

**Independent Oversight
Inspection of
Emergency Management
at the**



Savannah River Site

January 2010

Office of Independent Oversight
Office of Health, Safety and Security



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Abbreviations Used in This Report

AEC	<i>Area Emergency Coordinator</i>	PAR	<i>Protective Action Recommendation</i>
CARB	<i>Corrective Action Review Board</i>	SOM	<i>Shift Operations Manager</i>
CAT	<i>Consequence Assessment Team</i>	SRNS	<i>Savannah River Nuclear Solutions, LLC</i>
DIL	<i>Derived Intervention Level</i>	SRS	<i>Savannah River Site</i>
DOE	<i>U.S. Department of Energy</i>	SRSOC	<i>Savannah River Site Operations Center</i>
DOE-SR	<i>DOE Savannah River Operations Office</i>	STAR	<i>Site Tracking, Analysis, and Reporting</i>
DWPF	<i>Defense Waste Processing Facility</i>	TSR	<i>Technical Support Room</i>
EAL	<i>Emergency Action Level</i>	WINDS	<i>Weather Information Display System</i>
ED	<i>Emergency Director</i>	WSI	<i>Wackenhut Services, Incorporated</i>
EDO	<i>Emergency Duty Officer</i>		
EM	<i>Emergency Manager</i>		
EOC	<i>Emergency Operations Center</i>		
EP	<i>Emergency Preparedness</i>		
EPHA	<i>Emergency Planning Hazards Assessment</i>		
EPI	<i>Emergency Public Information</i>		
EPIP	<i>Emergency Plan Implementing Procedure</i>		
EPZ	<i>Emergency Planning Zone</i>		
ERO	<i>Emergency Response Organization</i>		
FDA	<i>Food and Drug Administration</i>		
FEC	<i>Facility Emergency Coordinator</i>		
FTF	<i>F-Tank Farm</i>		
FY	<i>Fiscal Year</i>		
HSS	<i>Office of Health, Safety and Security</i>		
IC	<i>Incident Commander</i>		
JIC	<i>Joint Information Center</i>		
LSPT	<i>Limited-Scope Performance Test</i>		
NNSA	<i>National Nuclear Security Administration</i>		
PA	<i>Public Address</i>		

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1 Introduction

The U.S. Department of Energy (DOE) Office of Independent Oversight within the Office of Health, Safety and Security (HSS), inspected the emergency management program at the DOE Savannah River Site (SRS) in August and September 2009. The inspection was performed by the Office of Independent Oversight's Office of Emergency Management Oversight to support site management in the execution of the SRS mission. This report discusses the results of the review of the SRS emergency management program. Concurrently, the HSS Office of Environment, Safety and Health Evaluations inspected the nuclear safety program at several National Nuclear Security Administration (NNSA) facilities at SRS and the SRS environment, safety, and health programs. The results of those inspections are discussed in separate reports.

The DOE Office of Environmental Management is the lead program secretarial office for SRS. As such, it has overall Headquarters responsibility for programmatic direction and funding of most activities, including emergency management. At the site level, line management responsibility for most SRS operations and safety falls under the manager of the DOE Savannah River Operations Office (DOE-SR). The NNSA Office of the Deputy Administrator for Defense Programs is the cognizant secretarial office for the site's tritium operations. The NNSA Savannah River Site Office provides line management oversight for the NNSA defense programs operations. DOE-SR provides support to the Savannah River Site Office in many technical and administrative areas, including line oversight of emergency management at NNSA's site tritium facilities.

Two contractor changes have recently occurred at SRS. On August 1, 2008, Savannah River Nuclear Solutions, LLC (SRNS) assumed management and operating responsibilities for SRS from the Washington Savannah River Company. Savannah River Remediation, LLC assumed the duties as the liquid waste operations contractor on July 1, 2009. Other contractors include Wackenhut Services, Incorporated (security) and Shaw AREVA MOX Services (mixed oxide fuel fabrication facility construction and operations).

The SRS management and operating contract includes three key mission areas: environmental cleanup, operation of the Savannah River National Laboratory, and NNSA activities. Environmental cleanup activities include management of spent nuclear fuel, nuclear materials, and non-high-level radioactive waste; deactivation and decommissioning of excess facilities; and remediation of soil and groundwater. In support of the DOE national security and non-proliferation programs, the NNSA activities include operation of the tritium facilities and completion of the plutonium disposition program.

SRS activities involve effectively controlling various potential hazards, which include exposure to external radiation, radiological contamination, nuclear criticality, hazardous chemicals, and various physical hazards associated with facility operations (e.g., machine operations, high-voltage electrical equipment, pressurized systems, and noise). Significant quantities of radiological and chemical hazardous materials are stored and utilized in various forms at SRS.

The purpose of this inspection was to assess the effectiveness of emergency management programs at SRS as implemented by SRNS under the direction of DOE-SR. This inspection addressed areas where programmatic weaknesses were noted in either the 2004 or 2006 inspections, including procedure use and communications during limited-scope performance tests (LSPTs), implementation of the DOE-SR emergency management assessment program, emergency response organization (ERO) personnel training, emergency planning hazards assessment (EPHA) development, and emergency public information procedures.

Independent Oversight used a selective sampling approach to assess a representative sample of facilities and ERO responders at SRS. Specifically, the sampling approach was used to evaluate:

- The effectiveness of the hazards surveys and EPHAs in providing an appropriate foundation for the DOE-SR emergency management program
- The effectiveness of DOE-SR and SRNS emergency responders in applying their skills, procedures, and training to make appropriate decisions and to properly execute actions to protect emergency responders, workers, and the public.

To evaluate response performance, Independent Oversight conducted LSPTs involving initial responders and decision-makers. The performance tests were designed to evaluate the ability of responders to effectively execute their assigned duties during postulated site-specific emergencies. Independent Oversight used trusted agents from the site to assist in developing and conducting the LSPT scenarios and validating the results.

These activities, as well as other assessment areas, included a review of corrective actions intended to address weaknesses identified during the 2004 and 2006 Independent Oversight emergency management inspections. This review provided insights into the effectiveness of SRNS feedback and continuous improvement systems, as well as DOE's emergency management oversight and operational awareness activities at SRS.

Section 2 of this report provides an overall discussion of the results of the review of the SRS emergency management program elements that were evaluated. Section 3 provides Independent Oversight's conclusions regarding the overall effectiveness of DOE-SR and SRNS management of the emergency management program. Appendix A provides supplemental information, including team composition. Appendices B through E detail the results of the reviews of individual emergency management program elements.

In accordance with ongoing DOE management reforms, particularly in the area of worker safety oversight, DOE will rely on site managers to resolve the weaknesses and specific deficiencies identified in this report. Consequently, the Office of Environmental Management, DOE-SR, and SRNS should ensure that the deficiencies and opportunities identified in this report are evaluated and addressed, as appropriate, in accordance with site issues management processes. In cases where the Independent Oversight report identifies potential non-compliances with applicable DOE requirements, corrective action plans should be developed in accordance with site corrective action management and quality assurance processes, including extent-of-condition and causal analyses, as appropriate. While this report does not identify findings, the weaknesses identified in Section 2.2 of this report identify the issues that Independent Oversight believes warrant priority management attention in the site corrective action processes.

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Results

2.1 Positive Program Attributes

DOE-SR and SRNS continue to improve the SRS emergency management program, ensuring that site responders can effectively respond to a wide range of potential initiating events. Positive attributes of the emergency management program are discussed below.

Procedures implemented by SRNS for developing the site hazards surveys and EPHAs have resulted in a sound technical basis for the site emergency management program. A review of selected hazards surveys and EPHAs, as well as walkdowns of the respective facilities, indicates that the positive elements of the program observed in 2006 have been retained. Site procedures provide detailed instructions for the development, review, and approval of the hazards surveys and EPHAs. Hazardous material control processes ensure that facilities maintain hazardous materials within analyzed limits and that emergency management personnel are notified before significant changes in hazardous material inventories. Hazards surveys appropriately identify emergency conditions and screen the identified hazardous materials. EPHAs comprehensively address site events and hazards, consistently develop hazardous material source terms, appropriately analyze the hazardous materials, and adequately support development of emergency action levels (EALs). EALs generally support timely event classification, provide predetermined protective actions for onsite and offsite populations, and (with the exception of the Defense Waste Processing Facility) include malevolent-act scenarios analyzed in the EPHAs.

SRNS has implemented an effective emergency response capability through a full set of site and facility response procedures combined with comprehensive and well-documented drill and exercise programs. The *SRS Emergency Plan* provides an appropriate description of the site's emergency response strategy. Roles and responsibilities for important decision-making actions are clearly delineated. Appropriately detailed response actions are implemented in a set of site-level and facility/area-level emergency plan implementing procedures and supporting checklists, forms, and aids. The *SRS Emergency Plan* defines the training goals, organizational responsibilities, and training requirements, and it applies to all operating and security contractors and Federal staff. The plan is supported by an integrated emergency public information program and a mostly effective training, drill, and exercise program. Training consists of an appropriate mix of classroom and computer-based training and position walkthroughs. Drills are an integral part of initial and refresher training, providing ample opportunities for personnel and teams to practice their functions and to demonstrate proficiency at assigned tasks. The site also implements a comprehensive program of facility drills and site exercises that ensure facilities evaluate their emergency response capability annually. The annual site exercises and numerous facility emergency preparedness drills collectively encompass all site-

level emergency response elements and a variety of hazards, and they frequently include offsite organizations. Site exercise and facility drill packages are thoroughly written, and most identified issues are entered into the corrective action system and appropriately resolved.

Both DOE-SR and SRNS positively impact the emergency management program by actively addressing issues identified by external and internal assessments. DOE-SR is actively involved in the SRS emergency management program and has effectively overseen the corrective actions for identified issues. DOE-SR was particularly effective in tracking and verifying the corrective actions resulting from the previous Independent Oversight inspections and DOE-SR assessments of the contractor's emergency management program. Personnel conducted several follow-up assessments to validate the closure of the actions, including follow-on actions. Interactions with contractor personnel were used to verify the effectiveness of the completed actions. SRNS's corrective actions have been effective in addressing weaknesses from the previous inspection and, during the past 18 months, has improved the management of identified issues by chartering a Corrective Action Review Board to review the assignment of corrective actions, status of actions, and closure. Emergency management issues identified through the assessment program and the site drill program are evaluated, and actions are assigned by the Corrective Action Review Board. Overall, issues are effectively managed, tracked to closure, and validated using the site issues management database, and, in general, the issues management process results in program improvements.

2.2 Program Weaknesses and Items Requiring Attention

The SRNS emergency management program is generally strong, and Independent Oversight noted several performance improvements since the 2006 inspection. However, some weaknesses warranting attention were noted during the LSPTs and in the training and drill programs.

During the LSPTs, response personnel did not always effectively determine and implement appropriate protective actions and protective action recommendations. During the security event scenarios, response personnel did not achieve a consensus on the protective action distances related to a potential explosive device, and did not demonstrate familiarity with the difference between the outdoor and building evacuation distances. Decision-makers also gave inconsistent directions for the protective actions to be taken, such as the emergency duty officers (EDOs) over-conservatively issuing default protective actions applicable to a radiological release for a security event that threatened a chemical release. Information critical to the decision-making process was not always appropriately prioritized by the emergency operations center (EOC) cadre. During the same scenario, the technical support room did not provide timely chemical inventories to consequence assessment personnel, resulting in significantly different material-at-risk quantities being modeled. Finally, although protective actions were ordered in a timely manner, neither decision-makers nor response personnel consistently took actions to verify accountability for personnel evacuating from one facility building to another and to ensure that orders to "remain indoors" (shelter in place) were implemented.

During the LSPTs, facility shift operations managers and EOC decision-makers did not always perform prompt and accurate event classifications. During the security event scenario, EDOs appropriately declared an Operational Emergency following the identification of a potential malevolent act (explosive device). When the explosive device was confirmed, shift operations managers correctly declared an Alert. Since this device was located next to a 4,500 gallon formic acid storage tank, there was the potential for a release of hazardous materials that would exceed protective action criteria beyond the facility boundary. The potential severity of this release should have led decision makers to upgrade the event classification to a Site Area Emergency and to reevaluate protective actions. However, the expected response and subsequent classification upgrade did

not occur because the consensus among the ERO was that although an explosion and release of hazardous material would upgrade the classification, the upgraded classification would not apply until an explosion actually occurred. As a result, the recommendation made to the emergency managers, emergency director, and other response decision-makers was to remain in an Alert.

The SRS training program does not ensure that all ERO personnel who perform critical tasks demonstrate proficiency as part of initial and continuing training, and does not ensure that all site personnel participate in protective action drills as required. A continuing weakness in the SRNS training program is that a demonstration of proficiency is not required for security incident commanders and several members of the EOC cadre who perform critical tasks. These members include the assessment and planning coordinator, the dispersion modeling system specialist, and the technical support coordinator. The training program also does not address the training and proficiency of personnel who take over critical functions in the absence of the primary personnel assigned to the position (e.g., acting as the emergency director). Additionally, the SRNS program does not ensure that drills are conducted periodically for all employees, specifically those in smaller or sparsely occupied buildings, who may be expected to take protective actions.

SRS has not developed and documented a news release process that correctly addresses timely dissemination of emergency information to the public and civil authorities. Of continuing concern is the inconsistent documentation of SRS policy regarding issuing an initial news release during both regular and off-hours. Several documents address the timeliness of the initial news release, with expectations that vary from “should be issued within about one hour of the time the public affairs representative is notified” to “within one hour of an operational event” (which is undefined). During the LSPTs, three of four initial news releases were timely, but team members did not agree on when the “one hour” would begin. Additionally, the guidance for an after-hours event could delay the issuance of the initial news release until the next business day.

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Conclusions

The Independent Oversight emergency management inspection determined that the efforts of DOE-SR and SRNS managers and staff have been successful in addressing most of the key emergency management program weaknesses noted during previous inspections. Prior concerns regarding the completeness of the hazardous material screening process, the performance of the consequence assessment teams, and the conduct and documentation of DOE-SR assessments of the site's emergency management program have been largely corrected. Nonetheless, recurring concerns were noted in the qualification process for key EOC staff and the ability of decision-makers to classify events. Additionally, the lack of clear processes for the initial news release continues to be problematic.

SRS plans and procedures are supported by a mostly effective training, drill, and exercise program. The exercise and evaluated facility-level drill packages are documented and implemented with sufficient rigor and quality to provide meaningful and thorough evaluations of response capability. However, not all ERO personnel and security incident commanders are required to receive task-specific training, or demonstrate proficiency in performing assigned duties. Also, periodic drills for employees who may be expected to take protective actions are not conducted as required.

During the LSPTs, improvements from the 2006 inspection were observed, including the timeliness of the notification process and decision-making by the shift operating managers and EDOs during the initial response to events. ERO and first-responder performance was generally effective. Messages to site workers and news releases were mostly accurate and informative. Within the EOC, periodic conference calls were good for exchanging information between the EOC and EDO; however, these calls removed much of the EOC cadre from urgent response tasks for extended periods of time. Decision-makers did not always perform prompt and accurate event classifications and were not familiar with the EAL instructions for consideration of a potential release. As a result, neither team upgraded the classification of one scenario, as directed by the EAL. Also, decision-makers experienced difficulty in applying protection actions. During the security scenarios, the default protective actions were overly conservative, and protective action distances for explosive devices were misapplied.

SRNS continues to improve the SRS emergency management program. Notably, SRNS has implemented a set of corrective actions that effectively addresses nearly all of the findings identified in the 2004 and 2006 inspections. Previous concerns that assessments of the emergency management program were not being planned and conducted as required by site procedures have been addressed, although some areas lack sufficient depth of inquiry to adequately identify issues. DOE-SR has been effective in overseeing the issues and corrective actions identified through external and internal assessments, and SRNS uses issues management policies and procedures effectively to correct emergency management issues.

Overall, SRS has implemented a mature, comprehensive, and well-documented emergency management program whose programmatic elements and site emergency response are well-governed by the site emergency plan and complemented by a thorough set of implementing procedures. Although a few weaknesses warrant management attention, the SRS emergency management program is consistent with DOE expectations and is capable of protecting scene responders, site workers, and the public from the range of analyzed events.

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APPENDIX A

Supplemental Information

A.1 Dates of Review

Scoping Visit	May 13-14, 2009
Planning Visit	August 4-6, 2009
Onsite Inspection Visit	August 17-26, 2009
Report Validation and Closeout	September 22-24, 2009

A.2 Review Team Composition

A.2.1 Management

Glenn S. Podonsky, Chief Health, Safety and Security Officer
William Eckroade, Deputy Chief for Operations, Office of Health, Safety and Security
John Boulden, Acting Director, Office of Independent Oversight and Office of Enforcement
Steven Simonson, Director, Office of Emergency Management Oversight

A.2.2 Quality Review Board

William Eckroade
John Boulden
George Armstrong
Dean Hickman
Robert Nelson
William Sanders
Pete Turcic

A.2.3 Review Team

Steven Simonson (Overall Team Leader)

Randy Griffin (Team Leader)
John Bolling
JR Dillenback
Deborah Johnson
Teri Lachman
David Odland
Thomas Rogers

A.2.4 Administrative Support

Laura Crampton

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APPENDIX B

Emergency Planning

B.1 Introduction

Two key elements of emergency planning are developing hazards surveys and emergency planning hazards assessments (EPHAs) to identify and assess the impact of site- and facility-specific hazards and threats, and establishing an emergency planning zone (EPZ). The hazards surveys and EPHAs serve as the foundation of the emergency management program. Consequently, their rigor and accuracy are key elements in developing effective emergency response procedures and other elements of the program. The degree to which the EPHAs effectively serve this function depends primarily on the completeness of the institutional processes for developing the hazards surveys and EPHAs; the effectiveness of the screening process by which hazardous materials are initially considered; and the rigor and accuracy of the analyses contained within the EPHAs.

U.S. Department of Energy (DOE) and National Nuclear Security Administration (NNSA) sites and facilities use the results of these assessments to establish emergency management programs that are commensurate with the identified hazards. The site emergency plan defines and conveys the management philosophy, organizational structure, administrative controls, decision-making authorities, and resources necessary to maintain the site's comprehensive emergency management program. Specific implementing procedures are then developed that conform to the plan and provide the necessary detail, including decision-making thresholds, for effectively executing the response to an emergency, irrespective of its magnitude. These plans and procedures must be closely coordinated and integrated with offsite authorities that support the response effort and receive DOE emergency response recommendations.

This evaluation included a review of the Savannah River Site (SRS) hazards surveys, EPHAs and the management of hazardous material facilities. Also reviewed were sitewide and facility-specific emergency plans and associated implementing procedures.

B.2 Status and Results

B.2.1 Hazards Survey and Emergency Planning Hazards Assessments

A review of selected EPHAs, and subsequent walkdowns by Independent Oversight of the respective facilities, indicates that the EPHAs have retained the positive elements observed in the 2006 inspection. Savannah River Nuclear Solutions, LLC (SRNS) has developed formal, clearly-defined, and well-documented procedures for developing the site hazards surveys and EPHAs. The procedures effectively identify requirements and expectations reflected in DOE Order 151.1C and the associated DOE emergency management guide. The procedures provide detailed instructions on the methodology, content, and format for developing the hazards surveys and EPHAs and identify contractor, DOE Savannah River Operations Office, and NNSA Savannah River Site Office roles and responsibilities for reviewing and approving the hazards surveys and EPHAs. The procedures also include mechanisms for facility/project managers to validate the contents of these documents through a review, comment, and approval requirement. Additionally, the concerns identified in the 2006 Independent Oversight inspection pertaining to the procedures have been appropriately resolved by SRS:

- The hazards survey procedure contains procedural guidance that assists the analyst in estimating particle size of solid materials to determine whether the material is larger than 10 microns and thus would be excluded from a quantitative assessment.
- The hazardous material screening process effectively incorporates the criteria described in DOE Order 151.1C.
- The EPHA procedure stipulates design or administrative controls when using segmentation as the basis for excluding materials and includes a specific list of initiating events that must be considered to represent a full spectrum of emergency events.

An effective hazardous material identification and screening process, which establishes the need for a quantitative EPHA, is based on a thorough identification of the hazardous materials present in the facility, which in turn relies to a great extent on an accurate site inventory of hazardous materials and appropriate screening thresholds. The hazardous material identification process incorporated at SRS appropriately identifies building/operations manager responsibilities to ensure that emergency management is notified before significant changes in hazardous material inventories or operations involving hazardous materials. Specifically, facility/project managers are required by procedure to ensure that they will not exceed the maximum anticipated quantities that have been analyzed for the facility before purchasing additional hazardous materials. They must also report any increases in hazardous material inventories before the changes to ensure revision of their EPHA and verify the accuracy of their hazardous material quantities biannually. In addition, emergency preparedness coordinators are assigned to each hazardous material facility as a point of contact to ensure that the emergency management department is notified before changes in inventories or operations.

Emergency management personnel have developed hazards surveys and EPHAs consistent with the defined procedures for each of their hazardous material facilities. The hazards surveys incorporate a screening process consistent with DOE Order 151.1C and the associated guide, applicable planning and preparedness requirements, and offsite response interfaces. The hazards surveys also include descriptions of emergency events and conditions of concern. A review of the hazardous material inventory databases (for facilities reviewed and walked-down during this inspection) that serve as the basis for the hazards survey tables determined that the hazards survey tables are consistent with the databases. Additionally, the facility walkdowns conducted during this inspection further verified the accuracy of the databases.

The EPHAs also include descriptions of external hazards (e.g., transportation accidents, CSX rail line accidents, and the impact of events at the Vogtle Electric Generating Plant) that have the potential to affect the facility. Also included is a specific list of required initiating events that must be considered to represent a full spectrum of emergency events (including moderate and extreme malevolent acts); technically adequate bases for the facility-based EPZs (used to develop the site's EPZ); and emergency action levels (EALs) that generally include default, worst-case source terms and maximum distances where protective action criteria are exceeded.

Additionally, a concern was noted in the management of the triennial update schedules. Although facility/project managers, DOE Savannah River Operations Office, and NNSA Savannah River Site Office are actively engaged in the hazards survey and EPHA development process through the review and comment process, the review and comment/comment resolution period is taking longer than anticipated on the published schedule. The S-Area hazards survey and the C-Area EPHA have exceeded their triennial review/revision date. However, approval for a nine-month grace period has been received from the NNSA Office of Emergency Management and Policy to obtain final approval of the hazards surveys and EPHAs.

Finally, SRS uses an excellent in-house modeling tool named Weather Information Display System (WINDS) for consequence assessment dispersion modeling during emergency events and drills or exercises. WINDS has 24-hour running meteorological observation capabilities that assist in weather forecasting. Input data (source term, plume height, release duration) from facility-specific EPHAs are kept up to date as changes are made to the documents. The default radiological and chemical event information contained in the SRS EPHAs is incorporated into the model for use as default timely initial assessment plume modeling projections by consequence assessment dispersion modelers. An exception is the default formic acid release data contained in the Defense Waste Processing Facility (DWPF) EPHA, which has not been entered into WINDS.

To summarize, SRNS has implemented effective processes for developing hazards surveys and EPHAs that meet DOE requirements and expectations. Emergency management personnel have established an effective hazardous material identification process that ensures that facility/project managers and emergency planners can maintain the validity of EPHAs. The site hazards surveys identify applicable emergency conditions and appropriately screen identified hazardous materials. The EPHAs are comprehensive in considering events and hazards, consistent in development of source terms, and adequate in supporting the development of EALs. Although one hazards survey and one EPHA have exceeded their scheduled triennial update, SRNS has obtained approval for a grace period from the NNSA Office of Emergency Management and Policy. Additionally, SRS utilizes an in-house modeling tool (WINDS) that generally incorporates default hazardous material information obtained from the EPHAs to ensure timely initial assessments during emergency events.

B.2.2 Program Plans and Procedures

During the 2004 Independent Oversight inspection, plans and procedures were found to be comprehensive and effective, with opportunities for improvement in instructions for implementing “remain indoors” protective actions and adherence to review and update schedules. Because of the strength of this program element, plans and procedures were not included in the scope of the 2006 Independent Oversight inspection. This 2009 Independent Oversight inspection found that SRS continues to maintain plans and procedures in an effective and high quality condition, and improvements in the “remain indoors” protective action instructions and the periodic review and update process have been implemented.

The *SRS Emergency Plan* provides an appropriate description of the site’s overall emergency response strategy, including organizational assignments and responsibilities and the programmatic elements of the emergency management program. The plan describes the site emergency response organizations (EROs) and their functions at the site level, the facility/area level, and the incident scene. The field response, facility/area response, and site-level response teams’ roles and responsibilities are adequately described and provide continuity for important decision-making authority and notification and response capability. Furthermore, the plan addresses unique emergency planning features of the SRS, such as railways, waterways, air traffic, public roadways, remote areas, dam breaks, and the Vogtle Electric Generating Plant, all of which are on or near the site. The plan also includes response and notification agreements with the states of Georgia and South Carolina and local medical, fire, and law enforcement. Program administrative elements, such as program administration, drills, exercises, and readiness assurance, are adequately addressed.

Site-level and facility/area-level emergency plan implementing procedures (EPIPs) provide the appropriate details for implementing the site emergency plan. The EPIPs are well-integrated and consistently describe the authorities and responsible positions for executing the important functions of categorization, classification, formulation of protective action, activating the ERO, and personnel accountability. For example, the EPIPs describe the relationship of the emergency duty officer (EDO) and facility/area emergency coordinators

regarding authorities, communication requirements, and required support for implementing the emergency plan. Likewise, the EIPs described the relationship of the EDO and the emergency director/manager after the emergency operations center is operational. An effective and comprehensive set of checklists and form templates are available to help the EDO and ERO quickly execute their assigned tasks.

Each facility has a set of EIPs that describes how they will respond, including the authority and responsibility of facility/area emergency coordinators, staffing of the facility operations center, notifications to the EDO and facility workers, and support of the incident commander. A site emergency management program procedure is in place that governs facility personnel accountability systems. Several facility EIPs were reviewed and found to be both comprehensive and consistent with site program procedures. For evacuations, personnel accountability is established by an accountability coordinator who receives reports from rally point coordinators. These positions are equipped with a detailed checklist for executing their functions. For “remain indoors” protective actions, facilities have a procedure or installed placards that provide instructions on how to shut down ventilation systems or, if it is unsafe to follow the instructions, to relocate to another area.

Although the EIPs are mostly well conceived and constructed, one weakness was apparent. The notification EIP instructs the EDO to immediately issue a protective action recommendation (PAR) to offsite authorities for any radiological release classified as a Site Area or General Emergency. The PAR is for offsite authorities to issue ingestion pathway precautionary advisories downwind of the SRS within the SRS EPZ while dispersion models are being completed. However, the technical basis for the PAR, which potentially affects a large public area, is not documented. Additionally, issuing the advisory is not reasonable during the response phase of an event, nor is it consistent with Food and Drug Administration (FDA) guidance. Issuance of this PAR for a relatively small radioactive liquid spill, as was the case during the limited-scope performance tests, could result in undue concern from offsite authorities and the media. Per FDA guidance, the derived intervention levels (DILs) used for determining ingestion pathway protective actions are for radionuclides expected to deliver the major portion of the radiation dose from ingestion during the first year following an accident. DILs are for accidental releases of radionuclides from large nuclear reactors and for other radiological emergencies where there is a possibility of accidental radioactive contamination of human food. Furthermore, FDA guidance states that protective actions should be taken after the situation is evaluated. The use of DILs significantly contrasts with the protective action criteria used in the EPHAs because the EPHA analysis is for airborne exposures from a radioactive material release during the early stages of an emergency (rather than ingestion over a year). However, the SRS capability to produce dispersion plots based on DILs would be very beneficial during recovery planning in the event of a significant radiological release at SRS or the Vogtle Electric Generating Plant.

Most EALs are correctly based on the results of the analysis contained in the EPHAs, represent the analyzed scenarios, and are linked to event classifications and protective actions. Site-level and facility/area-level EALs are developed using the same emergency management program procedure to promote consistent formats and inclusion of essential information. To ensure that comprehensive guidance is available to decision-makers, supervisory EALs and the *Emergency Response Guidebook* are provided to formulate protective actions and classify an unanalyzed event.

However, although moderate and extreme malevolent-act scenarios have been considered in the EPHAs, the results are not consistently included in the development of EALs. For example, the malevolent act scenario analysis in the DWPF EPHA was not used for EAL development, while K-Area Alert and Site Area Emergency EALs are in the EAL manual even though the EPHA concludes that these EALs are not needed. Finally, security event classifications used to identify a tactical security response are inappropriately linked to the facility EALs used to classify hazardous material release events. There is no technical basis for the

hazardous material event classification to be linked to a security response. Furthermore, these EALs are not useful in formulating protective actions because protective action distances are not included in the EALs.

In addition, during the limited-scope performance tests, decision-makers did not decide to make an expected classification upgrade when applying a DWPF EAL (see Appendix D). In this case, the EAL entry indicators address an actual release, and the instructions for applying these indicators for a potential release are contained in the body of the DWPF EAL EPIP. The EAL is an attachment within the DWPF EAL EPIP; however, decision-makers were not familiar with these instructions and did not make reference to it. As a result, decision-makers applied the entry condition indicators verbatim and decided not to upgrade the classification until there was an actual release.

Fire department procedures provide adequate guidance for fire department personnel to implement the incident command system. The procedures include roles and responsibilities for each position and describe important functions, such as command and control, unified command, safety and accountability of responders, interactions with facility personnel, liaison with the emergency operations center, and development of an incident action plan. To support execution of important tasks, checklists are available for incident command system positions. Additionally, the fire department has pre-fire plans, the *Emergency Response Guidebook*, and access to material safety data sheets to support identifying hazardous materials and planning a safe response. The pre-fire plans could be improved by updating them with the concentrations of hazardous materials used at the facilities. The absence of this information was somewhat problematic during the limited-scope performance tests because facility personnel were not always available to provide this information, and the material safety data sheet database had multiple listings of hazardous chemicals and a wide range of concentrations to select from. The concentrations are sometimes important in applying the *Emergency Response Guidebook* when formulating protective actions.

The *Wackenhut Services, Incorporated (WSI) Emergency Security Operations Procedure* provides adequate guidance for a security response involving hazardous materials. It includes roles and responsibilities for a security incident commander for events involving suspicious packages, credible bombs, radiological materials, and hazardous chemicals. Furthermore, it is written within the SRS emergency response framework, which integrates the response with the SRNS and DOE concepts of operation. An adequate checklist is available for quickly executing a security response; however, clarification of standoff distances used for potential bomb blasts is warranted. The WSI procedure contains a bomb blast safe distance chart that provides different safe distances than stated in the body of the same procedure, and both are different from the safe distance contained in the SRNS security operations procedure (EPIP 116). Specifically, a briefcase sized bomb results in an outside protective action distance of 1850 feet by the chart, 350 feet within the body of the WSI procedure, and 900 feet by EPIP 116.

Memoranda of understanding/agreement with offsite entities are in place for mutual support and notification protocols. These memoranda address medical transport and care, county law enforcement and fire departments, the Federal Bureau of Investigation, military forts, the states of Georgia and South Carolina, and the Southern Nuclear Operating Company (Vogtle Electric Generating Plant). SRS training, response, and notification commitments within these agreements are contained in implementing documents. However, it was noted that the security operations EPIP references Richmond County, Georgia as a backup explosive ordnance demolition team, but the site's agreement with Richmond County does not include this asset.

In summary, SRS has a mature, comprehensive, and well-documented emergency management program. An emergency plan and a comprehensive set of implementing documents govern both the programmatic elements and site emergency response. Roles and responsibilities are well established in the plan, and the

implementing procedures, checklists, and guides provide adequately detailed instructions for implementing critical response functions, including categorization, classification, notification, protective actions, and personnel accountability. SRS has established a set of agreement documents with offsite organizations that adequately support nearly all emergency response activities; however, SRS may issue offsite PARs without sufficient understanding of the possible consequences. Additionally, some EALs are not technically based, and some either do not provide meaningful response instructions or contain inconsistent instructions for establishing safe bomb blast distances. Although improvements to procedures and completeness in agreement documents for these areas are needed, the existing set of plans and procedures supports an effective site emergency response.

B.3 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified, as appropriate, in accordance with site-specific emergency management program objectives and priorities.

Savannah River Operations Office

- To enhance the usefulness of the EALs, consider conducting a detailed comparison of existing EALs against the EALs proposed in EPHAs (including malevolent-act EALs) to ensure completeness and accuracy.
- To ensure a common understanding by all parties, consider updating the agreement with Richmond County, Georgia, to add the use of their explosive ordnance demolition team at SRS.

Savannah River Nuclear Solutions, LLC

- To preclude unnecessary offsite PARs, consider removing the default DIL recommendations from the initial notification form and reserve this action for an update notification after sufficient understanding of event consequences is achieved.
- To provide accurate event categorization and classification guidance, meaningful response actions, and more timely EAL review by decision-makers, consider reviewing and revising the EALs, particularly the security-related EALs, to ensure that all EALs:
 - Have a technical basis in the EPHA analysis.
 - Provide the maximum distance to protective action criteria.
 - Meet the definition of an Operational Emergency.
 - Accurately classify emergencies involving hazardous materials, as applicable.
 - Appropriately categorize security events as Operational Emergencies when they do not have the potential to involve hazardous materials or require the implementation of protective actions based on protective action criteria thresholds.

-
- To enhance the fire department's response when hazardous chemicals are involved, evaluate updating the pre-fire plans to include the chemical concentrations at the facilities.

Savannah River Nuclear Solutions, LLC and Wackenhut Services, Incorporated

- To provide consistent safe-distance protective action instructions in all the SRS response procedures for potential bomb blasts, consider:
 - Using the protective action distances developed by the Department of the Treasury and the Bureau of Alcohol, Tobacco, and Firearms bomb blast standoff distance chart for all bomb blast safe distance instructions
 - Revising all the site and facility emergency response procedures accordingly
 - Training facility and site response decision-makers on the revised procedures.

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APPENDIX C

Emergency Preparedness

C.1 Introduction

A coordinated program of training, drills, and exercises is necessary to ensure that emergency response personnel and organizations can respond effectively to emergencies impacting a specific facility or the site as a whole. This response includes the ability to make time-urgent decisions and take action to minimize the consequences of the emergency and to protect the health and safety of responders, workers, and the public. To be effective improvement tools, exercises should be used to validate all elements of an emergency management program over a multi-year period using realistic, simulated emergency events and conditions, and to provide emergency response organization (ERO) members an opportunity to practice their skills. An effective emergency public information (EPI) program provides the public, news media, and U.S. Department of Energy (DOE) employees with accurate, timely information during an emergency event. In part, effectiveness is based on having in place a long-term, documented program to educate the public and the media about actions that may be required during an emergency response.

The Office of Independent Oversight evaluated the training, drill, and exercise program used to support the Savannah River Site (SRS) ERO. As part of the programmatic review of the training, drill, and exercise elements, Independent Oversight evaluated the plans and procedures that support these elements and reviewed training and proficiency records for key site emergency responders. Drill documentation and exercise reports were also reviewed for indications that they are being used effectively to enhance responder proficiency and evaluate the level of the site's response preparedness. EPI plans and applicable processes for emergency response were also evaluated.

C.2 Status and Results

C.2.1 Training, Drill, and Exercise Program

Training and Drills

During an inspection in 2004 (a review of the training, drill, and exercise program was not conducted during the most recent inspection, in 2006), Independent Oversight concluded that although the training program was well defined, the qualification process did not ensure that all individuals clearly demonstrated the required level of proficiency before being assigned to the ERO roster. This 2009 inspection found that SRS continues to have a well-defined training program, and drills provided numerous practice opportunities for the ERO. However, there were weaknesses in the scope of the protective action drills, and the requirements for demonstrating proficiency before being assigned to the ERO roster remain an issue.

Savannah River Nuclear Solutions, LLC (SRNS) offers frequent training opportunities to offsite emergency responders along with assistance on emergency management issues. Training opportunities, which are discussed at quarterly meetings with the offsite emergency responders, include such courses as Radiation

Emergency Assistance Center/Training Site and Medical Emergency Radiological Response Team for hospitals with memoranda of understanding with SRS to treat contaminated patients. SRNS also provides offsite emergency responders with technical assistance, which has included assisting a local hospital in developing controller/evaluator training, and creating a procedure for hospital personnel on how to properly remove contaminated protective clothing.

SRNS has established and implemented a generally comprehensive and mostly well-documented program for the training and qualification of emergency duty officers (EDOs), the site ERO, and the area/facility EROs. Training goals, organizational responsibilities, and training requirements are clearly defined in the *SRS Emergency Plan* and associated documents and, for the site ERO, include all operating contractors, the security contractor, and the Federal staff. Further, initial training requirements include an appropriate mixture of classroom training, computer-based training, and position walkthroughs, which were added in response to an issue noted in the 2004 Independent Oversight report that the site ERO had not received training on specific positions requirements and responsibilities. Refresher training consists of computer-based training and required reading. In addition, drills are an integral part of initial and refresher training and are used to provide “hands on” training and demonstrate initial or continued proficiency at assigned tasks. SRNS tracks the completion of required training and drills by EDOs and area/facility EROs through the sitewide training database. The completion of training and drills for the site ERO is similarly tracked, and performance metrics are published monthly showing the current percentage of the site ERO that is fully qualified.

Minor weaknesses were noted in the documentation, content, and qualification tracking of the training program. First, the required-reading process used for refresher training is not documented in any emergency management plans or procedures. Second, training provided to emergency directors does not include information on the decision-making responsibility for emergency exposure of responders, which transfers from the area emergency coordinator (AEC)/facility emergency coordinator (FEC) to the emergency director position when the emergency operations center (EOC) activates. In addition, although adequately presented in lesson plans, the training does not appear to have been effective in conveying the concept of choosing an emergency action level based on the actual or potential release of hazardous materials; difficulties in making this choice were observed during the limited-scope performance tests (LSPTs) discussed in Appendix D. Finally, a programming error in the sitewide training database allows AECs/FECs to be listed as qualified even though they had not completed all required training and/or an annual refresher drill. SRNS is implementing corrective actions to resolve this issue.

Training programs for the SRS fire department and Wackenhut Services, Incorporated (WSI) incident commanders have been defined and implemented, although there are notable differences in the rigor of the training programs. The WSI program was only recently established based on performance feedback from the DOE Savannah River Operations Office (DOE-SR). Training and qualification requirements have been defined for both the SRS fire department and the WSI personnel who would serve as incident commanders in the event of hazardous material or security emergency respectively. Both programs appropriately incorporate computer-based incident command training courses from the Federal Emergency Management Agency. In addition, the SRS fire department training program also requires classroom training that incorporates proficiency demonstrations through performance-based decision-making exercises. However, the WSI training program does not include similar training or any demonstrations of proficiency. This discrepancy likely contributed to the performance differences observed between the SRS fire department and WSI incident commanders during the LSPTs.

A continuing weakness in the SRNS training program is that SRNS has not ensured that all site ERO members are required to demonstrate proficiency before being added to the ERO roster. This demonstration

of proficiency is only required for five key site ERO positions, specifically the emergency director, DOE and National Nuclear Security Administration emergency managers, emergency management coordinator, and site security commander. As a result, no demonstration of proficiency is required for several site ERO members who perform critical tasks, such as:

- The EOC assessment and planning coordinator, who coordinates the formulation and issuance of protective actions
- The EOC dispersion modeling system specialist, who generates dispersion models as part of the consequence assessment team
- The EOC technical support coordinator, who determines changes in the emergency classification level and approves reentry into evacuated facilities.

Further, personnel in the chain of succession for the key ERO positions of emergency director, DOE and National Nuclear Security Administration emergency managers, and site security commander are not required to complete the associated training or demonstrate proficiency for those key ERO position. Consequently, site ERO members may not be fully qualified to perform these additional response duties.

SRNS provides employees with detailed information on their responsibilities in an emergency, including how to take the proper protective actions. SRNS requires all employees and visitors to take general employee training, which includes an emergency management component, before they are allowed access to SRS. In addition, the refresher training that is required annually for all SRS employees includes materials on emergency management responsibilities. Further, SRS employees assigned to facilities or areas with hazardous materials receive additional emergency management training, specific to their location, before assuming their duties. The protective actions used primarily at SRS in response to hazardous material emergencies are evacuation or “remain indoors,” with the latter as the default protective action in most cases. At least one protective action drill is conducted annually for each shift at facilities or areas with hazardous materials, and in many cases, multiple drills are conducted annually. However, no drills are conducted for some of the other SRS employees who may be expected to take protective actions in response to emergencies. For example, in SRS areas without hazardous materials, an annual evacuation drill is conducted for multi-story buildings or those with over 100 occupants, but a “remain indoors” drill, including a simulation of ventilation shutdown, is neither required nor conducted. Furthermore, neither evacuation nor “remain indoors” drills are required or conducted for the remaining buildings at SRS. As a result, SRNS does not provide all site personnel with sufficient opportunities to practice taking all of the protective actions that may be necessary in an emergency.

To summarize, SRNS offers training to offsite emergency responders, along with any needed technical assistance. SRNS has established an integrated training program that provides initial and refresher training for the EDOs, site ERO, and area/facility EROs, and training requirements are clearly defined for the SRS fire department and WSI incident commanders. Employees are provided comprehensive information on their responsibilities during an emergency, and frequent protective action drills are held at hazardous material facilities. Nonetheless, weaknesses were noted in the documentation of the required-reading process and the effectiveness of training on the use of emergency action levels. Additionally, some AECs/FECs are listed as qualified without completion of all required training and/or drills, and the training provided to the WSI incident commanders is limited. Further, a demonstration of proficiency is not required for most of the ERO before being added to the ERO roster, including several key site ERO members and the WSI incident commander, all of whom perform critical tasks. Furthermore, no training or demonstration of proficiency

is required for site ERO members in the chain of succession for key decision-making positions in the EOC. Finally, SRNS does not conduct drills for all employees who may be expected to take protective actions.

Exercises

The 2004 Independent Oversight inspection found that the evaluated drill and exercise programs are well defined, and a standardized set of drill objectives and evaluation criteria that had been recently implemented was a notable improvement. This 2009 inspection found that the drill and exercise program continues to be well defined and is used effectively to improve performance and procedures.

The SRS facility emergency preparedness (EP) drill and site exercise programs are well defined and include many positive attributes. The *SRS Emergency Plan* requires that a site-level exercise be held annually and that facilities and areas with emergency planning hazards assessments conduct annual facility EP drills for each shift to evaluate their emergency response capability. Further, site exercise and facility EP drill packages contain appropriate information, including a description of the scenario, drill or exercise objectives, and associated evaluation criteria. In addition, guidelines and instructions are provided for controllers, evaluators, observers, and players. The methods used to conduct facility EP drills and site exercises are specified, along with expectations for the format and timeliness of after-action reports. Furthermore, SRNS has developed a generally comprehensive set of exercise and facility EP drill evaluation criteria that are observable and measurable, and that support an effective evaluation of the exercise or drill objectives. Issues identified in exercises and facility EP drill reports are categorized as strengths, good practices, improvement items, weaknesses, or deficiencies, with clear definitions provided for each issue type. Weaknesses and deficiencies identified during exercises and facility EP drills are required to be entered into the Site Tracking, Analysis, and Reporting (STAR) database to track the completion of corrective actions. One minor weakness was noted in that the evaluation criteria do not include categorization actions performed by EDOs or actions taken to determine whether an emergency can be terminated.

SRNS effectively implements the site exercise and facility EP drill programs established by the *SRS Emergency Plan*. Site exercises and facility EP drills have been conducted annually as required, and in some cases, the number of facility EP drills far exceeds the minimum requirement of one drill annually per shift. In addition, each site-level emergency response element has participated in at least one exercise or facility EP drill annually. Further, all elements of the emergency management program, and a spectrum of hazards, have been included in an exercise or facility EP drill over a five-year period. SRNS rotates the basis for the annual site exercise among the 15 facilities and areas with emergency planning hazards assessments. Exercises involving a transportation emergency, in addition to an emergency with security personnel serving as the incident commander, also occur every three years. Facility EP drills often include other elements of the site-level emergency response elements, such as the EOC, the SRS Operations Center, or security and fire department personnel. This breadth of experience with the various facilities and hazards at SRS ensures that the site-level emergency response elements have opportunities to practice an integrated response. Furthermore, offsite organizations participate periodically in site exercises, as well as selected facility EP drills.

With few exceptions, site exercise and facility EP drill results are well-documented and used to promote program improvements. Reports documenting the results of facility EP drills and site exercises are completed in a timely fashion and include an overall rating for the drill or exercise. In addition, issues noted during the drill or exercise are clearly noted, and lessons learned based on the drill or exercise are shared with the site ERO. Further, corrective actions plans to address weaknesses and deficiencies identified in site exercise reports are developed, and responsibilities for corrective actions are formally assigned to personnel and tracked to completion in STAR, as discussed in Appendix E. However, inconsistencies were noted in the quality of the

facility EP drill reports and the disposition of issues identified in these reports. Many of these drill reports do not associate issues with specific evaluation criteria, and the issues have not been consistently entered into the SRS drill and exercise trending database as required by facility EP drill manual. Deficiencies and weaknesses noted in some facility EP drill reports were also not consistently entered into STAR as required by the facility EP drill manual, although corrective actions were completed in most cases. SRNS is aware of these inconsistencies in the facility EP drill reports and is in the process of transitioning to the use of Exercise Builder to promote more consistency in the reports and entry of deficiencies and weaknesses into STAR.

To summarize, SRNS's comprehensive program for facility EP drills and site exercises ensures that facilities evaluate their emergency response capability annually. Site exercises are held annually, along with numerous facility EP drills that collectively encompass all site-level emergency response elements and frequently include offsite organizations. Facility EP drill and exercise reports clearly describe identified issues and include an overall rating, and they are shared with the site ERO to promote program improvement. Identified deficiencies and weaknesses requiring corrective action are assigned to appropriate personnel; however, they are not always entered into STAR and tracked to completion as required. Further, drill and exercise evaluation criteria do not cover all aspects of the emergency response, and the trending of information from facility EP drill reports is inconsistent. Although these items do not substantially impact the effectiveness of this program element, they warrant additional consideration.

C.2.2 Emergency Public Information

The EPI program has not been reviewed since the 2004 Independent Oversight inspection. The 2004 inspection concluded that with a few exceptions, SRS had implemented a well-planned and documented EPI program. Significant programmatic success was also attributed to the knowledge and experience of the DOE and contractor staffs. The most important weakness identified was the lack of definition and documentation regarding process for developing the initial news releases during regular and off-hours events. That inspection further found that the planning documents lacked procedures for coordinating news releases with the local hospitals as agreed upon in each hospital's memorandum of understanding. This 2009 inspection found that although the program is mostly comprehensive and is supported by an extensive public education component, the site has not appropriately addressed the aforementioned weaknesses from 2004. Additionally, neither the emergency plan nor the checklists adequately document the rumor control process.

The SRS EPI program is mostly well defined. It includes an operations planning document within the *SRS Emergency Plan* and supporting checklists that provide the framework for a comprehensive program that, with few exceptions, adequately addresses all of the elements required by DOE Order 151.1C. The elements present include development and approval of most news releases; identification of required personnel, resources, and facilities; and provisions for coordination in the joint information center (JIC). Supporting the EPI plan is a well-developed public education component that effectively informs site workers and the public of emergency plans and protective actions both before and during emergencies. It includes a proactive outreach strategy involving multiple offsite Federal, state, and local organizations, as well as the Vogtle Electric Generating Plant. DOE-SR and SRNS coordinate with these organizations to annually develop and distribute the Community Preparedness Information calendar, which provides the public with information regarding potential SRS hazards, emergency planning zone boundaries, and potential protective actions. Additionally, DOE-SR and SRNS regularly participate in meetings of the Quarterly Fixed Nuclear Facility Meeting, Quarterly Issues Meeting, the Radiological Working Group, local emergency planning committee meetings, and Vogtle Electric Generating Plant's media day. The program is a coordinated responsibility between the DOE-SR Office of Safeguards, Security and Emergency Services and SRNS Safeguards, Security and Emergency Services.

The program includes adequate provisions for a JIC where multiple jurisdictions gather, process, and disseminate public information during an emergency, with DOE-SR responsible for oversight of all JIC activities. Contractor EPI personnel in the EOC develop and transmit approved news releases to the JIC for dissemination to the media and to the telephone response team members. The telephone response team is located in the JIC to address public and media inquiries. The JIC is near the site at the Center for Hydrogen Research and includes adequate work areas for onsite and offsite personnel; a news conference area for the media; and adequate equipment, such as computers, video projector, faxes, and copy machines. Provisions are in place to automatically activate the JIC upon the declaration of a Site Area Emergency, with expectations that it will become operational within one hour of declaration. The DOE-SR public information oversight representative and the public information coordinator, co-located in the EOC, may activate the JIC earlier during events that create significant media interest, or they may use the facility as a media center during lesser events.

SRNS trains the EPI cadre and requires each member to participate in at least one drill annually to requalify for the ERO. For all members of the EPI cadre, the SRS ERO training matrix identifies coursework consisting of an overview of the elements of the emergency preparedness program, their relationship to the site's emergency response effort, and a walkthrough of the functional checklist for each EPI position. However, the training program does not require practical demonstration of proficiency before assignment on the ERO, as required by DOE Order 151.1C and discussed in Section C.2.1 of this report, nor does it provide for required spokesperson training for individuals with technical expertise related to the emergency. Interviews conducted by Independent Oversight revealed that members of senior leadership have received some form of spokesperson training during their tenure at SRS; however, there is neither documentation nor training records to confirm this training.

While the EPI program is mostly well defined, planning documents describing three aspects of the site's EPI program are inconsistent, ambiguous, or lacking in detail. Of particular concern is the site's policy regarding issuing the initial news release during both regular and off-hours, which does not meet DOE expectations for issuing the initial news release within one hour of event categorization/classification. This weakness, identified in the 2004 inspection report, has yet to be resolved. The following SRS documents provide conflicting guidance or lack sufficient detail:

- Section 10 of the emergency plan and the public information operations implementing procedure state the initial news release “should be issued within about one hour of the time the public affairs representative is notified.”
- The training student study guide calls for issuing the initial news release “within one hour of an operational event [with “operational event” not defined] except when there is an operational emergency.”
- The only expectations established in the emergency plan for issuing the initial news releases during off hours states that during an operational emergency when the EOC is not activated, the news release may be issued the next business day morning depending on circumstances.

During the LSPTs, three of four initial news releases were released within one hour of the event categorization/classification, but both teams applied different definitions of when the one hour clock began.

DOE-SR has preapproved the development of the initial news releases based on the information in the notification form, and the checklists include preformatted news releases that should enable expeditious development and issue of the initial news release. However, the plan and procedures require an overly

burdensome approval process that slows the initial news release. This approval process includes up to six concurrences for a security event, plus approvals by the emergency manager and emergency director prior to the release of information. Additionally, neither the plan nor procedures include requirements for the timely development and issuance of the initial news release during off hours.

In addition, there is no procedure to coordinate news releases with the local hospitals relating to the hospital's support to SRS, as agreed to through each hospital's memorandum of understanding. This issue, also identified in 2004, has not been addressed in the planning documents. Lastly, while the public information operations procedure acknowledges the need for reporting "persistent" rumors and misinformation and identifies roles and responsibilities necessary for monitoring, recognizing, and resolving rumors, the EPI checklists lack sufficient detail to implement the rumor control process. Taken together, the checklists do not identify all of the required roles, nor do they provide integrated procedures to ensure either the capture or resolution of rumors.

In summary, the EPI program is an integrated effort between DOE-SR and SRNS that, with few exceptions, provides the framework for a comprehensive, EPI program adequately addressing most elements required by DOE Order 151.1C. Those elements include development and approval of most news releases; identification of required personnel, resources, and facilities; and provisions for coordination within a well-equipped JIC. The EPI program is supported by an adequate training program, as well as an extensive, well-developed public education component that effectively informs the public of the appropriate emergency plans and protective actions before and during emergencies. However, neither the plan nor the procedures correctly address the timely issuance of the initial news release or the coordination of news releases with local hospitals. Further, the checklists lack specificity regarding how to implement the rumor control process.

C.3 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified as appropriate, in accordance with site-specific emergency management program objectives and priorities.

Savannah River Operations Office and Savannah River Nuclear Solutions, LLC

- To help ensure that trained spokespersons are available at the JIC, consider reviewing the spokesperson training that was previously given to DOE-SR and SRNS personnel with technical expertise related to potential SRS emergencies, and augmenting that training as necessary.
- Strengthen the process for the development, approval, and issuance of initial news releases. Specific actions to consider include:
 - Develop a preformatted initial news release template that requires only the date, time, and acknowledgement of the incident and that can be quickly prepared and approved for immediate release.
 - Revise the procedures and checklists to include a requirement for the EOC public information coordinator to issue the initial news release within one hour of event categorization or classification.

- Develop a mechanism to ensure that the initial news release can be issued in a timely manner during off hours when neither the DOE-SR nor the EOC public information coordinator is in the EOC.
- Review and update the SRS Emergency Plan, public information operations procedure, and EPI checklists to ensure accuracy, consistency, and unambiguous identification of the SRS news release policy.
- Revise the public information training student study guide to include the current policy.
- To ensure coordination of news releases with the hospitals (per SRS letters of agreement), assess assigning an offsite-interactions coordinator or the hospital communications coordinator, both located in the EOC, with the responsibility to review any news release that addresses SRS interaction with the respective hospital. Make the necessary changes to the news release distribution list to ensure that the assigned coordinator position receives news releases.
- To strengthen the rumor control process, consider enhancing the description and fully describing the rumor control process in the plan and procedure, including:
 - Add further details in the EPI operations procedure and checklists to fully describe the roles and responsibilities of individuals responsible for identifying or resolving rumors and misinformation.
 - Include specific responsibilities and methods for identifying and resolving rumors and misinformation among and between the public information coordinator in the EOC, the EOC media monitoring team, the JIC specialist, the emergency information specialist, and the telephone response team.
 - Incorporate a form to track misinformation from identification through resolution.
- Revise and update the SRS Emergency Plan to address the current policies, roles, and responsibilities identified in the latest public information operations procedure revision.

Savannah River Nuclear Solutions, LLC

- Consider the following enhancements to the SRS Emergency Plan to ensure that training requirements and expectations are clearly defined:
 - Expand the initial demonstration of proficiency required for qualification to include all site ERO personnel who perform critical tasks.
 - Stipulate that personnel assigned to more than one ERO position demonstrate proficiency in each position.
 - Require personnel who succeed to key site ERO positions to be fully qualified in those positions.
 - Document the process that describes how required reading is developed, delivered, and tracked.

- Refine the facility EP drill and site exercise programs to foster program and performance improvement. Specific actions to consider include:
 - Increase the number of facility EP drills and site ERO exercises that require WSI to perform the role of incident commander.
 - Compare the bank of drill/exercise objectives and evaluation criteria to those contained in the DOE emergency management guide (DOE Guide 151.1-3) to ensure that objectives and evaluation criteria have been developed for all response actions that should be tested on a periodic basis.
 - Identify the minimum expected content for facility EP drill after-action reports, including associating identified issues with the appropriate evaluation criteria.
 - Ensure that issues identified in facility EP drills are entered into the SRS drill and exercise trending database.
- Strengthen the training provided to EOC emergency directors to include all critical tasks.

Wackenhut Services, Incorporated

- Enhance the ability of the WSI training program to prepare incident commanders for their emergency response roles. Specific actions to consider include:
 - Review the SRS fire department incident commander training program and revise the WSI incident commander job task and training matrix as necessary to address their emergency management responsibilities.
 - Develop and implement requirements for demonstration of proficiency before qualification as a WSI incident commander.

APPENDIX D

Emergency Response

D.1 Introduction

The ultimate objective of emergency planning and preparedness is to prepare emergency responders so that they can apply their skills, procedures, and training to make appropriate decisions and to properly execute actions to protect emergency responders, workers, and the public. Critical elements of the initial response include formulating protective actions, categorizing and classifying the emergency, and notifying onsite personnel and offsite authorities. Concurrent response actions include reentry and rescue, provision of medical care, and ongoing assessment of event consequences using additional data and/or field monitoring results.

The information provided in this section is based on observations from two sets of emergency management limited-scope performance tests (LSPTs) evaluated by the Office of Independent Oversight. Each set of LSPTs involved a combined assessment of response activities by the Savannah River Nuclear Solutions, LLC (SRNS) or Wackenhut Services, Incorporated (WSI) incident commander (IC) and field support staff and emergency response organization (ERO) members in the Savannah River Site Operations Center (SRSOC), facility control rooms, and emergency operations center (EOC). Key decision-makers in the facility control rooms and SRSOC consisted of a Savannah River Remediation shift operations manager (SOM) and an SRNS emergency duty officer (EDO), respectively. The EOC cadre included an SRNS emergency director (ED), a U.S. Department of Energy Savannah River Operations Office (DOE-SR) emergency manager (EM), and selected EOC support staff, including a consequence assessment team (CAT).

Two operational emergency scenarios were developed for the LSPTs: a facility operational event that results in release of a radiological material, and a malevolent act involving the potential release of a hazardous chemical. During the first scenario, it was expected that the event would be classified as a Site Area Emergency because of the accidental release of radiological material and associated consequences, in accordance with Savannah River Site (SRS) emergency action levels (EALs). During the second scenario, it was expected that the event would initially be categorized as an Operational Emergency due to the malevolent act; soon after, it would be further classified as an Alert due to the confirmation of an explosive device, and later the classification would be upgraded to a Site Area Emergency due to the potential involvement of hazardous materials. The LSPT scenarios, which were developed by Independent Oversight in conjunction with SRS trusted agents, were presented to the participants by the SRS controllers to ensure scenario validity and delivery of accurate event cues.

D.2 Status and Results

Depending on the location and type of emergency, direction and control of the SRS emergency response resides with the SOM, acting as the facility or area emergency coordinator and located in the facility/area control room, or the EDO, located in the SRSOC. Facility/area events are the responsibility of the facility SOM, and general site/security events are the responsibility of the EDO. Key SOM responsibilities are to

provide command and control of the facility/area response, classify events and implement protective actions for the facility/area, and notify the EDO of decisions and response status. Significant EDO responsibilities are to provide overall command and control of the response, perform event categorization (including general site/security event classification, if necessary), notify all offsite organizations, implement general site protective actions and issue protective action recommendations (PARs) for offsite populations, and resolve conflicts between operations and the protective force, as needed. For a non-security event emergency, the fire department senior officer serves as the IC, provides direction and control of the incident scene response, and is responsible for safety of SRS emergency responders. After the EOC is declared operational, the ED assumes responsibility for the overall emergency response, except for security events, when the DOE-SR EM assumes this function. Key ED responsibilities are to verify event classification and protective actions made by the SOM and EDO, further classify events and recommend PARs (if needed), and review and approve notifications and news releases. The DOE-SR EM reviews the ED's decisions and provides concurrence or additional direction (as necessary) and assumes overall command and control for security events. Consequence assessment personnel in the EOC support event response by identifying areas that could be affected by a hazardous material release and by providing associated recommendations to the EOC command staff.

During the February 2006 Independent Oversight inspection, SRS contractor initial decision-makers demonstrated effective response during LSPTs; however, weaknesses in the conduct of emergency operations in the areas of procedure usage and self-checking in the SRSOC resulted in inaccurate onsite notifications and incorrect offsite PARs. Furthermore, the cumbersome process used for completing offsite notifications from the EOC delayed the issuance of most EOC EAL upgrade notifications beyond the 15-minute requirement, and communication weaknesses within the EOC hampered the effectiveness of response activities, such as the issuance of accurate news releases.

This 2009 inspection identified several performance improvements, particularly those related to the notification process. Additionally, facility SOMs and EDOs demonstrated effective decision-making for the initial response to all events. However, during the LSPTs, SOMs and EOC personnel did not always perform prompt and accurate event classifications. Further, ERO responders did not consistently determine event information and effectively communicate that information among the emergency response venues to ensure accurate understanding of event status. Lastly, decision-makers experienced difficulty related to the formulation and implementation of protective actions and PARs.

D.2.1 SRS Emergency Response Organization

Facility SOMs successfully demonstrated effective command and control during the postulated operational events. Use of procedures, checklists, status boards, and other tools effectively supported the response. Additionally, facility personnel used three point communications almost without exception, and communications within the facility organization, both before and after ERO activation, effectively conveyed both status of the event and desired actions. Communications between the control rooms and SRSOC was primarily maintained by the use of ringdown telephones, which supported collaborative decision-making, particularly in the early stages of the response. In addition, SOMs provided frequent, comprehensive briefings to ensure that staff members maintained situational awareness of the event and response priorities. Furthermore, SOMs made effective use of the facility procedures to identify and implement facility protective actions and to initially classify the events. However, during the security events (discussed in Section D.2.2), the appropriate upgrade in classification was not implemented by either SOM. Lastly, notification information was provided verbally and via the EDO information form in a timely manner to support notifications.

Overall, SRNS and WSI ICs effectively demonstrated a clear understanding of protocols for which function (fire department or protective force) becomes the IC and the capability to implement an incident command system. Knowledgeable personnel staffed the incident command teams, including a facility technical support person to advise the IC on event status and forecast future operational impacts. Additionally, ICs communicated clear strategic goals and tactical objectives and effectively used checklists, status boards, command staff identification vests, and appropriate communications to maintain control of the emergency response. In addition, incident command staff communicated that response personnel would exercise necessary precautions for personnel safety by keeping personnel upwind, closely monitoring weather conditions, and periodically assessing the habitability of the command post. Appropriate understanding of personal protective equipment, accountability of firefighters by safety officers, and contamination control measures was also communicated. Furthermore, fire response personnel effectively used maps and overlays, pre-fire plans, and other resources to support assessments of the response and to develop mitigation strategies. However, during one security event, the WSI IC did not establish an incident command post that included support from the fire department, and the EDO did not inform the IC of the protective action to remain indoors issued for a two-mile radius around the Defense Waste Processing Facility (DWPF); as a result, the fire department established its staging area within the protective action zone and was unaware of the ordered protective actions.

SRSOC teams provided prompt initial response actions for event categorization determinations, offsite notifications, formulation of protective actions, and ERO activations. EDOs used the appropriate procedure, although they used different checklists during the security event. EDOs consistently categorized the security events using the appropriate EAL. Additionally, initial notification for each event was made immediately following approval of the SRS notification form. Furthermore, coordination with facility SOMs and ICs resulted in adequate initial assessments of events. Lastly, SRSOC personnel prepared and disseminated onsite protective action messages in a timely manner, except in one case where the security event was initially labeled as a chemical release rather than a security event.

EDs and EMs demonstrated familiarity with most EOC operations and used position-specific checklists. Consistently, minimum staffing was verified in declaring the EOC operational, and formality was observed when the EDs and EMs assumed command and control responsibilities (i.e., an EDO/ED or EM turnover, significant event log entry). Additionally, EDs required periodic briefings from the EOC cadre and ensured that the cadre prepared and submitted DOE situation reports. However, activation of the EOC was not completed within one hour of event classification for three of the four responses, as specified by procedures. Typically, most EOC cadres provided effective and accurate event response. Overall, the EOC cadre:

- Clearly articulated strategies, priorities, and directions to field responders
- Demonstrated appropriate delegation of tasks within the EOC
- Maintained situational awareness of such items as the habitability of the EOC, the relationship of the EOC and joint information center (JIC) locations to the plume location, and meteorological conditions
- Participated in formal and comprehensive status briefings (although the unavailability of key staff often caused the briefings to be delayed).

Log keeping and use of position-specific checklists was observed for most of the EOC cadre; however, some of the cadre did not effectively use the available checklists. During the radiological events, inconsistent performance was observed from the technical support room (TSR), with only one team producing a refined

source term for the CAT during the F-Tank Farm (FTF) scenarios. This resulted in the CAT being unable to develop the required consequence assessments. Developing source term calculations did not appear to be a high priority for the TSR, and the TSR task list does not assign a priority for each task (each appears of equal value). Furthermore, during the security events, the TSR did not provide timely chemical inventories, so the consequence assessment personnel used significantly different material-at-risk quantities.

D.2.2 Event Categorization and Classification

FTF SOMs consistently used operator aids and EALs to appropriately classify the radiological events, and EDs and EMs generally referred to EALs to ensure understanding and verify event classification. For the security scenarios, EDOs properly declared Operational Emergencies not further classified based on the use of the emergency categorization and classification emergency plan implementing procedure. Likewise, DWPF SOMs consistently used facility-specific EALs to further classify the security events as an Alert, with assistance from the WSI IC. Additionally, the Alert classification declaration was based on a Phase II security declaration made by the WSI IC and corresponded to the confirmation of an explosive device in the facility. However, the Alert declaration implies that protective actions are not required beyond the facility boundary; this conclusion was not appropriate for the analyzed consequences for a worst-case release of 4500 gallons of formic acid (the formic acid tank administrative limit). Furthermore, classification decision-makers (DWPF SOMs and EDs) did not consider the potential for hazardous material being released that exceeded protective action criteria beyond the facility boundary, and thus did not declare a Site Area Emergency. Lastly, actions and discussions in the DWPF control room and EOC reflected a lack of understanding of the need to classify an event based on the potential for the situation to deteriorate.

D.2.3 Notification and Communications

Notification processes are well established, and with few exceptions, the SRS ERO demonstrated appropriate notification of employees, offsite agencies, and the public. SOM and SRSOC teams consistently set high priority on notifying employees of the events. During all events, EDOs provided timely notification to SRS employees to avoid the area where the event was occurring. In addition, after an event was classified as an emergency, EDOs provided timely notification to SRS employees regarding protective actions to be taken, with the one exception involving the fire department staging area (see Section D.2.1).

With few exceptions, the SRSOC successfully completed all initial offsite notifications, update notifications, and upgrade notifications. Verbal notification to the DOE Headquarters watch office was timely in all but one event (during one security event, verbal notification was made 90 minutes after the notification form was faxed). Also, EDOs demonstrated reliable notification of ERO cadres using the pager system, typically within 10 to 20 minutes of event categorization or classification.

The DOE public information oversight representatives and the SRNS public information coordinators diligently followed position-specific checklists and demonstrated a thorough understanding of the overall emergency public information (EPI) and news release processes. With one exception, SRS accomplished timely initial news releases, based on the DOE expectation to issue the initial news release within one hour of event categorization. The review and approval process for news releases was consistent and well documented. Additionally, the JIC was activated (simulated) and the EPI staff performed the appropriate actions to prepare the executive team for an initial news conference during three of the four events; however, EPI staff did not have a procedure to notify the media of JIC activation.

Inadequate information management hampered the overall response to most events, and the information displays did not keep the ERO staff and decision-makers current on the emergency condition and response activities. For example:

- The SRSOC has no information management system to provide the status of emergency condition and response activities to arriving EOC staff. Instead, EOC coordinators had to give multiple, repetitive briefings during all events.
- No formal system was used to record, sequence, validate, and track the flow and chronology of emergency information in the SRSOC. As a result, some information was revised, modified, or deleted without the action being recorded and time/date stamped.
- Although EOC conference calls provided a good exchange of information between venues, in effect they removed key EOC, TSR and SRSOC staff from urgent response tasks (e.g., TSR determining inventories and source terms or EDO managing the response) for extended periods of time, typically only to validate information that had been previously communicated or was available through other communication channels.

D.2.4 Protective Actions and Protective Action Recommendations

Typically, facility and SRSOC teams demonstrated conservative and procedurally based protective action decision-making and promptly communicated protective actions to affected populations using:

- Telephone calls to all site control rooms
- Fax to all site control rooms
- Public address (PA) announcement to all facility and SRS employees
- “All call” radio announcement to all remote workers (SRS employees not able to hear PA announcements)
- Pager messages to all remote workers.

Additionally, SOMs and EDOs quickly initiated conservative protective actions; however, decision-makers experienced difficulty related to protective action formulation and implementation. For example, during both security events (which threatened a chemical release), the EDOs used default protective actions for a radiological release (i.e., those located within a two-mile radius were to remain indoors), even though this decision was not supported by specific event indicators, or an EAL that required the use of protective measures for a radiological release.

Independent Oversight observed that there was no consensus on how to apply the “protective action” distances for potential explosive devices (i.e., whether the specified distance applied to inside or outside evacuation). Before conducting the LSPTs, SRS trusted agents identified the potential for response personnel to use different protective action distances for the bomb threat scenario due to out-of-date procedural guidance. In addition, recent changes to the protective force bomb threat guidance included new standoff distances that were not uniformly understood, including a reduction in the building evacuation distances (350 feet to 150 feet) used by facility and SRSOC personnel. Furthermore, protective force personnel were inconsistent in applying the new bomb threat guidance, and in one case they incorrectly used the outdoor evacuation distance (1850 feet), instead of the building evacuation distance (150 feet).

Also, response staffs did not always adequately follow up on the status of directed protective measures, and in one instance, the SOM stated that accountability could not be performed for personnel evacuated from one building and relocated to another (in the facility). This assertion contrasted with otherwise strong conduct of operations observed during the LSPTs. Furthermore, EDOs issued recommended offsite protective actions (advisories) for the downwind emergency planning zones while awaiting downwind consequence projection models to be completed; however, as discussed in Section B.2.2, the issuance of precautionary advisories based on a derived intervention level (DIL) was inappropriate for the postulated event.

D.2.5 Consequence Assessment

Consequence assessment personnel located in the EOC supported key activities, such as event classification and protective action decision-making. As event information became available, CAT personnel developed plume plots using a variety of dispersion modeling programs, meteorological monitoring systems, and information provided by the TSR regarding the amount of material at risk. Additionally, most CAT personnel effectively used and followed their position-specific checklists and operator aids. Further, CAT personnel demonstrated familiarity with their assigned responsibilities. For example:

- Field operations coordinators positioned road blocks in appropriate locations.
- Field monitoring team specialists dispatched the field monitoring teams in upwind locations from the plume.
- Dose assessment liaisons and assessment specialists persevered to obtain refined/actual source terms from the TSR.

Both dispersion modeling specialists developed worst-case, real-time meteorological plume plots for the FTF release (radiological) scenario using the default source term. Additionally, one CAT obtained a refined source term from the TSR, and the dispersion modeling specialist performed a DIL run to verify no adverse consequences for the state of South Carolina. However, notification to cancel precautionary advisories was not made after confirmation of no adverse offsite consequences. The other CAT was unable to perform a DIL run because TSR personnel could not provide the CAT with a refined source term. Furthermore, the dispersion modeling specialists did not consistently compute and correctly assess consequences of hazardous material releases or potential explosive blast effects during the DWPF event scenario. For example:

- The default material-at-risk information for the hazardous materials was not available. As a result, one team assumed approximately 500 gallons of material and modeled the release as a puddle, while the other assumed 5,000 gallons and modeled the release as a tank rupture.
- The dispersion modeling conducted on both days indicated a potential for the protective action criterion to be exceeded beyond the facility boundary, requiring the event to be upgraded to a Site Area Emergency. However, the CAT personnel did not recognize this potential on either day, and no event upgrade was ever recommended.

D.3 Conclusions

In conclusion, Independent Oversight observed the response of two sets of SRS ERO personnel to two postulated emergency events. ICs demonstrated an effective capability to implement an incident command

system and lead the field response. EDOs demonstrated effective event categorization, notification to onsite workers, and activation of the EOC. With one exception, all offsite notifications were completed in a timely, accurate manner. Likewise, SOMs effectively established command and control of the facility emergency response and initiated appropriate initial response actions. Generally, EDs and EMs promptly verified the event classification and associated protective actions. EDs demonstrated mostly effective decision-making and leadership within the EOC and established a suitable set of priorities and course of action for each event. The EDs were supported by a command staff and other EOC cadre, including the CAT, who generally performed consequence predictions based on worst-case and real-time assessments. EDs also consistently placed high priority in initiating employee notification of the events, and they performed timely review and approval of news releases. However, not all classification decisions were prompt and accurate, likely reflecting a lack of understanding to classify an event based on the potential for the situation to deteriorate. Additionally, response personnel often did not effectively determine event information and communicate that information among the emergency response venues to ensure accurate, consistent understanding of event status. Significantly, information from the TSR was consistently unavailable or was not provided in a timely manner, adversely impacting decision-making within the EOC. Furthermore, ERO personnel had some difficulties in formulating protective actions for the security event. Lastly, during the security events, dispersion modeling specialists did not consistently compute and correctly assess consequences of hazardous material releases or potential explosive blast effects. Collectively, these response weaknesses indicate the need for improvement in event classification and protective action decision-making to ensure that in an actual event, SRS emergency responders outside the event scene can respond in a fully effective manner.

D.4 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified, as appropriate, in accordance with site-specific emergency management program objectives and priorities.

Savannah River Operations Office

- To enhance the ability to accurately classify events and select appropriate protective actions, consider having DOE-SR personnel perform EAL and protective action verification reviews.

Savannah River Nuclear Solutions, LLC

- To improve event categorization and classification decision-making, evaluate the following:
 - Apply “potential for” statements to applicable facility- and site-level EAL procedure tables to reflect anticipatory classification decisions based on the most likely progression and future consequences of an event or condition.
 - Ensure that EALs lead to event classification on the basis of conservative estimates of conditions and consequences where detailed or quantitative material-at-risk information is lacking.
- To improve event classification and protective action decision-making, consider the following:
 - Provide facility-specific malevolent-act EALs with recognition indicators that cover the spectrum of initiating events identified by the emergency planning hazards assessment (EPHA).

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- Provide EALs for EPHA-analyzed facility explosions that occur outside the facility.
 - Provide site-specific identification criteria for potential explosive devices, as necessary, to aid in decision-making (recognition and categorization) of Operational Emergencies not requiring further classification.
 - Ensure that all issued offsite PARs are appropriately reviewed by the EOC and that determinations to cancel precautionary advisories are promptly communicated to the offsite notification points.
 - Strengthen the process for implementing personnel accountability and onsite protective actions. Specific actions to assess include:
 - Validate personnel accountability performance for evacuation and relocation of building personnel during drills and exercises.
 - Develop a process for facility and/or EOC members to verify that “remain indoors” orders have been implemented in facilities required to do so.
 - Standardize the use of available “key-hole” software within the facility control rooms, SRSOC, and EOC to determine areas and specific facilities that require protective action implementation and tracking.
 - To improve consequence assessment capabilities, consider the following:
 - Ensure that default material-at-risk information (chemical and radiological) in the EPHAs is pre-loaded in the appropriate database for the CAT to support timely analysis and protective action decisions where detailed or quantitative information is lacking.
 - Add a dispersion modeling specialist to the core EOC roster to support timely event classification and protective action decision-making within the EOC.
 - Provide an explosive blast effects capability to the suite of modeling programs used by the EOC CAT.
 - To improve protective action decision-making and consequence assessment functions, consider more frequent training and exercises that include the following:
 - Timely event recognition, categorization/classification, and initial protective actions based on the conservative estimates implicit in the EALs
 - Joint drills and exercises with the protective force, facility operations, and emergency response assets
 - Objectives for applying bomb blast standoff charts for selecting safe shelters and standoff distances
 - Scenarios that only have a potential for a hazardous material release, such as from an explosion or a spreading fire
 - Scenarios that require anticipatory decision-making for a potential hazardous material release and require time-sensitive employee notifications.
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- Consider strengthening the ERO’s communications protocols by:
 - Providing an improved capability to record, sequence, validate, and track the flow of initial emergency information
 - Emphasizing the use of WebEOC™, geographic information system displays, and event status boards during drills and exercises to strengthen the use of available information systems
 - Expanding the use of WebEOC™ or an equivalent information management system to the SRSOC and selected facility control rooms to strengthen information management during drills, exercises, and actual emergency responses
 - Issuing a news release or a “blast fax” from either the EOC or the JIC to ensure that all media are notified of the operational status of the JIC in a timely manner
 - Communicating EOC emergency management team briefings throughout the EOC via a PA system, or other means, to provide the entire cadre current information on the status of the event and any related strategies or tasking.

APPENDIX E

Readiness Assurance

E.1 Introduction

Emergency management program administration includes elements of readiness assurance as well as performance of some planning and response functions. Readiness assurance activities ensure that emergency management program plans, procedures, and resources of the U.S. Department of Energy Savannah River Operations Office (DOE-SR) and Savannah River Nuclear Solutions, LLC (SRNS) will facilitate an effective response to an emergency at the site. Site readiness assurance activities include implementation by both DOE-SR and SRNS of a coordinated schedule of program evaluations, appraisals, and assessments and the effective use of issues management systems to effect program improvement. Key elements of the readiness assurance program include the active involvement of U.S. Department of Energy (DOE) line organizations in monitoring program effectiveness; implementing self-assessment programs; and ensuring that timely corrective actions for identified weaknesses are identified, implemented, and appropriately closed. DOE field elements also have direct responsibility for performing some emergency response activities, including oversight of the site's emergency response and activities related to the release of emergency public information to site workers and the public.

This inspection examined the processes by which DOE-SR provides guidance and direction to, and maintains operational awareness of, the Savannah River Site (SRS) emergency management program. The inspection included a review of the DOE-SR emergency management program assessment process, selected aspects of the SRNS emergency management self-assessment and issues management processes, and the status of actions taken to address findings identified during the previous Independent Oversight inspection.

E.2 Status and Results

E.2.1 DOE Line Program Management

The 2006 Independent Oversight inspection found that DOE-SR had continued its active engagement in oversight of the SRS emergency management program and developed an appropriate structure for a systematic assessment program. However, the inspection also found that implementation of the emergency management assessment program was incomplete, and shortcomings in implementation limited the effectiveness of the emergency management assessments. This 2009 inspection found that DOE-SR personnel continue to provide mostly effective oversight of the SRS emergency management program. DOE-SR personnel have also implemented significant improvements to the assessment process in this fiscal year (FY), although the depth of the assessments is not yet sufficient to identify issues that will lead to overall program improvement.

DOE-SR has continued its close oversight of the SRS emergency management program and is adequately supported by the DOE Office of Environmental Management. Roles and responsibilities for oversight and assessment of the contractor program are clearly established, and DOE-SR manuals and procedures provide appropriate guidance and instruction for implementing those responsibilities. DOE-SR personnel are involved and familiar with the site program through a variety of activities, including operational awareness activities

during site drills, evaluation of site exercises, review of technical planning documents, and participation in regular meetings and interactions with SRNS emergency management personnel. Additionally, DOE Headquarters personnel provide overall support to the site office through regular telephone contact with the members of the emergency management team, providing assistance through answers to specific technical questions and general direction for the program. Further, personnel from the Office of Environmental Management recently completed an assessment of the field office oversight program, which is documented in an assessment report that demonstrates a thorough and appropriately critical approach to the review.

DOE-SR has established sufficient procedures and processes for contractor oversight and has implemented an assessment program that includes its responsibilities to conduct both contractor assessments and self-assessments. The *Integrated Performance Assurance Manual* provides the necessary structure for planning, scheduling, and implementing the assessment program, and the assessment tracking process is well supported by an electronic system – the Site Integrated Management Total Assessment System. DOE-SR conducted a number of programmatic assessments and operational awareness activities in FY 2008. Although not formalized, the schedule of assessments for FY 2009 included six programmatic self-assessments and functional area assessments of all areas of the contractor’s program. Oversight activities also included observation of facility drills and participation in the evaluation of the annual site drill. DOE-SR has completed the scheduled self-assessments for this FY, which adequately address its programmatic and response elements, and is on schedule to complete the baseline assessment of the contractor’s program. In addition, DOE-SR appropriately completed reviews of the contractor self-assessment program in each of the past two years. DOE-SR personnel used a suitable set of objectives, criteria, and lines of inquiry to complete the assessments, and they appropriately documented the responses to most of the lines of inquiry. Although the completed assessments have broadly addressed the program elements, in some areas the approach lacks sufficient depth of inquiry to identify issues that might lead to improvements in the program. For example, in the examination of the participation of emergency response personnel in the drill and exercise program, the report indicates that the records are available in the training documentation system but does not indicate that any records were checked to verify participation.

DOE-SR has been mostly effective in managing the issues and corrective actions identified through both external and internal assessments. The corrective action process is supported well by the Site Integrated Management Total Assessment System, which provides an excellent tool for tracking and closing corrective actions and the associated issues. DOE-SR was particularly effective in tracking and verifying the corrective actions that resulted from assessments of the contractor’s emergency management program. Site office personnel conducted several follow-up assessments to validate the closure of the actions, including follow-on actions and interactions with contractor personnel to verify the effectiveness of the completed actions. DOE-SR also successfully managed and tracked the completion of corrective actions from the previous Independent Oversight inspection and was involved in validating closure of the contractor’s actions. Following completion of the corrective action plan, DOE-SR personnel completed an appropriately detailed effectiveness review, which concluded that the contractor actions were effective in addressing the underlying issues and that the DOE-SR actions had been partially effective. The conclusions of the DOE-SR effectiveness review are corroborated by the results of this Independent Oversight inspection.

To summarize, DOE-SR manuals, procedures, and database tools provide an adequate supporting foundation for oversight of the site emergency management program. Supported by personnel from the Office of Environmental Management, DOE-SR personnel have continued to actively engage in oversight of the site’s program. During this FY, DOE-SR personnel have implemented an aggressive schedule of assessments and improved the overall execution of the assessment process. Additionally, DOE-SR has effectively managed the corrective actions from the previous Independent Oversight inspection and the contractor actions for issues

identified by DOE-SR. Nonetheless, continued improvement in the depth of the contractor assessments and self-assessments is warranted to promote the identification of issues that will lead to continued improvements in the site program.

E.2.2 Contractor Feedback and Improvement

The 2006 Independent Oversight inspection found that the site contractor continued to be mostly effective in using assessments, facility drills, and exercises to identify sitewide and facility-specific emergency management areas for continued program improvement. Additionally, implementation of the issues management process, as it specifically related to the closure of corrective actions taken to resolve the findings from the previous inspection, was found to be largely effective. The 2006 report also noted that although a recent sitewide workforce restructuring reduced the emergency management department's staffing, the remaining staff continued to fulfill the program responsibilities, including conducting the training, drill, exercise, and assessment programs. This 2009 inspection found that the implementation of feedback and improvement remains effective in identifying and solving issues affecting the emergency management program. SRNS continues to use a mix of site and facility assessments, program analyses, drill lessons learned, and exercise evaluations to identify and correct issues, although Independent Oversight identified some potential areas for improvement in the scope and depth of the site assessment program.

SRNS policies, manuals, and procedures establish a strong framework for the site's feedback and improvement program. Overall, assessment program requirements are captured in the standards/requirements identification document, and appropriate expectations are established in a series of policy statements and site manuals, including the site assessment manual. Procedures establish suitable processes for assessment conduct, analysis, and follow-up utilizing a supporting database of objectives and criteria. In addition to exercise evaluations and drill lessons learned, the feedback and improvement program includes self-assessments of the emergency management department and site emergency response organization, self-assessments of the facility emergency response programs, and independent assessments conducted by the Facility Evaluation Board. The management assessment program also includes an annual performance analysis of the emergency management functional area.

An annual assessment plan and schedule defines the self-assessment program for the emergency management department, which includes facility program assessments, program performance analysis, the annual site drill and exercise, site and facility drills, and organization self-assessments of the site program. Changes in the facility assessment program this year, coupled with training and oversight of the responsible facility personnel, should lead to improvements in the facility self-assessments. Performance analyses are completed annually, as required, and demonstrate critical examination of the collected data, which come primarily from evaluated drills. The drill and exercise program is also used extensively to meet the annual self-assessment requirements. Lessons learned from the site drill program are captured and reviewed by the department Corrective Action Review Board (CARB) for assignment of corrective actions. Additionally, facility drills are used to identify weaknesses, deficiencies, and improvement items, and to provide important data for the program functional analysis.

Organizational assessments (emergency operations, program support, facility programs, and drills/exercises) are conducted using objectives established in a site database and are implemented using lines of inquiry entered in the Site Tracking, Analysis, and Reporting system assessment modules. Following the previous Independent Oversight inspection, the loss of emergency management personnel resulted in a decline in the implementation of the self-assessment and issues management programs. This was noted in an external assessment by DOE-SR and an internal assessment by the Facility Evaluation Board. The

subsequent addition of a staff member with responsibility for assessments and issues management, and the later establishment of the emergency management CARB have led to improvements in the implementation of the feedback and improvement program. Overall, self-assessments have progressed since early 2008, demonstrating a self-critical approach using the established lines of inquiry and identifying issues requiring correction. However, though many self-assessments have been conducted, a number of these were directed at conduct of operations within the SRS Operations Center rather than at the site's emergency management program functional areas. As a result, some functional areas have been evaluated only through drills and exercises, and have not been subject to programmatic assessments. For example, although SRNS takes significant credit for the identification and correction of issues derived from the drill and exercise program, the self-assessment program has not examined the effectiveness of the facility and site drill and exercise evaluations in appropriately identifying issues. In addition, the assessment criteria contained in the source and compliance document do not match the criteria provided in the DOE emergency management guide, limiting the scope and detail of the assessment.

SRNS has also established an appropriate set of policies and procedures governing issues management. Emergency management has implemented these documents and, during the last FY, has improved its management of corrective actions and is adequately correcting identified issues. A corporate policy establishes the basis for the corrective action program and provides detailed instructions on the identification of issues, determination of corrective actions, and management of the process. The Site Tracking, Analysis, and Reporting database provides an excellent tool to manage the issues and associated actions and to record and validate the closeout actions. Issues assigned to the emergency management department are appropriately reviewed by the CARB and managed until closed. Issues from site drill lessons learned are also being effectively evaluated and tracked by the CARB; some are corrected directly by personnel assigned by the CARB, and others are managed and corrected using the corrective action tracking system. In addition, review of a sample of facility issues entered in the site corrective action tracking system provided evidence of adequate management and closeout. SRNS also tracks the performance of the corrective action tracking system as one of the department's performance indicators, although the statistics do not account for corrective actions that have had their due dates extended. Overall, identified issues are effectively managed and tracked to closure, including validation of the closure actions in a number of instances.

Finally, actions by the site contractor were effective in correcting the issues identified during the previous Independent Oversight inspection. Corrective actions were well documented and were implemented as specified in the corrective action plan. Closure of the site contractor's actions was verified appropriately through internal reviews, and as noted previously, DOE-SR was also actively involved in validating closure.

To summarize, actions taken by SRNS, including the assignment of additional resources to the SRNS feedback and improvement program, have resulted in the implementation of a feedback and improvement program that is satisfactorily identifying and correcting problems, as well as facilitating improvements in the site emergency management program. In addition, the site effectively addressed the findings identified in the previous Independent Oversight inspection. Although the site's feedback and improvement processes are mostly effective in identifying improvement items, opportunities for improvement exist to increase the scope of the programmatic self-assessments to more functional areas and to use a broader set of objectives and criteria for those assessments.

E.3 Opportunities for Improvement

This Independent Oversight inspection identified the following opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management and accepted, rejected, or modified, as appropriate, in accordance with site-specific emergency management program objectives and priorities.

Savannah River Operations Office

- Enhance the assessment program to facilitate the identification of deficiencies that will lead to improvement of the site program. Specific actions to evaluate include:
 - Adjust the schedule of contractor assessments to address each of the functional areas over a three-year period after completing the baseline assessments this FY.
 - Increase the depth of the investigation for both contractor assessments and self-assessments to focus on the implementation of programs and products of the activities.
 - Review the contractor self-assessment program in depth each year to verify that it is effective in finding and correcting deficiencies.

Savannah River Nuclear Solutions, LLC

- To improve the assessment criteria in the source and compliance document and to establish a basis for the included and excluded criteria, consider the following actions:
 - Reconcile the existing criteria in the source and compliance document with those published in the DOE emergency management guide (DOE Guide 151.1-3).
 - Revise the source and compliance document to more closely reflect the criteria in the guide.
 - Provide a rationale for those emergency management guide assessment criteria that are not adopted for use in the assessment program.
- To enhance the ability of the assessment program to identify program deficiencies, assess the following actions:
 - Review and revise the site self-assessment program to increase the scope of the programmatic reviews to better supplement the drill and exercise evaluations.
 - Schedule a mix of annual programmatic assessments that more fully addresses the program functional areas at both the site and facility level.
 - Perform a mix of assessments each year so that all areas receive a periodic in-depth review.
 - Continue to improve the facility assessment program by providing training, guidance, and oversight to the emergency preparedness coordinators in performing self-assessments.

- To enhance the identification of potential response issues, consider expanding the CARB charter to include review of weaknesses, deficiencies, and improvement items identified during facility drills for potential application to the sitewide program and lessons learned.
- To ensure that the corrective action performance measures provide an accurate depiction of issues management, consider adding a measure that addresses those actions that are beyond the original due date or first extension (although not overdue because of an approved extension).

