Summary Report

Inspection of Environment, Safety, and Health Management and Emergency Management at the

Savannah River Site

February 2004

Office of Independent Oversight and Performance Assurance
Office of the Secretary of Energy

OVERSIGHT

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Abbreviations Used in This Report

ALARA	As Low As Reasonably Achievable
AHA	Automated Hazards Analysis
CFR	Code of Federal Regulations
D&D	Deactivation and Decommissioning
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
DWPF	Defense Waste Processing Facility
EAL	Emergency Action Level
EDO	Emergency Duty Officer
EM	DOE Office of Environmental Management
EOC	Emergency Operations Center
EPHA	Emergency Planning Hazards Assessment
EPI	Emergency Public Information
EPIP	Emergency Plan Implementing Procedure
ERO	Emergency Response Organization
ES&H	Environment, Safety, and Health
ISM	Integrated Safety Management
NNSA	National Nuclear Security Administration
OA	Office of Independent Oversight and Performance Assurance
SR	Savannah River Operations Office
SRS	Savannah River Site
SRSO	Savannah River Site Office
USQ	Unreviewed Safety Question
WSRC	Westinghouse Savannah River Company

1.0 Introduction

The Secretary of Energy's Office of Independent Oversight and Performance Assurance (OA) conducted an inspection of environment, safety, and health (ES&H) and emergency management programs at the U.S. Department of Energy's (DOE) Savannah River Site (SRS) in January and February 2004. The inspection was performed as a joint effort by the OA Office of Environment, Safety and Health Evaluations and the Office of Emergency Management Oversight.

This is the first inspection that OA has conducted since Secretary of Energy Spencer Abraham established the new Office of Security and Safety Performance Assurance in December 2003. This action merged OA and the Office of Security into the new Office of Security and Safety Performance Assurance as part of an effort to improve coordination between these offices in addressing safeguard and security policy issues within DOE. OA and the Office of Security remain independent of one another, ensuring the integrity of the independent oversight functions. Both offices report to the Director of the Office of Security and Safety Performance Assurance, who reports directly to Secretary Abraham.

Background

The DOE Office of Environmental Management (EM) is the lead program secretarial office for SRS. As such, it has overall Headquarters responsibility for most activities at the site. The National Nuclear Security Administration (NNSA) has line management responsibility for the site's tritium operations. At the site level, line management responsibility for EM-funded activities falls under the manager of the Savannah River Operations Office (SR). The NNSA Savannah River Site Office (SRSO) provides line management oversight for the NNSA-funded operations, with support from SR in various technical and administrative areas.

SRS is managed and operated by Westinghouse Savannah River Company (WSRC), under contract to DOE. WSRC has a number of teaming partners and uses subcontractors for some activities, such as construction. However, all of the contractor organizations are required to abide by the SRS institutional policies, manuals, and processes, which were developed by WSRC, to perform activities on the SRS site.

SR and SRSO have mission responsibilities in the areas of environmental stewardship, stockpile stewardship, nuclear material stewardship, and nonproliferation. Under EM/SR direction, environmental stewardship activities at SRS include the management, treatment, and disposal of radioactive and non-radioactive wastes resulting from past, present, and future operations. SRS also manages excess nuclear materials, including transportation, stabilization, storage, and disposition to support nuclear nonproliferation initiatives. Under NNSA/SRSO direction, SRS supports nuclear weapons stockpile stewardship by ensuring the safe and reliable recycling, delivery, and management of tritium resources; by contributing to the stockpile surveillance program; and by assisting in the development of alternatives for large-scale pit production capability. SRS encompasses approximately 310 square miles of DOE-owned property near Aiken, South Carolina, approximately 20 miles south of Augusta, Georgia.

SRS activities, which include facility operations, facility maintenance, waste management, and environmental restoration, involve various potential hazards that need to be effectively controlled. These hazards include exposure to external radiation, radiological contamination, nuclear criticality, hazardous chemicals, and various physical hazards associated with facility operations. Significant quantities of radiological and chemical hazardous materials are present in various forms at SRS.

Throughout the inspection, OA reviews the role of DOE organizations in providing direction to contractors and conducting line management oversight of contractor activities. In reviewing DOE line management oversight, OA focused on the effectiveness of EM/SR and NNSA/SRSO in managing the SRS contractor, including such management functions as setting expectations, providing implementation guidance, monitoring and

assessing contractor performance, and monitoring/evaluating contractor self-assessments. Similarly, OA focuses on the effectiveness of contractor self-assessment programs.

ES&H Review Scope

The purpose of the ES&H inspection was to assess the effectiveness of selected aspects of ES&H management as implemented by WSRC under the direction of EM/SR and NNSA/SRSO. The OA inspection team used a selective sampling approach to determine the effectiveness of EM/SR, NNSA/SRSO, and WSRC in implementing DOE ES&H requirements. The approach involved examining selected institutional programs that support the integrated safety management (ISM) program and implementation of requirements in selected SRS organization, facilities, and activities. The ES&H inspection was organized to evaluate the following selected aspects of the ISM program:

- EM/SR, NNSA/SRSO, and WSRC implementation of selected ISM guiding principles, including safety-related roles and responsibilities (ISM Guiding Principle #2) and identification of safety standards and requirements (ISM Guiding Principle #5). The review also examined the recent DOE efforts to establish system engineers for safety systems, which is one part of the DOE corrective action plan for Defense Nuclear Facilities Safety Board Recommendation 2000-2, which addresses safety system reliability.

- EM/SR, NNSA/SRSO, and WSRC feedback and continuous improvement systems.

- SRS implementation of the core functions of safety management for selected facility activities. Facility activities that were reviewed included: deactivation and decommissioning (D&D) projects at selected facilities, including 246F and 247F, performed by WSRC at the direction of EM/SR; operations, maintenance, and facility modifications at the H-Tank Farm performed by WSRC at the direction of EM/SR; and operations, maintenance, and construction at the Tritium Facilities (232H, 233H, 234H, 238H, and 264H—the Tritium Extraction Facility, currently under construction) performed by WSRC under NNSA/SRSO direction.

- Functionality of selected essential systems at one EM/SR facility—the Defense Waste Processing Facility (DWPF)—and one NNSA/SRSO facility—233H. The systems selected for review at DWPF include the Zone I Ventilation Exhaust System, the Chemical Processing Cell Safety Grade Nitrogen System, and the safety-class Melter Off-Gas Instrumentation and Associated Interlocks. The systems selected at 233H include the Fire Suppression System and the Exhaust Ventilation System.

Emergency Management Review Scope

In addition to the OA review of SR's emergency management oversight and operational awareness activities, the emergency management portion of the inspection evaluated the status of selected critical elements of the emergency management program that WSRC has implemented at SRS. The OA inspection team also conducted tabletop performance tests with a sample of the site's key decision-makers to evaluate their ability to employ available tools and skills when responding to postulated emergency conditions.

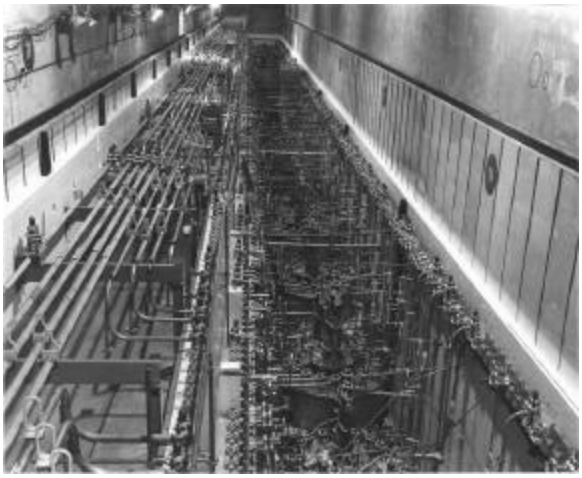
Organization of the Report

Section 2 provides an overall discussion of the results of the review of the SRS ES&H and emergency management programs, including positive aspects and weaknesses. Section 3 provides OA's conclusions regarding the overall effectiveness of SR, SRSO, and SRS contractor implementation of ES&H and emergency management programs. Section 4 presents the ratings assigned during this review. Appendix A provides supplemental information, including team composition. Appendix B identifies specific findings that require corrective action and follow-up.

More detailed information on the inspection results is contained in two separate volumes of this report, which were provided to SR and SRSO management and are available to other DOE sites on request. Volume I provides more detailed information on the results of the review of SRS ES&H programs, and Volume II provides more detailed information on the results of the review of the SRS emergency management program.

2.0 Results

In the past two years, the SRS site has undergone a significant transition in its approach to accomplishing its cleanup mission. Many major SRS production facilities, such as F-Canyon, have been shut down and are awaiting D&D. New equipment, such as a new melter at the DWPF, has been installed and is used to process waste materials. NNSA established the SRSO as a separate organization reporting directly to NNSA and responsible for management of the remaining defense facilities and activities. In addition, SR and WSRC have undergone major reorganizations to better meet their future mission activities, which include a heavy emphasis on a project-oriented approach to the site cleanup and accelerated cleanup schedules. Further, SR and WSRC have established a new operating contract, which focuses on cleanup schedules, provides significant incentives for efficiency and meeting the stretch goals (e.g., early completion of cleanup of facilities and areas), and has a new set of evaluation criteria. WSRC has also implemented a new hazards analysis and control process, called the automated hazards analysis (AHA) process.



Canyon Interior

While these changes are appropriate for the mission and have contributed to good progress in cleanup activities, they have presented some challenges from the ES&H program, ISM, emergency management, and oversight perspectives. As a result of the reorganization, many line managers and ES&H personnel are in new organizations and have new roles, and must cope with a learning curve and start-up of new organizational elements. Many procedures and processes used in the past no longer reflect the new organization and allocation of ES&H personnel to line organizations. Historical approaches to assessments and line management oversight were not well suited to the challenges associated with accelerated D&D efforts (e.g., different hazards in different phases of D&D, new and unique activities, limitations on the ability to characterize hazards, schedule pressures, etc.). In addition, SR and SRSO are separate organizations, but SRSO relies on SR for support and expertise in a number of areas; thus, significant effort was devoted to developing interfaces and support agreements. Further, both SR and SRSO use the same site contractors (WSRC and the site security contractor) and thus significant effort was devoted to coordinating efforts to provide direction to the contractor and to evaluate contractor performance. As discussed below, SRS organizations have responded well to these challenges in most respects, although some deficiencies need increased attention.

A Plutonium Button, the Historical SRS Product

2.1 Positive Attributes

Environment, Safety, and Health

Several positive attributes were identified in ISM implementation by EM/SR, NNSA/SRSO, and WSRC. Most work activities, particularly those involving higher hazards, were performed with a high regard for safety, and environmental programs were effective.

SRS has sustained a good safety record while site cleanup activities have been accelerated. SRS worker safety and environmental performance indicators, such as recordable and lost workday case rates, historically have been among the lowest in the DOE complex and have been improving for several years. In the past year, work activities at SRS have increased significantly as D&D efforts have accelerated. For example, SRS is scheduled to D&D about 250 buildings during the period of the current contract, and several buildings have undergone D&D in the past year. During this time, SRS has sustained a low injury and illness rate on a sitewide basis. The mature ISM program and SRS's behavioral-based safety programs have contributed to the sustained good performance and improving trends. In addition, the overall injury rates for subcontractors are improving, which correlates with a number of changes to subcontractor safety management, such as strengthening selection criteria and subcontractor worker protection plans.

Many aspects of the SRS ISM program are rigorous, comprehensive, and mature. Although some implementation weaknesses were identified, the ISM program at SRS is mature, comprehensive, well designed, and well documented. Roles and responsibilities are defined in detail in institutional documents and implementing procedures. The WSRC process for managing requirements is comprehensive and effective. SR and WSRC recently devoted significant effort and resources to a re-verification of their ISM program. WSRC controls at the operating tritium facilities are particularly effective. Engineering controls, such as glove boxes and ventilation, are used extensively. Operating procedures are detailed and include numerous measures to preclude errors, such as stop points for quality assurance to verify proper safety conditions. In other parts of the site where there are less opportunities to minimize radiation dose through use of engineering controls, WSRC has implemented innovative controls for potential high radiation dose situations. For example, at H-Tank Farm where there is significant potential for external dose during maintenance work, WSRC has linked electronic pocket dosimeters being worn by workers to a local computer that provides real-time information about accumulated doses to individuals, allowing supervisors to adjust activities and personnel in an effort to maintain doses as low as reasonably achievable (ALARA). This approach is a noteworthy practice that would be beneficial for consideration at other DOE sites.

SRS has a robust waste management program that aggressively pursues pollution prevention goals and opportunities, and implements effective controls for disposal of radioactive waste. Pollution prevention programs include "Green is Clean" for reducing the amount of low-level radioactive waste, and pollution prevention opportunity assessments for identifying and funding projects to reduce waste generation. The site has submitted and won several awards for pollution prevention programs and projects. Excess chemicals are redistributed or reused and new chemical purchases are evaluated for substitution of less- or non-hazardous replacements. To ensure that disposal meets regulatory and DOE requirements, tight controls have been implemented beginning at the point of generation, using waste generator training programs, deployed Waste Generator Certification Officials, and effective procedures and guidance manuals, and ending with effective acceptance criteria for the transfer of waste into the solid waste program for either onsite or offsite disposal.

Low Level Waste Interim Storage Bins

WSRC has established and implemented an effective, structured process to identify, evaluate, develop, communicate, and apply lessons learned from work activities and events. A rigorous, well-documented process provides for screening externally-identified lessons learned as well as lessons learned

from internal activities and events, analysis for applicability to SRS, determination of necessary corrective or preventive actions, and dissemination to affected organizations and workers. Effective application of lessons learned is facilitated by the well-written, thorough analyses and preventive actions that are tailored to the conditions, organizations, and processes existing at SRS. Management support, dedicated coordinators and institutional-level staff, rigorous documentation, continuous self-assessment, and user-friendly software and databases all contribute to an efficient, effective program. The effective lessons-learned program is a noteworthy practice; other DOE sites may benefit from examining and adapting elements of the SRS lessons-learned process.

WSRC has established and implemented an effective, broad-based, behavior-based safety observation program that has increased worker awareness of safe and unsafe work behaviors, contributing to continuous improvement in safety performance. Thousands of trained observers conduct many thousands of work observations annually, identifying and correcting unsafe work practices and identifying unsafe working conditions. Local safety improvement teams administer the process in each organization and review observation data for trends and initiate corrective actions as appropriate. The growth and success of this program is promoted by clearly communicated support and encouragement from all levels of management.

WSRC has developed innovative approaches to the analysis and control of dimethyl mercury and mold contamination hazards. The WSRC Industrial Hygiene organization has worked in conjunction with facility line managers and outside laboratories to characterize and control mold and dimethyl mercury hazards. At the tank farms, significant resources have been dedicated to the identification, analysis, and control of mercury and dimethyl mercury, which was discovered in liquid waste tanks, evaporators, and process waste systems during the past two years. To confront these hazards, research has been conducted to investigate the formation of dimethyl mercury in liquid waste systems, ventilation systems have been installed to reduce work exposures, and the development of new detection equipment and analysis methods has begun. Similarly at 247F, significant resources have been allocated to the identification and control of the mold contamination, which has been found throughout many of the older SRS facilities awaiting D&D. As a result, new methods have been developed for the analysis, encapsulation, and control of mold spores, and administrative controls have been implemented to protect the D&D workforce. These industrial hygiene measures are noteworthy, and other DOE sites may benefit from examining and adapting the approaches to their needs.

D&D Activities

EM/SR and WSRC have a systematic approach for addressing legacy hazards, from both the site-wide perspective and the facility-level perspective. Significant recent management attention—from EM to SR to WSRC—has been focused on accelerating cleanup. As part of reengineering EM management priorities for the SRS, the "AREA Closure" unit concept was developed to help prioritize legacy hazard management and cleanup priorities for SRS. The concept systematically considers a number of important factors, such as the type of hazards, proximity to the SRS site boundary, and current and future missions in support of the cleanup. SRS has performed surveys of approximately 250 buildings identified for D&D under the current contract to determine legacy hazard issues and identify any needed actions. Legacy hazards involving waste or potential waste storage in facilities awaiting D&D have been evaluated and are scheduled to be processed. Many actions are ongoing to address legacy hazards, including consolidation of nuclear materials and stabilizing legacy materials. Currently, final negotiations with the State regulators are ongoing to approve the area closure concept that is now being implemented at SRS, and DOE is evaluating the basis for the cleanup endpoints, which depends on whether SRS will be open to the public or controlled by the government, and thus subject to a less restrictive cleanup criteria.

Emergency Management

SR and WSRC have established a fundamentally strong emergency management program, particularly in the response protocols that have been developed

and the capabilities that reside in the emergency response organization (ERO). Weaknesses were noted within several programmatic areas, as discussed under Program Weaknesses and Items Requiring Attention, but they do not materially detract from the site's ability to respond effectively to a wide range of potential initiating events. Positive attributes of the emergency management program are discussed below.

The SRS emergency plan, sitewide and facility-specific emergency plan implementing procedures, and ERO checklists provide an effective framework and mechanisms for implementing the SRS emergency management program. The SRS emergency plan and facility/area-specific annexes thoroughly document the SRS concept of emergency operations, and the concept is implemented through a hierarchy of well integrated standards, procedures, and checklists. Collectively, these documents provide clear roles, responsibilities, and direction in the critical areas of emergency response decision-making. WSRC has developed symptom-based emergency action levels, which are used for event classification, that facilitate prompt classification without the need to determine the exact nature of the initiating event. WSRC has also developed a site-level response procedure that delineates ERO responsibilities and actions for such events as forest fires and offsite transportation events that require elevated management attention or early, coordinated response, but that do not trigger an emergency classification.

Key emergency response personnel at both the site and facility levels demonstrated effective decision-making in the key areas of event categorization/classification, notifications, and protective-action decision-making. During tabletop performance tests, emergency operations center (EOC) teams exhibited effective teamwork and accomplished their major objectives, including demonstrating concern for and sound approaches to personnel and environmental protection; clear lines of command and control during varying circumstances; and awareness of notification requirements, mutual aid assets, and press release responsibilities. Emergency duty officers performed key emergency response actions in a timely manner, including classifying events, demonstrating effective use of the 2000 Emergency Response Guidebook in implementing protective actions, and notifying offsite agencies. Facility emergency response decision-makers clearly understand their response roles and responsibilities, and they effectively implemented the actions prescribed by the applicable response procedures.

Emergency Operations Center

SR and WSRC have implemented well-conceived programs for maintaining effective interfaces with state and local offsite organizations and for communicating emergency information to the public, the media, and other stakeholders. Both SR and WSRC maintain cooperative and informative relationships with offsite organizations. Roles and responsibilities for offsite interfaces are clearly defined, and the program plan, supporting procedures, and memoranda of understanding effectively outline the relationship between onsite and offsite response organizations; establish the lines of communication for use during an emergency; and reflect offsite and onsite expectations. The emergency public information program, through which emergency information is disseminated to the public, the media, and other stakeholders, is appropriately defined by a framework of procedures and is supported by knowledgeable and experienced SR and WSRC staff. With the exception of the initial news release, EOC and joint information center procedures include specific provisions for developing and approving news releases that facilitate the timely release of approved information to the public during normal working hours and coordinating emergency public information efforts with Federal, state, and local organizations.

2.2 Program Weaknesses and Items Requiring Attention

Environment, Safety, and Health

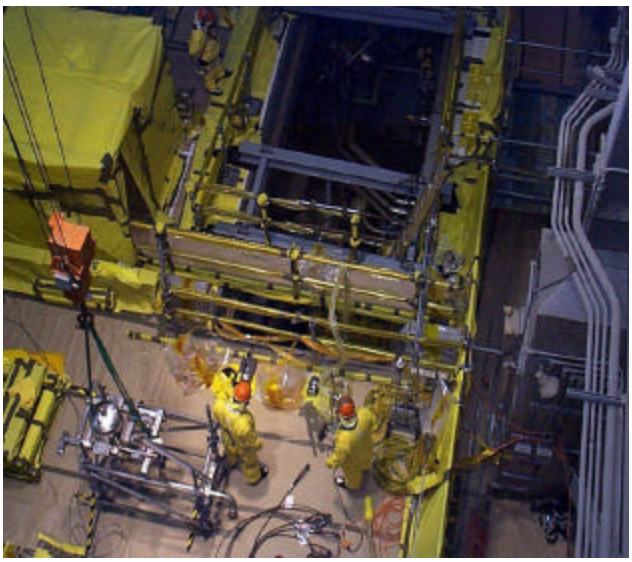
Although many aspects of ISM at SRS are effective, WSRC implementation of construction safety requirements at inspected facilities were not always sufficiently rigorous, and there are deficiencies in the unreviewed safety question process and analysis for two essential systems. EM/SR, NNSA/SRSO, and WSRC feedback and improvement programs are not

always sufficient to ensure that ES&H requirements are effectively implemented and that deficiencies are self-identified and corrected.

For two DWPF safety-class systems, testing and analysis are not sufficient to ensure that the systems will perform their design safety function. SRS safety systems are in good material condition, are maintained effectively, and have a robust design. However, there are two systems that have not been sufficiently tested and analyzed to ensure that the systems will perform their design safety function. Two check valves in the Chemical Processing Cell Safety Grade Nitrogen System have not been regularly tested, and no allowable leakage surveillance requirements have been established. The Melter Off-Gas System Instrumentation and Associated Interlocks do not meet the single-failure criterion for safety-class systems. Existing documentation does not adequately justify exemption from this requirement. The deficiencies in two safety-class systems indicate insufficient rigor in the WSRC analysis, testing, and quality assurance processes as applied to these two safety systems. Insufficient technical review by SR is also indicated by the approval of a documented safety analysis (DSA) and technical safety requirements that had implementation deficiencies related to these two safety-class systems.

The SRS unreviewed safety question (USQ) process is not adequately designed or implemented The high rate of incorrect USQ screenings (15 of 32 reviewed) and an incorrect USQ evaluation (leading to a potential inadequacy in the safety analysis) indicate a deficiency in the USQ program. The primary cause of the deficient screenings and evaluation is an inadequate USQ procedure. The USQ procedure provides direction and guidance that is inconsistent with 10 CFR 830, Subpart B, and DOE Guide 424.1-1, and that can be, and has been, misleading and non-conservative. Federal regulation 10 CFR 830 recognized that guidance documents are not mandatory but are considered an acceptable method to satisfy the requirements. Federal regulation 10 CFR 830 references DOE Policy 450.2A, *Identifying, Implementing and Complying with Environment, Safety and Health Requirements*, which allows alternate methods to be used; however, the alternative methods must be justified to ensure an adequate level of safety. The required justifications have not been performed in the cases where the SRS USQ procedure deviates from DOE Guide 424.1-1. The SRS technical review was not sufficient to identify and correct the inadequate USQ process prior to approval. As a result, changes to the facilities or procedures as described in the DSA and potential inadequacies in the DSA are not being evaluated by WSRC in accordance with the requirements of 10 CFR 830 to determine whether they constitute a USQ. In addition, some weaknesses in the DOE Guide are also contributing to inconsistent field implementation of the USQ process.

Safety controls are not always effectively communicated to the workers and effectively implemented by the workforce. The AHA is a new process at SRS and provides an effective means of identifying and analyzing hazards. However, WSRC has not established adequate mechanisms to ensure that controls identified in the AHA are implemented and effectively integrated into work activities. In addition, construction and subcontractor personnel are not always rigorously and consistently implementing construction safety requirements, resulting in potentially unsafe conditions and practices. D&D workers and their supervisors do not always recognize inadequately analyzed hazards as potentially unsafe conditions, and consequently do not resolve the discrepancies in accordance with site procedures and management expectations.



D&D Work Activity

WSRC processes for analyzing and assessing worker exposures to hazards and for implementing necessary controls have a number of deficiencies. WSRC radiological control personnel have not consistently performed radiological air monitoring in accordance with established procedures, as necessary, to verify protection from exposure to

airborne radioactivity and to demonstrate continued adequacy of the site's current annual routine bioassay technical basis. In addition, WSRC is not conducting effective ALARA reviews in accordance with site procedures in connection with D&D project work. Further, WSRC is not analyzing and documenting occupational exposures to some hazards (noise, hazardous chemicals, and beryllium) in accordance with the requirements of DOE orders and site requirements.

Important elements of SRS feedback and improvement programs are not effectively designed or implemented. SR, SRSO, and WSRC conduct a large number of assessments, and many aspects of their feedback and improvement programs are mature and effective. However, some important elements are not currently effective. SR has not implemented an effective self-assessment program that focuses on its internal functions. SRSO oversight is not sufficiently comprehensive and does not adequately address construction activities. In addition, SRSO Facility Representative assessments, self-assessments, and corrective-action/commitment management, are not implemented in accordance with some of the applicable site-specific requirements. WSRC performs numerous assessments that identify and correct deficient conditions, but weaknesses in processes and implementation hinder consistent evaluations of performance, especially for crosscutting and institutional ES&H programs. Furthermore, WSRC has not established and implemented a fully effective issues management process that consistently evaluates performance, identifies adverse trends and root causes, and prevents recurrence through appropriate actions.

Emergency Management Programs

The SRS emergency management program is strong in most areas; however, weaknesses were noted in the process used to screen hazardous chemicals for inclusion in the emergency planning hazards assessment (EPHA). Lesser concerns arising from inadequate definition or inconsistent implementation in several other program elements were noted as well. Specific weaknesses are discussed below.

The EPHAs do not assess all of the materials that may impact the health and safety of co-located workers. The process for developing EPHAs does not evaluate hazardous chemicals that lack Code of Federal Regulations (CFR)-published threshold planning quantities. Therefore, many hazardous chemicals, including significant quantities of formic acid and mercury, have not been evaluated for their potential toxicological impact on site workers following facility-specific events. Consequently, as observed during facility-specific tabletop performance tests conducted as a part of this inspection, facility emergency response decision-makers have not been provided with the necessary response procedures and training to ensure that they can identify chemical hazards, protect workers in a timely manner, and accurately classify chemical-release events.

WSRC consequence assessment teams did not demonstrate the ability to develop accurate and timely assessments of emergency event consequences. The current approach to performing consequence assessments is largely expert-based inasmuch as WSRC has not developed all of the necessary expectations, procedure guidance, or other tools (such as archived EPHA consequence analyses) to support a timely, accurate, and consistent consequence assessment process. The impact of this weakness was indicated during tabletop performance tests in which, for a nitric acid release scenario, the two consequence assessment teams each needed approximately 30 minutes to develop plume plots, the results of which varied widely. The identified performance weaknesses can be attributed in large part to the cumbersome process for entering the necessary information into the consequence assessment computer model, as well as weaknesses in the ERO training, drill, and exercise program that collectively permitted these individuals to serve in their designated capacity without first ensuring that performance expectations were clearly articulated, necessary training was provided, and performance was verified to be satisfactory.

SRS continuous improvement processes, as applied to the emergency management area, are not consistently effective in identifying weaknesses and developing effective corrective actions. With the exception of its involvement in the annual exercise process, SR has not conducted emergency management assessments of WSRC to ensure that all programmatic elements are evaluated, as required by both DOE Order 151.1B and the SR technical assessment program. Additionally, until the June 2003 reorganization, SR had not conducted self-assessments of its emergency management program. Consequently, the absence of programmatic assessment activities by SR has gone unnoticed until recently, and SR was not aware that Facility Representatives were not performing technical reviews of EPHAs, as was assumed. These weaknesses can be attributed in part

to the fact that the procedure that SR uses to describe its line management oversight process for emergency management is not sufficiently detailed to ensure that the required oversight activities are appropriately planned, conducted, and documented. Although a variety of assessment activities are occurring and improvements are being identified and implemented, WSRC is not conducting annual sitewide programmatic assessments. Further, largely because of institutional weaknesses in the WSRC corrective action development process, a reduced level of rigor is associated with causal analysis of emergency management weaknesses. As a result, observed weaknesses have recurred during emergency management assessments, drills, and exercises. WSRC has identified repeat performance issues in such areas as consequence assessment, radiological controls, SRS operations center communications, and incident commander command and control, indicating that corrective actions have not been effective in completely addressing the underlying causes of these weaknesses.

3.0 Conclusions

Environment, Safety, and Health

EM/SR, NNSA/SRSO, and WSRC have faced a number of challenges associated with transition of organizations, project approaches, and processes. In most cases, site management has effectively ensured that ES&H programs were effectively implemented through the transition. For example, SRS environmental protection programs continue to be rigorous and comprehensive. The reverification of the ISM program was effective in identifying needed improvements. However, some weaknesses are evident in safety systems, hazard controls and their implementation, and feedback and improvement processes. Some of these weaknesses are attributable to the challenges associated with new processes and organizational interfaces; SR, SRSO, and WSRC have a number of ongoing actions, such as additional worker training and reemphasis of stop-work expectations.

Defense Waste Processing Facility

Many elements of the SRS institutional ISM program are mature and have been effectively implemented by the new organizational elements. Some aspects of SRS institutional programs are notably effective, such as the lessons-learned process and the behavior-based safety program. SR, SRSO, and WSRC feedback improvement programs perform numerous inspections and have contributed to improvements in ES&H programs. WSRC has implemented a systems engineering approach that is consistent with DOE requirements, and SR is well positioned to meet the expected requirements for DOE safety system oversight. With a few exceptions, SR, SRSO, and WSRC have adequately identified and communicated responsibilities for ES&H functions. WSRC has an effective process for identifying requirements and ensuring that they are clearly incorporated into working-level processes and procedures.

Many aspects of ISM are effectively implemented in SRS operating facilities, particularly those with stable operations and management teams. Most work observed by OA was performed safely and many elements of ES&H programs are effective. Implementation of ES&H controls in operating tritium facilities was detailed, comprehensive, and rigorous. Environmental protection programs were effective, and pollution protection efforts were aggressive and rigorous. Innovative measures to measure and control radiation dose were used in high dose situations. Extensive efforts have been devoted to controlling mold and mercury hazards. Essential safety systems at SRS are in good material condition, operators are well trained, and most operating procedures are well designed. Additionally, most aspects of configuration management are effective.

However, improvements are also needed in some aspects of worker safety at SRS facilities. Deficiencies in implementation and oversight of construction safety requirements are evident, particularly in the major construction effort for a new Tritium Extraction Facility. There are gaps in some aspects of exposure assessments and implementation of hazard controls in such areas as stop work, beryllium, and air monitoring. The recently implemented AHA is a good process improvement and provides a number of benefits, but it currently has some deficiencies (e.g., translating the controls to work instruction).

Although there are many positive aspects in the feedback and improvement process, many deficiencies are contributing to recurring deficiencies. SR, SRSO, and WSRC assessments and corrective actions have not been consistently

effective in identifying and correcting deficiencies in facilities, processes, and work activities. For example, the WSRC issues management program has some process and implementation deficiencies, and some assessments activities are not sufficiently comprehensive (e.g., few assessments of cross-cutting programs). In some cases, new organizational elements in SR and SRSO, or elements that have been reorganized, have not sustained all required oversight activities, such as self-assessments.

In addition, a few safety systems have deficiencies that need timely management attention. Specifically, two DWPF systems have deficiencies in testing or safety analysis that threaten their ability to perform their safety functions. In addition, the USQ program has a number of deficiencies in the procedure and implementation of screening and evaluation functions. These deficiencies were not identified by the WSRC system engineers or in SR technical reviews of the DSA and USQ procedure. WSRC has initiated some appropriate actions, but increased attention is needed to ensure that safety systems are fully analyzed and are verified to be able to perform their function for all accident conditions.

Overall, the ISM programs at SRS are mature and well structured and effectively address many of the potential hazards. Some elements are notably effective, such as the environmental protection program, the approach to dose monitoring, the behavior-based safety program, dissemination of lessons learned, and additional controls for mold and mercury. However, improvements are needed in several important aspects of the SR, SRSO, and WSRC implementation of ISM, including implementation of controls, safety basis analysis and documentation for some safety systems, USQ processes, certain aspects of exposure assessments, and SR, SRSO, and WSRC feedback and improvement systems. Although improvements are needed in a number of areas, SRS has maintained a good safety record.

Emergency Management

WSRC has implemented an emergency management program at SRS that exhibits most aspects of a mature, comprehensive program. The programmatic framework and the implementation mechanisms are notable strengths. The SRS emergency plan and implementing procedures are well integrated, and they facilitate the effective coordination of sitewide and facility-specific responsibilities for key decision-making and response actions. The quality of the response procedures and implementing checklists contributed significantly to the effective performance in protecting people and the environment that nearly all SRS ERO personnel demonstrated during tabletop performance tests.

Other program elements contained numerous positive attributes as well. WSRC has developed a transportation EPHA and has taken advantage of extensive installed instrumentation to develop symptom-based emergency action levels, which can facilitate rapid event classification. The offsite interface and emergency public information programs are well conceived and effectively implemented, as indicated by the many positive comments related to issues of offsite interest that were received by the inspection team from various state and local emergency preparedness officials. Site and facility ERO training and drill programs provide an appropriate knowledge base for ERO members through in-depth classroom instruction and an extensive program of drills for the training of ERO personnel. In the area of continuous improvement, SR performs a variety of operational awareness activities related to the WSRC emergency management program. Additionally, following last year's SR reorganization, emergency preparedness staff conducted a self-assessment that identified seven areas of improvement for SR oversight of the WSRC emergency management program. Finally, WSRC is using various assessment activities, management evaluations, and drills/exercises to identify sitewide and facility-specific emergency management weaknesses and improvement opportunities, and to implement improvements.

The most important weakness identified during this inspection is that the WSRC process for screening hazardous materials for subsequent evaluation in facility-specific EPHAs excludes hazardous chemicals that do not have CFR-published threshold quantities, irrespective of the potential adverse health effects that the release of such materials might cause. Consequently, several hazardous chemicals whose uncontrolled release could cause protective action criteria to be exceeded, thus necessitating event classification, were not assessed at the three facilities reviewed. One impact of this weakness is that although WSRC believed that facility response procedures for abnormal events adequately addressed the release of such materials, facility emergency response decision-makers demonstrated during tabletop performance tests that they did not have the procedures and training

necessary to ensure an effective response to a release of a hazardous chemical from their facility.

Several other weaknesses were identified in the SRS emergency management program. Some provisions of the training, drill, and exercise program are not effectively implemented. Most important of these is that the process for ERO position qualification does not always verify that the participant can execute all the key tasks necessary to perform the job duties before being placed on the ERO rotation schedule. The consequence assessment teams' difficulty in producing reasonably accurate assessments of event consequences in a timely manner can be attributed in part to weaknesses in the training and qualification program. Additionally, SR has not been conducting programmatic assessments of the WSRC emergency management program, and existing line management oversight processes in the emergency management area lack the structure and formality necessary to ensure that SR can proactively identify programmatic weaknesses. Finally, WSRC's implementation of the existing corrective action process does not ensure that identified weaknesses are subjected to an appropriate causal analysis and that corrective actions are developed to prevent recurrence.

WSRC has implemented a well structured emergency management program that provides a high degree of confidence that site workers and the public will be adequately protected if a significant event occurs. The identified weakness in the hazardous material screening process will require a carefully considered approach to correction, and additional SR line management attention to SR oversight of the SRS emergency management program is warranted in order to sustain the recent improvement initiatives. Some other elements of the WSRC program will require attention to improve those aspects that limit their effectiveness. Overall, however, the program is strong.

4.0 Ratings

The ratings reflect the current status of the reviewed elements of the SRS ISM and emergency management programs.

Safety Management System Ratings

Guiding Principle #2 – Clear Roles and Responsibilities ..... EFFECTIVE PERFORMANCE
Guiding Principle #5 – Identification of Standards and Requirements ..... EFFECTIVE PERFORMANCE

Feedback and Improvement

Core Function #5 – Feedback and Continuous Improvement ..... NEEDS IMPROVEMENT

Implementation of Core Functions for Selected Work Activities

Core Function #1 – Define the Scope of Work ..... EFFECTIVE PERFORMANCE
Core Function #2 – Analyze the Hazards ..... EFFECTIVE PERFORMANCE
Core Function #3 – Develop and Implement Hazard Controls ..... NEEDS IMPROVEMENT
Core Function #4 – Perform Work Within Controls ..... NEEDS IMPROVEMENT

Essential System Functionality

Design and Configuration Management ..... SIGNIFICANT WEAKNESS
Surveillance, Testing, and Maintenance ..... EFFECTIVE PERFORMANCE
Operations ..... EFFECTIVE PERFORMANCE

Emergency Planning

Hazards Survey and Hazards Assessments ..... NEEDS IMPROVEMENT
Program Plans and Procedures ..... EFFECTIVE PERFORMANCE
Offsite Interfaces ..... EFFECTIVE PERFORMANCE

Emergency Preparedness

Training, Drill, and Exercise Program ..... EFFECTIVE PERFORMANCE
Emergency Public Information ..... EFFECTIVE PERFORMANCE

Emergency Response

SRS Emergency Response Decision-Making ..... EFFECTIVE PERFORMANCE

Readiness Assurance

DOE Assessments and Performance Monitoring ..... NEEDS IMPROVEMENT
Contractor Assessments and Issues Management ..... EFFECTIVE PERFORMANCE

APPENDIX A
SUPPLEMENTAL INFORMATION

A.1 Dates of Review

Scoping Visit	December 16 – 17, 2003
Onsite Planning Visit	January 12 – 16, 2004
Onsite Inspection Visit	January 26 – February 6, 2004
Report Validation and Closeout	February 18 – 20, 2004

A.2 Review Team Composition

A.2.1 Management

Glenn S. Podonsky, Director, Office of Security and Safety Performance Assurance
Michael A. Kilpatrick, Director, Office of Independent Oversight and Performance Assurance
Patricia Worthington, Director, Office of Environment, Safety and Health Evaluations
Thomas Staker, Deputy Director, Office of Environment, Safety and Health Evaluations
Charles B. Lewis, Director, Office of Emergency Management Oversight

A.2.2 Quality Review Board

Michael Kilpatrick	Patricia Worthington	Thomas Staker	Douglas Trout
Charles Lewis	Dean Hickman	Robert Nelson	

A.2.3 Review Team

Patricia Worthington (Team Leader)
Bob Freeman (Management Systems Lead)
Phil Aiken
Ali Ghovanlou
Robert Compton
Albert Gibson

Brad Davy (Core Functions Lead)
Vic Crawford
Ivon Fergus
Marvin Mielke
Mark Good
Joe Lischinsky
Jim Lockridge
Edward Stafford
Mario Vigliani

Bill Miller (Essential Systems Functionality Lead)
Charles Campbell
Michael Gilroy
Don Prevatte
Joe Panchison
Michael Shlyamberg

Steven Simonson (Emergency Management Lead)
JR Dillenback
Stephen Kirchhoff
David Odland
Jeff Robertson
Tom Rogers
David Schultz

A.2.4 Administrative Support

Mary Anne Sirk
Tom Davis

APPENDIX B
SITE-SPECIFIC FINDINGS

Table B-1. Site-Specific Findings Requiring Corrective Action Plans

ES&H FINDING STATEMENTS
1. The SR self-assessment program is not effectively implemented in accordance with the SR self-assessment program procedure, and SR self-assessment processes do not provide for sufficient independent internal assessment of SR technical programs and their implementation.
2. SRSO feedback and improvement processes, including Facility Representative assessments, technical assessments, self-assessments, and corrective-action/commitment management, are not sufficiently comprehensive and do not fully meet applicable requirements.
3. WSRC has not established and implemented a fully effective assessment program that consistently evaluates performance, especially for crosscutting safety and health and institutional safety management processes.
4. WSRC has not established and implemented a fully effective issues management process that consistently evaluates performance, identifies adverse trends and root causes, and prevents recurrence through appropriate actions.
5. WSRC has not established adequate mechanisms to ensure that controls identified in the AHA are effectively integrated into work activities and implemented prior to performing the work.
6. WSRC radiological control personnel have not consistently performed radiological air monitoring in accordance with established procedures, as necessary, to verify protection from exposure to airborne radioactivity and demonstrate continued adequacy of the site's current annual routine bioassay technical basis.
7. Construction and subcontractor personnel are not always rigorously and consistently implementing construction safety requirements, resulting in unsafe conditions and practices that could cause injury.
8. D&D workers and their supervisors do not always recognize inadequately analyzed hazards as potentially unsafe conditions, and consequently do not resolve the discrepancies in accordance with site procedures and management expectations.
9. WSRC is not analyzing and documenting occupational exposures to some hazards (noise, hazardous chemicals, and beryllium) in accordance with the requirements of DOE Order 440.1A and site requirements.
10. WSRC is not conducting effective ALARA reviews in accordance with site procedures in connection with D&D project work.
11. WSRC has not fully demonstrated through rigorous analysis and/or testing that two safety-class systems at DWPF will perform their design safety function.
12. SR technical reviews were not sufficient to identify deficiencies with implementing the DSA and technical safety requirements for two DWPF safety-class systems.
13. WSRC is not evaluating changes to the facilities or procedures as described in the DSA, or potential inadequacies in the DSA, in accordance with 10 CFR 830 to determine whether they constitute a USQ; deficiencies in the USQ procedure and its implementation are a contributing factor.
14. SR has not ensured that the SRS USQ process, procedure, and implementation are adequate.

Table B-1. Site-Specific Findings Requiring Corrective Action Plans (continued)

EMERGENCY MANAGEMENT FINDING STATEMENTS
1. WSRC has not ensured that all hazardous chemicals are identified and then assessed, as appropriate, for potential impact on site workers and the public, as required by DOE Order 151.1B, *Comprehensive Emergency Management System.*
2. The WSRC process for training and qualifying ERO personnel does not ensure, through task-specific training and demonstration of required proficiency, that the personnel can perform all of their key ERO position responsibilities, as required by the SRS emergency plan and site training standards.
3. During tabletop performance tests, the WSRC consequence assessment teams did not develop accurate and timely assessments of emergency event consequences to support emergency response organization decision-making, as required by DOE Order 151.1B.
4. SR is not conducting programmatic assessments of the site emergency management program, as required by the emergency plan and DOE Order 151.1B.