis documents

## SITE UTILITIES DEPARTMENT

The Site Utilities Department is responsible for the design, management, inspection, and testing of all site fire water supply systems (excluding those in D, S/Z and T Areas). These systems include firewater pumping, storage distribution systems, and hydrants, up to and including, the final post indicator valve outside each facility.

## ENVIRONMENT, SAFETY, HEALTH AND QUALITY ASSURANCE DIVISION

Environment, Safety, Health & Quality Assurance (ESH&QA) is responsible for performing periodic independent assessments of WSRC facilities and FPPD Fire Protection Program performance in accordance with WSRC Procedure Manual 12Q (Ref. 16).

## DIGITAL CONTROLS AND SYSTEMS

Digital Controls and Systems provides centralized fire protection system maintenance, testing, and inspection for fire systems, to include startup and acceptance testing, periodic testing, and technical support of FPPD.

## ALL WSRC ORGANIZATIONS

All WSRC organizations, construction contractors, and subcontract organizations are responsible for complying with all plans, procedures, instructions, and requirements of the WSRC Fire Protection Program (Ref. 12). This includes reporting any action, circumstances or deficiency that could adversely affect or reduce the fire safety at SRS.

## MEMORANDUM OF UNDERSTANDING

Memoranda of Understanding (MOUs) may be utilized by (not a requirement) divisions that own facilities, which have fire protection systems. MOUs establish organizational responsibilities for fire protection related duties. They should confirm responsibilities as stated in the WSRC Procedure Manual 2Q and address any specific changes in those responsibilities as specifically allowed in the WSRC Procedure Manual 2Q responsibilities section (Ref. 14).

The WSRC Procedure Manual 2Q provides the administrative plans and procedures involved in the implementation of the site Fire Protection Program (Ref. 14).

### 11.4.2.2 Fire and Explosion Protection Criteria

DOE has established specific requirements in DOE Order 420.1 for the operation of departmental facilities to protect the public, site personnel, and facilities from the effects of fire. All new SRS facilities, and any modifications of a substantial nature to existing facilities, are designed and built in accordance with DOE Order 420.1 and the mandatory fire protection it contains. The Fire Protection Program has been established by management in accordance with DOE requirements to ensure that the criteria listed in Section 11.4 are satisfied (Ref. 15).

The WSRC S/RIDs are the major sources of DOE fire protection requirements. However, other documents specify additional requirements (e.g., DOE Standard, DOE-STD-1066-97 [Ref. 8]). A list of mandatory fire protection criteria are provided in the WSRC Procedure Manual 2Q along with additional criteria and guidelines pertaining to the DOE Fire Protection Program (Ref. 14).

### 11.4.2.3 Fire Protection Requirements

The Fire Protection Program provides direction and guidance in specifying fire protection requirements for facilities for compliance with DOE Orders and nationally recognized codes and standards such as NFPA codes. Generic requirements are listed in the WSRC 1-01 Manual for the fire protection systems and activities (Ref. 6).

The fire protection related codes and standards in effect when facility design commences (Code of Record) remain in effect for the life of the facility. When substantial modifications of a substantial nature occur, as determined by the Authority Having Jurisdiction (AHJ), the current edition of the code applies to the modification. There are two exceptions as follows:

- Exception 1: If there is a significant hazard that endangers building occupants or the public, as determined by the AHJ, shall meet the requirements of the current edition of the code or standard.
- Exception 2: The Code of Record for NFPA 101, Life Safety Code, is the current edition. This code applies to all new construction and existing buildings. This

code stipulates specific provisions for existing buildings that may differ from those for new construction.

Specific standards and site procedures governing maintenance, testing, inspection, and repair are indicated for each of the fire protection systems (Ref. 14). Operational Readiness Reviews (ORRs) identify noncompliances with the requirements.

Regular surveillance tests of fire protection equipment and systems are conducted as required by NFPA codes, and the results are documented. Specific in-service maintenance procedures are written for individual systems, detailing inspection requirements and frequencies. Maintenance, testing, and inspection schedules are established based on the requirements of the individual NFPA codes, standards, and recommended practices applicable to the individual system or component (Ref. 14).

#### 11.4.2.4 Fire Protection Reviews

The following fire protection reviews are specified to ensure that modifications or work practices do not reduce the level of fire protection required by the S/RIDs.

- New facilities and modifications to existing facilities must undergo fire protection reviews during the project ranging from definition of Functional Performance Requirements to the ORR.
- Line organizations are responsible for ensuring that activities not covered in the WSRC Procedure Manual 2Q are reviewed for compliance with S/RIDs by cognizant personnel (Ref. 6).
- Designs and modifications, acceptance test procedures, fire system test procedures, specifications, and fire equipment procurement documents must be reviewed and comments must be formally tracked on these items.

DOE Order 420.1 specifies that each facility that is termed significant, having major modifications, and/or facilities with significant fire safety risks, shall undergo a FHA (Ref. 15). The WSRC Procedure Manual 2Q lists the minimum content requirements for FHAs. An FHA is performed under the direction of a WSRC or subcontractor qualified fire protection engineer (Ref. 14).

#### 11.4.2.5 Fire Safety Deficiency Classification

WSRC Procedure Manual 2Q outlines procedural steps for evaluating and assigning corrective action priority to previously determined Fire Safety Deficiencies (FSDs). The condition constituting an FSD is the failure to meet the minimum objectives of the DOE Fire Protection Program as delineated in DOE Orders 420.1 and 440.1 (Ref. 15, 17). This classification methodology uses the existing priority classification system developed in WSRC Procedure Manual 1Y to provide a consistent approach to assigning corrective action priorities across the SRS (Ref. 18).

The classification system assists personnel and organizations that have the responsibility for FSD corrective actions in accurately prioritizing these deficiencies. Accurate FSD priority assignment ensures the appropriate level of management attention until the FSD condition is adequately mitigated.

Use of this classification methodology requires knowledge of fire protection hazards, the damage potential associated with a fire event, and the potential risks associated with a deficient condition. Consultation with a qualified fire protection engineer may be warranted to accurately assess the seriousness of a noncompliant condition and to determine the appropriate FSD priority.

This program is currently used in F and H Areas.

#### 11.4.3 COMBUSTIBLE LOADING CONTROL

##### 11.4.3.1 Control of Combustibles

SRS facilities employ administrative controls to identify and control potential fire hazards. Certain administrative controls minimize the risks associated with flammable and combustible materials. The Fire Protection Program includes guidelines and requirements specified in the following areas (Ref. 14):

- General control of transient combustibles
- Use and handling
- Storage criteria for transient combustibles, flammable/combustible liquids, and compressed gases
- Inspections

The use of transient combustibles is limited to those materials and quantities necessary to support work activities. Metal planking, where practical, is used in the construction of scaffolding. Pressure-treated, fire-retardant lumber is used where metal scaffolding is inappropriate. Plastic or fabric tarpaulin sheets must be Underwriter Laboratories (UL)-listed fire retardant materials unless otherwise approved by the fire protection coordinator (Ref. 14).

Transient combustible is stored in areas designated and established by the Fire Protection Coordinator (FPC). General storage criteria, as well as storage criteria for specific materials and containers, are discussed in the WSRC Procedure Manual 2Q (Ref. 14).

Site and facility inspections serve an important role in the control of combustibles. The fire prevention inspection program is discussed in Section 11.4.5.

#### 11.4.3.2 Control of Ignition Sources

SRS facilities employ administrative controls to identify and control potential fire hazards. Ignition sources within a facility are controlled and minimized as noted below (Ref. 14):

- Only UL-listed portable electrical heaters are used (Ref. 14).
- Coffee pots, hot plates, cooking equipment, and portable heaters are turned off at the end of the workday and when not in use.
- Hot work activities, including the use of acetylene welding and cutting torches, electrical welding equipment, blow torches, propane torches, melting pots, portable furnaces and heaters, grinding, spark producing operations and open flames of any kind, require compliance with NFPA standards. A hot work permit is required for all hot work activities. In addition, permits for specific operations are valid for only one job at one location. Multiple operations within a single area at different time periods require multiple permits. Permanent hot work areas in which clearly defined repetitive hot work occurs require Standing Hot Work Permits, which are renewed periodically in accordance with the requirements for new permits (Ref. 14).

More specific information may be found in the facility-specific SAR.

#### 11.4.3.3 Control of Special Hazards

The following areas are addressed as special hazards in the WSRC Procedure Manual 2Q (Ref. 14):

- Hazardous materials storage
- Pyrophoric materials
- Cooling towers
- Combustible metals
- Explosives
- Electric power generation
- Electrical transformers
- Cable installations
- Records storage
- Laboratories
- Idle Buildings
- Gloveboxes, hot cells, hoods and caves protection
- Filters and filter plenums

- Computer systems and telephone exchange systems
- Lasers

The WSRC Procedure Manual 2Q primarily cites NFPA codes for design and operational requirements and responsibilities in these areas (Ref. 14).

#### 11.4.4 FIREFIGHTING CAPABILITIES

##### 11.4.4.1 Fire Protection Personnel and Training Requirements

The following organizations and personnel are involved with the implementation of the Fire Protection Program (Ref. 6):

- Fire Department
- Facility personnel
- FPCs
- Fire wardens
- Fire watches
- Fire patrols

The following paragraphs describe the fire protection functions of these organizations, groups, and positions; specify personnel qualifications and training requirements; and specify firefighting and rescue capabilities (Ref. 14).

#### FIRE DEPARTMENT

The SRS Fire Department serves the following purposes:

- Protect life, including maintaining acceptable life safety for workers in the event of a fire emergency
- Reduce property damage by confinement and extinguishment of fires
- Assist in avoiding unacceptable interruptions of vital DOE programs as a result of fire
- Assist in ensuring that fire does not cause a release of radiological and other hazardous material that will threaten the public health and safety or the environment
- Mitigation of hazardous materials incidents

To serve the above purposes, the Fire Department provides the following emergency services (Ref. 19):

- Fire fighting
- Emergency Medical Service (critical function to include at least 2 EMT-paramedics)
- Rescue (e.g., structure collapse, trench, confined space, and high/low angle rope)
- Hazardous materials response
- Apparatus operator

S/RIDs, WSRC Procedure Manual 2Q, WSRC Procedure Manual 2Q2, and WSRC-SCD-7 establish the site requirements for the Fire Department (Ref. 4, 14, 19, 20). Implementing WSRC Procedure Manual 2Q2 establishes the internal operating procedures for the Fire Department to include such activities as administration, deployment of resources, staffing requirements, training, and response procedures for the services provided (Ref. 19).

The Fire Department organization includes a Chief with overall responsibility for the department, a Battalion Chief(s) who supervises department shift operations, and firefighting personnel who provide the indicated services.

Personnel providing fire department services receive initial training prior to independently performing such services and continuing training while assigned to perform such services.

## LINE ORGANIZATIONS

Line organizations involved in the site Fire Protection Program require qualified WSRC FPPD or subcontractor fire protection engineers and technical personnel to develop and maintain the program. Each organization develops and maintains its own organizational chart that outlines the responsibilities and required qualifications of its various fire protection professionals (Ref. 14).

## FACILITY PERSONNEL

All SRS employees complete Occupant Fire Prevention Training as part of initial General Employee Training and on an annual basis as part of Consolidated Annual Training Program.

## FIRE PROTECTION COORDINATORS

Each facility has an FPC who serves as a single point of contact for overall coordination of fire protection related activities within the facility. Qualifications to fill this position include Fire Warden Training, reading WSRC Procedure Manual 2Q, and Fire Safety Course Training (Ref. 14).

## FIRE WARDENS

The facility manager is responsible for determining the number of fire warden members required for the facility based on building size, materials handled, work flow, and number of personnel in the building. Personnel functioning as facility fire wardens or assistant facility fire wardens periodically complete Fire Warden Training to ensure compliance with OSHA requirements, including fire system operations and basic knowledge of building inspections.

## FIRE WATCHES

Fire watches are typically performed to provide constant fire coverage for activities associated with hot work (Ref. 14).

Personnel performing fire watch duties are trained to ensure compliance with NFPA and OSHA requirements (Ref. 14).

Fire watch personnel have no other duties that would interfere with their ability to monitor the work place or to immediately sound the fire alarm in the event of a fire. Fire watch personnel have the authority to correct or stop any condition that might lead to a fire (Ref. 14).

## FIRE PATROLS

Personnel performing fire patrol duties are trained annually to ensure compliance with NFPA and OSHA requirements (Ref. 14).

Fire patrols, when instituted, provide protection to the facility by performing a scheduled walkthrough inspection of areas identified by the facility manager. Fire patrol personnel patrol their assigned area on a regular basis and are provided with a positive means of documenting the completion of their route (i.e., fire patrol log) (Ref. 14).

Typically, fire patrols monitor a specified area on an hourly basis. When personnel complete fire patrols, the working copy of the fire patrol log is retained to document the patrol (Ref. 14).

### 11.4.4.2 Firefighting in Radiation and Hazardous Chemical Environments

Facility-level procedures contain fire control plans that define the specific responses of facility personnel in the event of a fire. Fire Department Pre-plans exist that define control strategies both inside and outside of radiologically controlled areas and hazardous chemical environments.

Guidelines for control of emergency exposures to radiation are specified in the site radiological control program (Ref. 21).

#### 11.4.4.3 Fire Response Procedures

The WSRC Procedure Manual 2Q provides the administrative plans and procedures involved in the implementation of the site Fire Protection Program (Ref. 14). The Fire Department prepares facility fire preplans for facilities larger than 5,000 square feet or possessing a special hazard.

#### 11.4.4.4 Firefighting Equipment

Specific information on firefighting equipment is provided in the WSRC Procedure Manual 2Q2 (Ref. 19).

### 11.4.5 FIREFIGHTING READINESS ASSURANCE

#### 11.4.5.1 Fire Prevention Inspection Program

The facility manager or a designee performs a periodic facility inspection to confirm the adequacy of the following items related to fire protection per NFPA codes (Ref. 22):

- Transient combustible liquids and solids
- Flammables, combustibles, liquids, and gases
- Impairments
- Exit doors, corridors, stairwells, and signs
- Housekeeping practices
- Emergency lights
- Fire lanes
- Hot work

The results of these inspections are documented, and outstanding deficiencies are tracked until resolution is complete.

The Fire Department conducts a periodic observation of pre-planned SRS facilities. A detailed report is submitted to the facility manager with a copy forwarded to the FPPD. The Fire Department develops and maintains internal operating procedures outlined in the WSRC Procedure Manual 2Q2 (Ref. 19).

ESH&QA is responsible for performing periodic independent appraisals of facilities to satisfy the independent oversight requirements of DOE Order 5482.1B, providing quality assurance support for the Fire Protection Program, and performing biennial site Fire Protection Program assessments to satisfy the independent oversight requirements of S/RIDs (Ref. 4, 14, 23).

The WSRC self-assessment program ensures that facilities meet the requirements of DOE Orders. The WSRC Procedure Manual 2Q specifies a list of program-related, facility-related, and combined aspects of the Fire Protection Program that are assessed and included in the appraisals and also specifies appraisal responsibilities for both facility managers and ESH&QA (Ref. 14).

#### 11.4.5.2 Fire Safety Drills and Exercises

Fire protection drills are conducted in accordance with the requirements contained in fire control pre-plans.

#### 11.4.5.3 Fire Protection Program Reports and Record Keeping Practices

Fire investigations and reports are performed and prepared in accordance with DOE Order 231.1 (Ref. 24). In addition, field reporting is performed in accordance with the applicable NFPA codes and site documents. The fire investigation report for any fire loss greater than \$5,000 is submitted to ESH&QA Division.

The Annual Summary of Fire Damage Report is prepared and submitted to the DOE Operations Office by March 31 of each year in accordance with DOE Order 231.1 (Ref. 24). The WSRC Procedure Manual 2Q provides guidance for preparing this report (Ref. 14).

Records and documentation retention schedules conform to the requirements established in the WSRC Site Records Inventory and Disposition Schedule (Ref. 14).

## 11.5 REFERENCES

1. Nuclear Safety Analysis Reports. DOE Order 5480.23, Change 1, U.S. Department of Energy, Washington, DC, April 1992.
2. Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports. DOE-STD-3009-94, U.S. Department of Energy, Washington, DC, July 1994.
3. Conduct of Operations Requirements for DOE Facilities. DOE Order 5480.19, U.S. Department of Energy, Washington, DC, May 1992.
4. Standards/Requirements Identification Document. Westinghouse Savannah River Company, Aiken, SC, July 1997.
5. Compliance Assurance Manual. WSRC Procedure Manual 8B, Westinghouse Savannah River Company, Aiken, SC, January 1999.
6. Management Policies. WSRC-1-01, Westinghouse Savannah River Company, Aiken, SC, December 1998.
7. Conduct of Operations Manual. WSRC Procedure Manual 2S, Westinghouse Savannah River Company, Aiken, SC, October 1997.
8. Fire Protection Design Criteria. DOE-STD-1066-97, U.S. Department of Energy, Washington, DC, March 1997.
9. Training and Qualification Program Manual. WSRC Procedure Manual 4B, Westinghouse Savannah River Company, Aiken, SC, March 1998.
10. Configuration Management Manual. WSRC Procedure Manual 7E, Westinghouse Savannah River Company, Aiken, SC, October 1998.
11. Industrial Hygiene Manual. WSRC Procedure Manual 4Q, Westinghouse Savannah River Company, Aiken, SC, November 1998.
12. Employee Safety Manual. WSRC Procedure Manual 8Q, Westinghouse Savannah River Company, Aiken, SC, December 1998.
13. Conduct of Engineering and Technical Support. WSRC Procedure Manual E7, Westinghouse Savannah River Company, Aiken, SC, January 1997.
14. Fire Protection Program. WSRC Procedure Manual 2Q, Westinghouse Savannah River Company, Aiken, SC, December 1998.
15. Facility Safety. DOE Order 420.1, U.S. Department of Energy, Washington, DC, October 1995.

16. WSRC Assessment Manual. WSRC Procedure Manual 12Q, Westinghouse Savannah River Company, Aiken, SC, January 1998.
17. Worker Protection Management for DOE and Federal Contractor Employees. DOE Order 440.1, U.S. Department of Energy, Washington, DC, October 1995.
18. Conduct of Maintenance Manual. WSRC Procedure Manual 1Y, Westinghouse Savannah River Company, Aiken, SC, December 1998.
19. Fire Department Operating Standards. WSRC Procedure Manual 2Q2, Westinghouse Savannah River Company, Aiken, SC, June 1995.
20. SRS Emergency Plan. WSRC Manual WSRC-SCD-7, Westinghouse Savannah River Company, Aiken, SC, November 1998.
21. Radiological Control Manual. WSRC Procedure Manual 5Q, Westinghouse Savannah River Company, Aiken, SC, September 1998.
22. Facilities Handling Radioactive Materials. NFPA 801, National Fire Protection Association, Quincy, MA, 1995.
23. Environment, Safety and Health Appraisal Program. DOE Order 5482.1B, Change 1, U.S. Department of Energy, Washington, DC, November 1991.
24. Environmental Safety, and Health Reporting Requirements. DOE Order 231.1, U.S. Department of Energy, Washington, DC, October 1990.

# GENERIC SAFETY ANALYSIS REPORT

## CHAPTER 12 PROCEDURES AND TRAINING

September 1999

Westinghouse Savannah River Company  
Aiken, SC 29808



## DISCLAIMER

This document was prepared by Westinghouse Safety Management Solutions LLC (WSMS) under contract with Westinghouse Savannah River Company (WSRC), subject to the warranty and other obligations of that contract and in furtherance of WSRC's contract with the United States Department of Energy (DOE).

Release to and Use by Third Parties. As it pertains to releases of this document to third parties, and the use of or reference to this document by such third parties in whole or in part, neither WSMS, WSRC, DOE, nor their respective officers, directors, employees, agents, consultants or personal services contractors (i) make any warranty, expressed or implied, (ii) assume any legal liability or responsibility for the accuracy, completeness, or usefulness, of any information, apparatus, product or process disclosed herein or (iii) represent that use of the same will not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trademark, name, manufacture or otherwise, does not necessarily constitute or imply endorsement, recommendation, or favoring of the same by WSMS, WSRC, DOE or their respective officers, directors, employees, agents, consultants or personal services contractors. The views and opinions of the authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

## CONTENTS

---

	<u>Page</u>
12.0 PROCEDURES AND TRAINING .....	12.1-1
12.1 INTRODUCTION.....	12.1-1
12.1.1 Objective .....	12.1-1
12.1.2 Scope .....	12.1-1
12.2 REQUIREMENTS .....	12.2-1
12.3 PROCEDURES PROGRAM .....	12.3-1
12.3.1 Development of Procedures .....	12.3-1
12.3.1.1 Procedure Preparation .....	12.3-1
12.3.1.2 Procedure Verification .....	12.3-2
12.3.1.3 Procedure Validation.....	12.3-3
12.3.2 Maintenance of Procedures .....	12.3-5
12.3.2.1 Procedure Changes and Revisions .....	12.3-5
12.3.2.2 Periodic Review of Procedures .....	12.3-6
12.3.2.3 Procedure Control and Dissemination.....	12.3-7
12.3.2.4 Procedure Training and Coordination .....	12.3-7
12.4 TRAINING PROGRAM.....	12.4-1
12.4.1 Development of Training .....	12.4-1
12.4.1.1 Site Level Guidance for Training Areas.....	12.4-1
12.4.1.2 Analysis of Training Requirements.....	12.4-3
12.4.1.3 Design of Training.....	12.4-3
12.4.1.4 Development of Training Materials .....	12.4-4

---

CONTENTS (continued)

	<u>Page</u>
12.4.1.5 Instructor Training and Qualification.....	12.4-4
12.4.1.6 Implementation of Training.....	12.4-4
12.4.1.7 On-the-Job Training .....	12.4-5
12.4.2 Maintenance of Training .....	12.4-5
12.4.2.1 Training Oversight Committee.....	12.4-5
12.4.2.2 Training Oversight and Assessment Program .....	12.4-7
12.4.2.3 Maintenance of Training Records .....	12.4-7
12.4.3 Modification of Training Materials .....	12.4-8
12.4.3.1 Incorporating Changes to Training.....	12.4-8
12.4.3.2 Administration of Training Change Requests .....	12.4-11
12.4.3.3 Evaluation of Training Effectiveness .....	12.4-11
12.5 REFERENCES.....	12.5-1

---

**ACRONYMS AND ABBREVIATIONS**

---

AOP	Abnormal Operating Procedure
ARP	Alarm Response Procedure
CQF	Cognizant Quality Function
CTF	Cognizant Technical Function
DOE	Department of Energy
EM	Emergency Management
EOC	End-of-Course
EOP	Emergency Operating Procedures
FEB	Facility Evaluation Board
FMC	Facility Managers Council
FOSC	Facility Operations Safety Committee
IPC	Immediate Procedure Change
OJT	On-the-Job Training
PC	Procedure Coordinator
PCR	Procedure Change Request
RM	Records Management
RR	Required Reading
QA	Quality Assurance
S&HO	Safety and Health Operations
SAR	Safety Analysis Report
S/RID	Standards/Requirements Identification Document
SRS	Savannah River Site
TCR	Training Change Request
TMC	Training Managers Council
TRAIN	Training Records and Information Network
V&V	Verification and Validation
WSRC	Westinghouse Savannah River Company

---

This page intentionally left blank.

## **12.0 PROCEDURES AND TRAINING**

### **12.1 INTRODUCTION**

#### **12.1.1 OBJECTIVE**

The objective of this chapter is to provide information that will satisfy the requirements of Department of Energy (DOE) Order 5480.23, Topic 13 [paragraph 8.b.(3)(m), amplified in Attachment 1, paragraph 4.f.(3)(d)13, of the Order], relating to procedures and training (Ref. 1). The DOE Order requires this chapter to document the processes by which the technical content of procedures and training are developed, verified, and validated. The DOE Order requires this section to document the mechanisms for identifying and correcting technical or human factors causing deficiencies in procedures and training programs, and to provide information regarding compliance with DOE Order 5480.20A requirements (Ref. 2).

#### **12.1.2 SCOPE**

This chapter describes the processes by which the technical content of the procedures and training program are developed, verified, and validated at the Savannah River Site (SRS). The training and procedures processes assure that the facility is operated and maintained by personnel who are qualified and competent to carry out their job responsibilities. In addition, procedures and training elements have been developed to keep the processes current through the use of feedback and continuous improvement.

This chapter contains the following:

- An overall summary of the site procedures and training programs
- A description of the processes for developing written procedures and training materials
- A summary of the processes for maintaining written procedures, training materials, and training records
- A summary of the processes for modifying written procedures and training materials
- A summary of the methods for incorporating operations experience, new analyses, other Safety Analysis Report (SAR) changes, etc., into the procedures and training programs
- A description of the mechanisms to identify and correct technical and human factors deficiencies

This page intentionally left blank.

## **12.2 REQUIREMENTS**

Standards/Requirements Identification Documents (S/RIDs) state the codes, standards, and regulations governing the procedures and training elements of the SRS (Ref. 3). Programmatic compliance assessment has been performed against the S/RIDs and documented as specified in the Westinghouse Savannah River Company (WSRC) Procedure Manual 8B (Ref. 4). The Standards Management/Compliance Section maintains records of the programmatic compliance assessments. |

This page intentionally left blank.

## 12.3 PROCEDURES PROGRAM

Operation of all facilities at SRS is governed by policies stated in WSRC Procedure Manual 1Q (Ref. 5). WSRC Procedure Manual 1Q states that division/department managers are responsible for implementing the Quality Assurance (QA) Program in their respective organizations. WSRC Procedure Manual 2S provides requirements and methods for developing and writing, reviewing, approving, revising, canceling, controlling, and using technical and response procedures (Ref. 6). WSRC Procedure Manual 2S implements procedure requirements contained in WSRC Procedure Manual 1Q and WSRC Procedure Manual 1B (Ref. 6, 7). WSRC Procedure Manual 1B provides requirements and responsibilities for preparation, review, approval, revision, and cancellation of all program-specific administrative procedures.

### 12.3.1 DEVELOPMENT OF PROCEDURES

WSRC Procedure Manual 2S and WSRC-SCD-2 provide standard practices for generating technical and response procedures (Ref. 6, 8). These guidelines ensure uniformity in operations procedures by providing guidance to procedure writers on how to clearly, and concisely, develop a procedure. These guidelines apply to technical procedures, including Standard Operating Procedures, maintenance procedures, test procedures, surveillance procedures, and other procedures that provide step-by-step instructions for the performance of an activity or evaluation and response procedures, including Abnormal Operating Procedures (AOPs), Emergency Operating Procedures (EOPs), and Alarm Response Procedures (ARPs) (Ref. 6). WSRC Procedure Manual 1B governs the generation of program-specific administrative procedures, which define the communication and coordination activities necessary to carry out a facility's technical programs (Ref. 7).

Note that the emergency plan-related procedures, such as Emergency Preparedness Administrative/Implementing Procedures, are distinct from ARPs, EOPs, and AOPs. Emergency plan-related procedures are discussed in WSRC-SCD-7 and in Chapter 15 of this SAR, and are beyond the scope of this section (Ref. 9).

#### 12.3.1.1 Procedure Preparation

WSRC Procedure Manual 2S establishes methods and requirements for developing and writing technical, reference, and response procedures that implement the requirements of DOE Order 5480.19 (Ref. 10). WSRC Procedure Manual 2S implements WSRC-SCD-2 as well. WSRC Procedure Manual 1B establishes responsibilities and requirements for preparing program-specific administrative procedures. Area and facility managers are responsible for implementing these requirements at the area and facility levels (Ref. 7).

Procedure writers develop technical and response procedures using WSRC-SCD-2 as guidance for researching the writing assignment (Ref. 8). The writer's guide was developed jointly by DOE and its contractors, and is designed to promote safe and efficient operations in keeping with DOE Order 5480.19 (Ref. 10). WSRC-SCD-2 establishes a recommended approach for

developing technical procedures that are accurate, complete, clear and consistent, including guidance for the following (Ref. 8):

- Planning, organizing, and structuring the procedure
- Formatting the procedure
- Writing action steps

A different type of response procedure, the ARP, is also employed by SRS. ARPs are formatted differently than the other procedures mentioned in the introduction to this section because they are intended to provide for the rapid response to an alarm. ARPs contain short, exact instructions, thereby eliminating the need for many of the format requirements specified in WSRC-SCD-2 (Ref. 8). ARPs are governed by WSRC Procedure Manual 2S in the other areas discussed in this report (Ref. 6).

Procedure writers involve the operational organization and its personnel in the procedure development process, including the review, verification, and validation of a procedure because they are a significant source of information.

Procedures maintain the safety envelope of a facility and are based upon the same technical information that was used in establishing the safety envelope. Procedure writers identify, assemble, and document the technical basis for the procedure prior to writing the procedure.

The procedure writer determines the technical content, the organization, arrangement, and format of the material in the procedure. WSRC Procedure Manual 2S contains a procedure content matrix that lists the content of various types of procedures. WSRC-SCD-2 and WSRC Procedure Manual 2S provide specific details regarding the development of the required sections of a procedure and the responsibilities of the individuals involved in developing a procedure (Ref. 6, 8).

WSRC Procedure Manual 1B identifies the required elements and content of administrative procedures, as well as, general guidance regarding procedure format (Ref. 7). Facility-level administrative procedures are developed by a Procedure Coordinator (PC) in cooperation with the originating organization. The PC is responsible for promoting standardization and consistency of procedure development for a particular facility, and for ensuring that facility procedures are processed for review, comment, approval, and issuance. More detail regarding administrative procedure development and the specific actions performed by a facility PC, are discussed in WSRC Procedure Manual 1B (Ref. 7).

#### 12.3.1.2 Procedure Verification

WSRC Procedure Manual 2S establishes the responsibilities and requirements for the verification of procedures. Procedure verification is the process for evaluating a procedure for technical and written correctness. This procedure applies to all WSRC facilities and organizations that generate, and use, operations, technical, or response procedures, and to all personnel who

perform procedure verification. This procedure also applies to the verification of administrative procedures. For specific details regarding the duties or responsibilities of any of the individuals involved in the procedure verification process, see WSRC Procedure Manual 2S (Ref. 6).

The PC is responsible for preparing, processing procedures, and assigning ownership of procedures to groups or individuals having primary responsibility for the content or performance of a given procedure. The procedure writer verifies the written correctness of the draft procedure and documents the performance of this verification. The PC then prepares a procedure review package and forwards the procedure to the appropriate personnel for review.

Procedure owners review technical and response procedures to ensure that they are correct and complete, and that independent verification points are identified. They review administrative procedures for impact on group or facility functions. The Cognizant Technical Function (CTF) verifies the technical accuracy of the procedures with respect to Operational Safety Requirements, SARs, Process Requirements, etc. The Cognizant Quality Function (CQF) ensures that all applicable QA requirements are met in procedures, particularly in administrative procedures that implement site quality requirements. Safety and Health Operations (S&HO) and Safety and Health Programs review procedures for radiation and contamination control and/or the control and handling of radioactive materials. Examples include procedures governing transport of radioactive materials within a facility, decontamination procedures, and building and room nuclear material limit maintenance procedures. The training organization, when required, reviews procedures to determine impact on training for the procedure owner. Additional departments or organizations review procedures that affect their areas of interest, as needed.

The PC ensures the following:

- All initial procedure review/concurrence forms are completed.
- All relevant comments are dispositioned with documented concurrence by the reviewer.
- Any technical review packages issued are completed.

When all concurrence reviews are completed, the procedure is prepared for validation (Ref. 6).

#### 12.3.1.3 Procedure Validation

WSRC Procedure Manual 2S provides guidance and direction for validating operations, technical, or response procedures. Validation is the process for evaluating a procedure for user and facility compatibility. Validation is not required for administrative procedures. For additional details regarding the specific responsibilities of any of the individuals involved in the validation process, see WSRC Procedure Manual 2S (Ref. 6).

The PC determines the need for procedure Verification and Validation (V&V) based on the following:

- New procedures that involve manipulation of systems or equipment and those that have potential to cause such manipulation require V&V.
- Revisions that affect the performance of the applicable procedure, such as a change in intent, technique, or sequential order or steps require V&V.
- Revisions that have a significant change in the format or method of presentation require V&V.

Procedure validation may be waived in cases of minor changes to procedures that do not:

- Involve or have the potential to cause manipulation of systems or equipment
- Affect procedure intent or sequential order of steps
- Significantly change the procedure format

For procedures that require validation, the PC is responsible for identifying a group to perform the validation and for assembling the validation package including the Procedure Validation Checklist. The lead validator performs the following:

- Directs the performance and ensures completion of procedure validation
- Determines the validation method to be used
- Contacts appropriate personnel to perform validation

A procedure validator must be trained as a validator and qualified/certified on the equipment or system for which the procedure being validated applies.

The two principal methods of validation are the walkdown and the tabletop methods. The walkdown method requires users of the procedure to perform a step-by-step enactment of the actions detailed in the procedure with no changes to facility configuration or operational conditions. This is the preferred method for validating procedures. However, in cases where As Low As Reasonably Achievable, facility status, inaccessible equipment, or other safety considerations are factors, the walkdown method may be impractical. The walkdown validation method verifies the following:

- The information contained in the procedure is adequate and easy to comprehend.
- The procedure is compatible with facility configuration and specified manpower.
- The sequence of procedure steps is correct and efficient.
- The communication methods used in the procedure are adequate.

The tabletop method involves a review of the procedure using a “talk-through” process and a checklist of evaluation criteria. Tabletop reviews are usually performed in a conference room

with the lead validator talking through the procedure, and V&V team members asking questions to enhance the assessment. This method is used only when a walkdown validation is not possible because this method does not validate the communication, or manpower aspects of the procedure being validated.

After completion of validation, the lead validator ensures that the Validation Checklist is complete and routes the validation package to the PC. The PC ensures that all Validation Checklists are completed and returned. If the validation results in major changes, the procedure is reissued for another review cycle, as discussed in Section 12.3.1.2, and subsequent revalidation. If not, procedure approval packages containing a copy of the procedure and all pertinent V&V documents and forms are distributed to required approval personnel.

Procedures are approved by the procedure owner. In cases where multiple areas or facilities are involved in the review process, the procedure is approved by the procedure owner of the area/facility that initiated the original Procedure Change Request (PCR) after obtaining concurrence from the affected areas/facilities. The procedure owners determine the required training for their organization, and indicate that training on the approval form.

When procedure validation has been completed, the PC verifies that the procedure owner has indicated, on the approval form, the type of training, if any, required for the procedure and will review the procedure to ensure that it is ready for field distribution. Upon approval of process-related procedures, the PC notifies the Training Organization and the Required Reading (RR) Coordinator of the training required for the procedure. The Training Organization develops appropriate training material, schedules training, and performs training, as required (as discussed in Section 12.4). The Training Organization notifies the PC upon completion of the training, and the PC then assigns an effective date for the procedure (Ref. 6).

### 12.3.2 MAINTENANCE OF PROCEDURES

WSRC Procedure Manual 2S provides guidance regarding the maintenance and control of procedures to assure proper dissemination and utilization of facility procedures. This guidance is consistent with the requirements provided by WSRC Procedure Manual 1B for document control. For additional details regarding the duties or responsibilities of any of the individuals involved in the processes described below, see WSRC Procedure Manuals 2S or 1B (Ref. 6, 7).

#### 12.3.2.1 Procedure Changes and Revisions

WSRC Procedure Manual 2S establishes the responsibilities and requirements for the revision and cancellation of procedures. There are different types of procedure changes and revisions. A major revision involves a change in basic process variables, personnel safety, equipment protection, nuclear safety review considerations, or the number of witnessing points within the procedure. The procedure V&V process described in Section 12.3.1 is applied in these cases to accomplish a procedure change. A minor revision involves only a change in format, punctuation, or grammar to administrative procedures. A PCR is submitted when the need for a revision,

cancellation, deactivation, or reactivation of a procedure is identified. If a change is needed quickly to continue work, an Immediate Procedure Change (IPC) is initiated.

The procedure owner reviews PCRs and assigns a priority to proposed procedure changes. Changes may be classified as minor revisions if they do not:

- Increase the safety risk to personnel
- Alter a source document requirement
- Alter the purpose or scope of the procedure
- Eliminate any required reviews or approvals
- Alter the operating, technical, design, process, regulatory, or quality control requirements of a procedure

The PC prepares minor revisions, and the procedure manager reviews and approves them prior to issue. When a PCR impacts multiple areas or facilities, the procedure owner obtains concurrence from the affected areas/facilities prior to forwarding the PCR to the PC/Group for completion.

In cases where a procedure change is required to continue work on a task, an IPC may be utilized. An IPC is originated using a PCR form indicating the change as an IPC. An IPC may be a temporary or a permanent change. As with other PCRs, concurrence from the operations supervision for all affected facilities and maintenance supervision from each affected discipline is required, as is CTF, CQF, and S&HO concurrence. Note that CQF and S&HO concurrence is not always required on PCRs. It is acceptable to obtain review/concurrence by the use of faxes, telephone, or electronic mail messages to speed the approval process. If the IPC is a permanent change, the IPC originator's supervisor recommends a priority for incorporation of the IPC into a procedure revision. WSRC Procedure Manual 2S provides details on the control of both temporary and permanent IPCs (Ref. 6).

#### **12.3.2.2 Periodic Review of Procedures**

To ensure the technical accuracy and the proper consideration of human factor issues in procedures, the PC establishes periodic review schedules for all procedures. The owner group performs this review at least every 2 years for technical procedures that prescribe safety-related activities and for all response procedures. Procedures with safety concerns may be issued for review more frequently. All other procedures are reviewed every 5 years. Periodic reviews may be initiated in conjunction with a major revision, an incident investigation, a design change, or the satisfactory performance of the entire procedure rather than waiting for the scheduled review time. However, the approval of a minor revision does not alter the scheduled periodic review.

The PC issues a periodic review package after the procedure writer prepares the revision in accordance with WSRC Procedure Manual 2S. Review personnel, or levels of authority for procedure review/concurrence, are identified by formal correspondence from the facility and

support managers to the PC. The procedure owner's department reviews procedures for which it has been assigned. The review ensures the following:

- The procedure is correct.
- The procedure is complete.
- Independent verification points are identified.
- The procedure contains a sufficient level of detail to accomplish intent.

The CTF performs a verification of technical accuracy, while the CQF ensures that the QA requirements are included. Health Protection reviews procedures in accordance with WSRC Procedure Manual 5Q, as necessary (Ref. 11). The training organization, when required, performs a training determination assessment. When additional organizations are affected by a revised procedure, these organizations also review the applicable sections. When the reviews are completed, all PCRs are forwarded to the PC. The PC then establishes a new periodic review date for the procedure based on the completion date of the revision (Ref. 6).

#### **12.3.2.3 Procedure Control and Dissemination**

The PC issues and controls procedures in accordance with WSRC Procedure Manual 1B, which establishes the responsibilities and methods for control, distribution, revision, and cancellation of controlled distribution documents (Ref. 7). These methods ensure that the correct procedure revision is available for use to perform work.

The PC for each organization establishes, maintains, and controls the controlled distribution list and the controlled index of procedures for that organization. The controlled index of procedures lists all controlled procedures that are issued and ready for use. This index is updated frequently to ensure that it remains current. Records Management (RM) distributes copies of controlled procedures and applicable controlled indexes to recipients noted on the distribution list submitted by the PC. RM maintains record copies of controlled procedures. Designated PCs may publish and distribute their own organization's procedures, revisions, and controlled indexes if that department's control procedures for publication and distribution is approved by the RM Manager. Authors subject procedure revisions to the same controls for preparation, review, approval, and issue as the original procedure. This ensures proper distribution and accuracy of revisions (Ref. 7).

#### **12.3.2.4 Procedure Training and Coordination**

Procedure revisions that affect the performance of the applicable procedure, such as a change in intent, technique, or sequential order of steps, require V&V. As part of this process, the training organization, when required, reviews procedures to determine impact on training for the procedure owner. This ensures the training program is maintained current with the procedures.

In addition, upon approval of process-related procedures, the PC notifies the RR Coordinator of the procedure, and it is made available to designated personnel through the RR program. WSRC Procedure Manual 2S provides guidelines for an RR program to ensure that designated individuals are given the opportunity to read, and be informed of important information. Designated individuals must read the material assigned in the RR program and indicate completion on the RR Log. The training coordinator notifies the appropriate supervisor when individuals are identified as delinquent in their reading requirements in order to ensure compliance (Ref. 6).

Lessons Learned material, as well as any other sources of information relevant to job performance, may be included in the RR program. Lessons Learned material evaluations may result in recommendations of procedure changes as a corrective action. The Facility Operations Safety Committee (FOSC) reviews the Lessons Learned evaluations and is responsible for implementing the corrective actions recommended and updating the site Lessons Learned coordinator, by way of the division Lessons Learned coordinator of the status of corrective action implementation. Details regarding the identification and processing of Lessons Learned material are discussed in Section 12.4.3.1 of this report.

## 12.4 TRAINING PROGRAM

The mission of the training program at SRS is to develop programs and a competent core technical workforce to ensure site operations are conducted in accordance with the highest standards of safety, health, and environmental protection. The training and development organizations serve the national interest and promote public confidence by providing integrated, cost-effective training and development programs that support conduct of site and facility operations. The program ensures a disciplined, formal approach to the conduct of site operations.

WSRC Procedure Manual 4B provides controls for training and qualification programs and addresses the requirements of DOE 5480.20A (Ref. 2, 12). Division Training Managers and facility training managers are responsible for the training programs within their division. Responsibilities and detailed instructions regarding generation of training programs are contained in WSRC Procedure Manual 4B.

Refer to the facility-specific SARs for further details regarding the utilization of these training programs at the facility level.

### 12.4.1 DEVELOPMENT OF TRAINING

This section summarizes the process by which the technical content of training programs is developed, reviewed, and approved (Ref. 12). Training developed, using these guidelines, may apply to various aspects of facility training including conduct of normal, abnormal, and emergency operations.

#### 12.4.1.1 Site Level Guidance for Training Areas

Specific areas for which training is typically developed and implemented for a facility and the site-level guidance governing that area are summarized in the following sections. The types of training mentioned below may include, but are not necessarily limited to, both on-shift and classroom training. Additional details regarding the responsibilities of individuals involved in generating training programs are contained in WSRC Procedure Manual 4B (Ref. 12). Further details regarding specific types of normal, abnormal, and emergency operations training may be provided in the facility-specific SARs, if applicable.

### CRITICALITY TRAINING

Criticality training is governed by the WSRC Nuclear Criticality Safety Manual (Ref. 13). The training policy in the area of criticality safety training states that all reasonable effort shall be taken to eliminate the potential for, and consequences of, a criticality accident. This manual establishes criticality safety related requirements for the selection, training, examination, qualification, retraining, reexamination and requalification of personnel whose duties are related to nuclear materials or criticality safety. Further details on the criticality training methods and

qualification requirements are contained in the Nuclear Criticality Safety Manual and in the facility-specific SARs.

#### RADIATION AND HAZARDOUS MATERIAL PROTECTION TRAINING

Radiological Protection Training is governed by WSRC Procedure Manual 5Q (Ref. 11). All employees are required to take a written examination to obtain the level of radiological training necessary to perform their specific duties. The level of training required is determined by the frequency with which personnel are exposed to radiological hazards, the types of potential radiological hazards present, and the type and duration of tasks assigned within radiological areas. Several levels of Radiological Protection Training are available to WSRC personnel. Further details regarding specific requirements and identification of personnel required to obtain the various levels of training are discussed in WSRC Procedure Manual 5Q and in the facility-specific SARs (Ref. 11).

#### MAINTENANCE TRAINING

Training requirements for maintenance personnel (mechanics) at SRS are described in the Maintenance Training and Qualification Program Description. Maintenance personnel are task-specific qualified. Task-specific training and qualification requirements for each maintenance organization are documented and approved on the Task-to-Training Matrix for that organization. Further details regarding facility and/or area specific training requirements are provided in the facility-specific SARs.

#### FIRE PROTECTION TRAINING

Fire protection training is governed by WSRC Procedure Manual 2Q (Ref. 14). This guidance requires each SRS employee to receive Occupant Fire Prevention Training on a biennial basis. Employees who perform fire watches receive additional training as part of their qualification. Specific details regarding fire protection training and qualification requirements are discussed in WSRC Procedure Manual 2Q and in the facility-specific SARs.

#### QUALITY ASSURANCE TRAINING

QA training is required as part of the employee indoctrination by WSRC Procedure Manual 1Q (Ref. 5). All employees receive general employee training and general QA program indoctrination to become familiar with the QA programs administered at WSRC. Guidance on both initial and continuing training at the general site and division levels is discussed in more detail in WSRC Procedure Manual 1Q (Ref. 5). Further details regarding facility and/or area-specific QA training requirements are provided in the facility-specific SARs.

## EMERGENCY PREPAREDNESS TRAINING

Emergency preparedness or Emergency Management (EM) training is governed by the SRS Emergency Plan (Ref. 9). Four EM training programs have been established to fulfill one, or multiple EM goals, such as providing Emergency Response Organizations with effective and efficient training that enables them to adequately respond to an emergency at SRS, and providing general instruction to all SRS personnel on the proper response to various alarm signals. Further details regarding these training programs and the objectives they meet are discussed in Chapter 15 of this SAR and WSRC-SCD-7 (Ref. 9). Facility-specific emergency preparedness training is discussed in the facility-specific SARs.

### 12.4.1.2 Analysis of Training Requirements

Training analysis describes the process for defining the positional requirements, from which training requirements are generated, which process includes the systematic determination of prioritized tasks, as well as the knowledge and skills necessary to ensure successful job performance. It also describes the process of defining needs when positional requirements have already been defined.

Changes to job and task analysis data are initiated and analyses are conducted by the appropriate training personnel, if there are indications that training has been unsatisfactory, or when other situations arise that may require analysis, such as the following:

- Evaluation data indicating performance problems
- DOE Order changes or initiations
- Occurrences, events
- Federal or state law changes
- Procedure or policy changes
- Assessment/audit recommendations/findings
- Equipment/system changes

Need analyses can be initiated using a Training Change Request (TCR).

### 12.4.1.3 Design of Training

WSRC Procedure Manual 4B describes the process for designing training for a documented requirement or need (Ref. 12).

The designer/developer reviews the analysis data and selects training setting, writes sequenced learning objectives, determines testing formats, develops test items, and produces inputs to a task-to-training matrix to plan for the development of training materials. These design phase

products are reviewed for correspondence with analysis data and designed setting, as well as for conformance with production guidelines.

#### 12.4.1.4 Development of Training Materials

WSRC Procedure Manual 4B describes the process for developing training materials to training setting requirements and design specifications (Ref. 12).

The designer/developer develops and compiles the required developed materials into instructional packages. Instructional packages are reviewed by Subject Matter Experts for technical accuracy and by personnel qualified to the level of Instructional Technologist/Lead Instructor for instructional effectiveness prior to being approved by training management and submitted to records.

#### 12.4.1.5 Instructor Training and Qualification

WSRC Procedure Manual 4B provides controls for the training programs and addresses DOE Order 5480.20A (Ref. 2). The WSRC Instructional Staff Training and Qualification Program Description (WSRC-IM-97-15) establishes the requirements for instructor qualification by type and level.

Requalification of instructors, in terms of technical skills, is defined within each division and approved by the line management of the division. Requalification of instructors for instructional skills is accomplished through the evaluation of instructors against standards established in the instructional objectives for required courses in each respective qualification area. Qualified divisional personnel conduct the evaluations. Continuing training courses that address specific instructional skill areas are available for those instructors requiring them for requalification.

#### 12.4.1.6 Implementation of Training

Implementation includes the preparation for, and conduct of, training, assessment of trainee performance, performance of in-training evaluation, and documentation of training. It is performed in training settings identified in the design process, such as classroom, laboratory, and on-the-job. The instructor for a given training course is responsible for the following:

- Ensure that the current revision of the controlled instructional package is being used
- Review instructional materials for technical and instructional accuracy, and ensure that the appropriate changes are initiated and accomplished prior to implementation
- Plan all assigned training activities, and prepare the instructional environment to promote learning.

- Conduct training in accordance with approved lesson plans and guides and in conformance with procedural requirements by training type
- Obtain formal and informal feedback from trainees
- Ensure the security and integrity of training materials
- Complete and submitting to records the appropriate training documentation

#### 12.4.1.7 On-the-Job Training

On-the-Job Training (OJT) is training that is conducted in the trainee's job environment. OJT is developed in a different manner than other training programs. The training program manager identifies OJT tasks by reviewing the task-to-training matrix and selecting tasks from that matrix which should be taught in the OJT setting. The training program manager then selects a qualified development staff to develop an OJT guide for each OJT segment in accordance with the OJT format given in WSRC Procedure Manual 4B (Ref. 12). An OJT guide outlines the job performance measures that must be met in order to complete an OJT segment and qualifies to independently perform tasks associated with the segment.

Management personnel from training and operations review the OJT guide for technical content, instructional adequacy and program adequacy. Upon approval, the training program manager forwards the master copy of the completed OJT guide to the administration/records manager for filing and maintenance. The training program manager monitors changes and updates OJT guides as needed (Ref. 12).

### **12.4.2 MAINTENANCE OF TRAINING**

This section describes the methods used to ensure that training programs reflect actual plant conditions and current procedures, and that necessary coordination is done before introducing new training programs or changes in procedures covered by training programs (Ref. 15). WSRC Procedure Manual 4B provides controls for the training programs and addresses DOE Order 5480.20A (Ref. 2, 12). Additional details regarding the responsibilities of individuals involved in maintaining training programs are contained in WSRC Procedure Manual 4B (Ref. 12).

#### 12.4.2.1 Training Oversight Committee

The Training Oversight Committee consists of senior line management. It is chaired by the Executive Vice President and is empowered by WSRC to allocate training resources and approve training policy.

Training materials are validated by line management through the application of the training review committee process. The training program manager selects representatives from the training organization and line management to serve on a training review committee. Personnel

involved with the training course, or training program to be reviewed are named to the training review committee. As a minimum, a training review committee will include training personnel, personnel who will be performing the work the training is intended for, and management, when needed. This action ensures that the training program reflects actual plant conditions and current procedures. The committee's purpose is to serve as a quality check for the performance-based training process for specific training programs within a division.

The division training manager defines functions and parameters of the training review committees such as frequency of meetings, reporting audience, and the extent of involvement in areas including the following:

- Pending and approved training development requests and other change indicators that affect training
- Review of accreditation and evaluation reports
- Regulatory and procedure changes and industry and facility operating experiences that affect training
- Summary reports of the post-training evaluation results, concerns, and any recommended changes or modifications to training
- Review of training facilities, equipment, and materials
- Changed or new job descriptions that require training

The training program manager identifies training courses that require the additional review of a training review committee and describes the following committee functions:

- Review and concurrence with learning objectives
- Validation of tasks selected for, and omitted from, training
- Validation of training evaluation standards
- Verification of the adequacy of existing training materials
- Review of development packages for technical accuracy
- Review of prerequisites for the training of incumbents
- Review of TCRs

Records kept at training review committee meetings include a list of attendees and decisions made on training-related functions. If changes to training are recommended, these changes are recorded and forwarded to the training program manager to administer the process of approving and incorporating the changes to training. This process is discussed in detail in Section 12.4.3.1. If a reviewed program is acceptable as is, the review committee's recommendation is filed in the training program records by the training records administrator (Ref. 12).

#### 12.4.2.2 Training Oversight and Assessment Program

Training oversight and assessment at WSRC is accomplished through a two-part process consisting of (1) facility and organizational self-assessments and (2) Facility Evaluation Board (FEB) activities. The WSRC assessment process employs Total Quality Management concepts supporting the SRS's five imperatives of Safety, Disciplined Operations, Continuous Improvement, Cost Effectiveness, and Teamwork. The program, governed by WSRC Procedure Manual 12Q, provides for recognition of noteworthy practices, identification of specific performance deficiencies, and input to a management evaluations process designed to pinpoint and address significant issues (Ref. 16).

- **Self-Assessments** -- When a facility becomes operational, self-assessments foster continuous improvement in the performance of activities. WSRC Procedure Manual 12Q defines the structure, principles, responsibilities, and associated requirements of self-assessments as well as instructions for planning and conducting programmatic and facility-specific self-assessments (Ref. 16). Performance objectives and criteria for self-assessments are provided in WSRC SCD-4 (Ref. 17).
- **Facility Evaluation Board** -- WSRC has chartered FEBs to (1) provide accurate, consistent, and gradable measures of performance effectiveness; (2) evaluate adequacy of the line self-assessment process; and (3) satisfy contractual obligations for company level independent oversight. Responsibilities of both line management and FEBs, as related to planning, conducting, reporting, and follow-up of FEB assessments, are outlined in WSRC Procedure Manual 12Q (Ref. 16).

#### 12.4.2.3 Maintenance of Training Records

WSRC has established a sitewide standard training records management system and a standard file format for individual training records at SRS, which applies to all SRS personnel who use or maintain individual training records. Individual training records indicate each individual's participation in, and successful completion of, required training. WSRC has also established a standard record keeping system for training program records at SRS, which applies to all WSRC and other subcontract personnel who prepare, store, and safeguard training program records. Training program records document the design, analysis, development, implementation, and evaluation of training programs and other pertinent training program documents. Training records shall be dispositioned in accordance with the Sitewide Records Inventory and Disposition Schedule. WSRC has also established separate requirements for personnel who are involved in handling and maintaining examination materials at SRS for security reasons. The training record administrator stores approved exams in a locked repository or lockable record room.

An automated records management system (Training Records and Information Network [TRAIN]) has been established to improve the quality and management of employee training

information. TRAIN is a standard, sitewide, automated training support system that utilizes a site computer network to electronically provide the following:

- Selected training history information for an employee
- SRS course catalog and class schedule
- Course development information
- Tracking of training development requests
- Centrally managed computer-based training
- Automated test generation
- Course, instructor, and facility evaluation information
- Employee qualification
- Employee training history
- Individual course completions
- Offsite training/payment information
- Employee scheduled training

Interfaces between TRAIN and other sitewide systems ensure data integrity and reduce redundancy (Ref. 12).

### 12.4.3 MODIFICATION OF TRAINING MATERIALS

This section describes the methods used to identify and correct technical, or human factor deficiencies in facility training programs, including operating experience, personnel examinations and Lessons Learned from other facilities. Additional details regarding the responsibilities of individuals involved in modifying training programs are contained in WSRC Procedure Manual 4B (Ref. 12).

#### 12.4.3.1 Incorporating Changes to Training

WSRC specifies a process that ensures Lessons Learned, occurrences, significant items and other pertinent information acquired through external and internal sources are screened, evaluated, and incorporated, when applicable, to training programs, courses, or modules at SRS.

WSRC provides guidelines for the timely identification, screening, dissemination, and evaluation of Lessons Learned experiences. The Lessons Learned program involves a systematic review of the operating experiences of similar facilities, processes, systems or equipment for the purpose of applying Lessons Learned in areas of process safety and personnel safety from those experiences. Environment, Safety, Health & Quality Assurance screens the for Lessons Learned, relying upon industry documents (among others) for following Lessons Learned material:

- Occurrence, event, experience
- DOE Order
- Federal or state law
- Requirements for startup or restart of a facility
- Procedure or policy change
- Defense Nuclear Facility Safety Board recommendations
- Other, including individual requests
- Equipment/system change
- Evaluation of training
- Job description
- Assessment/audit
- Requirements for improvement of operations and maintenance
- Management requests

Applicable material from these sources is disseminated to division Lessons Learned coordinators, who are responsible for administering division Lessons Learned processes and representing their division on the Site Lessons Learned Committee. Division Lessons Learned coordinators respond to the Lessons Learned material with applicability determinations, responses, and identification of corrective actions.

An area Lessons Learned Coordinator is assigned to administer the Lessons Learned process within functional operating organizations, usually Lessons Learned at the departmental level. Area Lessons Learned coordinators screen a Lessons Learned applicable Lessons Learned information from both in-house and external sources (provided by the division Lessons Learned coordinator) and disseminate it for information only, or for evaluation. If evaluation is necessary, the area Lessons Learned coordinator appoints an evaluator to review the Lessons Learned information with cognizant subject matter experts to identify appropriate corrective actions. The evaluator identifies corrective actions including recommending personnel training as needed. Determination of the need for training is based on the potential for recurrence of the event and the extent of other changes (procedure, design, emergency plan, etc.) required to implement the corrective action. The evaluator identifies corrective actions on the event evaluation form and interfaces with the area training manager as needed to determine specific training needs. The area training manager and the facility manager review and approve Lessons Learned evaluations,

and the training manager assists the facility manager in the development of training for specific Lessons Learned experiences.

The area Lessons Learned coordinator reviews proposed corrective actions for adequacy and briefs the FOSC regarding the status of Lessons Learned evaluations, and corrective action implementation. The FOSC ensures implementation of Lessons Learned corrective actions transmitted to them by the site Lessons Learned committee or coordinator. FOSC also transmits significant Lessons Learned items that have potential multi-divisional impact to the site Lessons Learned coordinator (Ref. 7).

Any SRS employee may identify a lesson learned, significant item, or other information with potential applicability to training or submit an individual request that impacts training. The employee documents the information, including an explanation of the request, and forwards the information to the division Lessons Learned coordinator.

The division training manager reviews the Lessons Learned, relying on information from internal sources for applicability within the division and in other divisions according to the following:

- Line management requirements
- Feedback from end-of-course or post-training evaluations
- Knowledge gained from operating experience
- Data reported from training assessments
- Changes in job descriptions
- WSRC policies or procedures
- Changes in procedures or policies
- Generic training programs
- Changes in process equipment
- Lessons Learned (Ref. 12)

After identifying an internal source with an impact on training within the division, the division training manager assigns responsibility for implementing an action plan and schedule for resolving the situation to the training program manager responsible for the affected training area. The division training manager generates a TCR for forwarding to the site training manager if training in other divisions is affected.

The site TCR Coordinator receives these TCRs from the divisions, documents them, and dispositions them. The Site Training Manager determines if the training requested affects site training or the training programs of more than one division. If the training is determined to be interdivisional, the Site Training Manager forwards the TCR to the Training Managers Council (TMC) for disposition. The TMC reviews the TCR and if it is determined to be interdivisional, forwards the TCR to the Facility Managers Council (FMC) for final disposition. The FMC recommends disposition to the Site Training Manager who will determine a source within the

TMC responsible for implementing an action plan and schedule for resolving the situation to the training program manager responsible for the affected training area.

After discovering an external source that impacts training onsite, the site training manager determines the applicability across the site and assigns responsibility for the action to the appropriate division training manager. The division training manager will assign a training program manager to implement specific change actions. The training program manager defines an action plan and schedule for changing existing training or developing new training (Ref. 12).

#### 12.4.3.2 Administration of Training Change Requests

The division TCR Coordinators initiate TCRs when external or internal sources impact training including Lessons Learned. The site TCR Coordinator coordinates TCR activities with the divisions, and maintains and publishes information, or requests and actions for TCRs. The division TCR Coordinator provides the site TCR Coordinator with current information regarding status or corrective actions on requests initiated within the division. A TCR is not initiated for minor changes, or corrections, such as typographical errors, or other changes that do not change the content, process, or intent of the training.

#### 12.4.3.3 Evaluation of Training Effectiveness

WSRC Procedure Manual 4B requires that an annual evaluation plan be prepared for each training program. The plan specifies what evaluation activities will be conducted and the schedule for conducting them. The division training manager is responsible for developing and implementing this plan, and for submitting to the site training manager an Annual Evaluation Report that summarizes the results of all evaluation activities conducted during the year.

Commonly employed evaluation techniques include the following:

- End-of-course (EOC) critique sheets submitted by students. EOC critiques are normally gathered for all courses, except that the annual evaluation plan may not require them for all sessions of courses that are scheduled frequently. The instructor summarizes comments from EOC critiques and recommends appropriate changes. Recommendations approved by the training program manager will be placed in a Course Revision File and incorporated into the course when it is revised.
- Post-training surveys of employees and supervisors. Post-training surveys for selected courses are scheduled in the annual training evaluation plan.
- Management evaluations. Line managers provide input for training evaluation based on direct participation in training activities, observation of work underway, participation in oral examinations required for employee qualification, and other activities which they initiate independently.

- Self-assessments. All WSRC organizations participate in self-assessment activities as required by WSRC Procedure Manual 12Q and WSRC-SCD-4 (Ref. 16, 17). Performance objectives and criteria are specified for self-assessments of training and training-related activities at both facility and site levels.

## 12.5 REFERENCES

1. Nuclear Safety Analysis Report. DOE Order 5480.23, Change 1, U.S. Department of Energy, Washington, DC, April 1992.
2. Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities. DOE Order 5480.20A, U S. Department of Energy, Washington, DC, November 1994.
3. Standards/Requirements Identification Document. Functional Area 04.0, "Training & Qualification (U)," Rev. 97-20, WSRC-RP-94-1268-004, Westinghouse Savannah River Company, Aiken, SC, December 1998.
4. Compliance Assurance Manual. WSRC Procedure Manual 8B, Westinghouse Savannah River Company, Aiken, SC, January 1999.
5. Quality Assurance Manual. WSRC Procedure Manual 1Q, Westinghouse Savannah River Company, Aiken, SC, October 1998.
6. Conduct of Operations Manual (U). WSRC Procedure Manual 2S, Westinghouse Savannah River Company, Aiken, SC, October 1997.
7. WSRC Management Requirements and Procedures. WSRC Procedure Manual 1B, Westinghouse Savannah River Company, Aiken, SC, November 1998.
8. Procedure Writing. WSRC-SCD-2, Westinghouse Savannah River Company, Aiken, SC, September 1996.
9. SRS Emergency Plan. WSRC-SCD-7, Westinghouse Savannah River Company, Aiken, SC, November 1998.
10. Conduct of Operations Requirements for DOE Facilities. DOE Order 5480.19, U.S. Department of Energy, Washington, DC, May 1992.
11. Radiological Control Manual. WSRC Procedure Manual 5Q, Westinghouse Savannah River Company, Aiken, SC, September 1998.
12. Training and Qualification Program Manual. WSRC Procedure Manual 4B, Westinghouse Savannah River Company, Aiken, SC, January 1999.
13. WSRC Nuclear Criticality Safety Manual. WSRC-IM-93-13, Westinghouse Savannah River Company, Aiken, SC, June 1995.
14. Fire Protection Program. WSRC Procedure Manual 2Q, Westinghouse Savannah River Company, Aiken, SC, December 1998.

15. Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports. DOE-STD-3009-94, U.S. Department of Energy, Washington, DC, July 1994.
16. Assessment Manual. WSRC Procedure Manual 12Q, Westinghouse Savannah River Company, Aiken, SC, January 1998.
17. Assessment Performance Objectives and Criteria. WSRC-SCD-4, Rev. 4, Westinghouse Savannah River Company, Aiken, SC, September 1997.