# Independent Oversight Inspection of Nuclear Safety at the

# Savannah River Site Office and the Tritium Program Facilities

**December 2009**

Office of Independent Oversight
Office of Health, Safety and Security

HSS
Office of Health, Safety and Security

# Table of Contents

# Abbreviations Used in This Report

| | |
|---|---|
| **AC** | *Administrative Control* |
| **CFR** | *Code of Federal Regulations* |
| **CM** | *Configuration Management* |
| **DOE** | *U.S. Department of Energy* |
| **DOE-SR** | *Savannah River Operations Office* |
| **ES&H** | *Environment, Safety, and Health* |
| **HANM** | *H-Area New Manufacturing* |
| **HPI** | *Human Performance Improvement* |
| **HSS** | *Office of Health, Safety and Security* |
| **MFFF** | *MOX Fuel Fabrication Facility* |
| **MOU** | *Memorandum of Understanding* |
| **MOX** | *Mixed Oxide* |
| **NNSA** | *National Nuclear Security Administration* |
| **LCO** | *Limiting Condition of Operation* |
| **SAC** | *Specific Administrative Control* |
| **SAR** | *Safety Analysis Report* |
| **SRS** | *Savannah River Site* |
| **SRSO** | *Savannah River Site Office* |
| **SRNS** | *Savannah River Nuclear Solutions, LLC* |
| **SSC** | *Structures, Systems, and Components* |
| **SSW** | *Senior Supervisory Watch* |
| **TEF** | *Tritium Extraction Facility* |
| **TSR** | *Technical Safety Requirement* |
| **USQ** | *Unreviewed Safety Question* |

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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), conducted an inspection of nuclear safety at several National Nuclear Security Administration (NNSA) facilities located at DOE's Savannah River Site (SRS) during August and September 2009. The inspection was performed by the Office of Independent Oversight's Office of Environment, Safety and Health Evaluations to support site management in the execution of the SRS mission involving the SRS mixed-oxide (MOX) fuel fabrication facility (MFFF), currently under construction, and the Tritium Program nuclear facilities.

Aerial view of SRS

This report discusses the results of the nuclear safety inspection at the Tritium Program facilities, the scope of which is outlined below. The results of the inspection at the MFFF, which at the site level falls under the MOX Federal Project Director (NA-265), are presented in a separate report. Concurrent with the nuclear safety inspection, the HSS Office of Environment, Safety and Health Evaluations and the Office of Emergency Management Oversight inspected the SRS environment, safety, and health (ES&H) and emergency management programs, respectively; the results of those inspections are also discussed in separate reports.

Within DOE, NNSA has line management responsibility for the site's Tritium Program operations. At the site level, the line management responsibilities for the Tritium Program operations fall under the manager of the Savannah River Site Office (SRSO). The Savannah River Operations Office (DOE-SR) provides technical and administrative support to SRSO.

The SRS Tritium Program is managed and operated by Savannah River Nuclear Solutions, LLC (SRNS), under contract to DOE; SRNS partners include Fluor Daniel, Northrop Grumman, and Honeywell. Located near Aiken, South Carolina, SRS encompasses approximately 310 square miles of DOE-owned property.

The SRS management and operating contract with SRNS includes three key mission areas: environmental cleanup, operation of the Savannah River National Laboratory, and NNSA activities. The NNSA activities, which support DOE national security and non-proliferation programs, include Tritium Program operations and completion of the plutonium disposition program. The primary mission of the Tritium Program facilities is to supply the Department of Defense with gas-filled reservoirs for the nuclear weapons program. Other Tritium Program activities support stockpile maintenance, weapons surveillance, and technology development. The Tritium Extraction Facility (TEF), which began operations in November 2006, provides the capability to extract and purify tritium from lithium-aluminate target rods irradiated in commercial light water reactors. The major radioactive hazard in the Tritium Program facilities is tritium in the form of gas, oxide, or tritide (a hydride derived from tritium). The dominant potential accident scenarios are fire, explosion, loss of confinement, direct radiological exposure, and natural phenomena events.

The purpose of this Independent Oversight inspection was to assess the effectiveness of various aspects of nuclear safety programs being implemented at SRS under the direction of NNSA. With respect to the Tritium Program operations, the Independent Oversight team evaluated a sampling of activities that provide perspectives on the safety of current nuclear-related work activities, including the following:

- Evaluation of SRNS programs and processes at the TEF for engineering, configuration management, surveillance and testing, maintenance and procurement, and system engineering, as they are applied to the functionality of the safety-significant Glovebox Oxygen Monitoring and Fire Suppression systems, including supporting and interface systems, such as the H-Area fire water supply system.

- Evaluation of the conduct of nuclear operations and training at the Tritium Program nuclear facilities in general, including TEF, H-Area New Manufacturing (HANM), and H-Area Old Manufacturing.

- SRSO's and SRNS's effectiveness in managing and implementing selected aspects of the nuclear safety program that Independent Oversight has identified as focus areas, including specific administrative controls (SACs) and the implementation of Departmental commitments 16 and 20 for Defense Nuclear Facilities Safety Board Recommendation 2004-1. Inspection results of the latter focus area topic are incorporated into the assessment of SRSO oversight. Independent Oversight will use this assessment of SRSO oversight, in combination with assessments of other DOE site offices, to evaluate this focus area.

- Selected aspects of SRSO feedback and continuous improvement systems. Specifically, the Independent Oversight team focused on SRSO nuclear safety oversight of SRNS operations and SRSO feedback and improvement processes. Independent Oversight also reviewed the effectiveness of corrective actions implemented to address SRSO weaknesses identified during the 2006 Independent Oversight inspection.

The feedback and improvement processes at the SRNS institutional level were reviewed as a distinct element of Independent Oversight's ES&H inspection of facilities and activities that fall under the purview of DOE-SR. That ES&H inspection was conducted in parallel with this nuclear safety inspection, and the results are reported in a separate inspection report.

Sections 2 and 3 discuss the key positive attributes and weaknesses, respectively, identified during this nuclear safety inspection. Section 4 presents a summary assessment of the effectiveness of the major nuclear safety elements that were reviewed. Section 5 provides the Independent Oversight team's conclusions regarding the overall effectiveness of NNSA, SRSO, and SRNS management of nuclear safety programs. Appendix A provides supplemental information, including team composition.

NNSA, SRSO, and SRNS must ensure that corrective action plans are developed to address each of the deficiencies and observations identified in this report as appropriate and in accordance with the appropriate site issues management processes and quality assurance requirements.

# 2 Positive Attributes

Positive attributes were identified in several key areas of the SRNS Tritium Program, including conduct of operations, configuration management (CM) and maintenance, and SRSO's oversight.

**SRSO and Tritium Program Operations management is strongly committed to human performance improvement (HPI) initiatives, and field implementation of HPI tools is evident.** SRSO's strong commitment to HPI includes the SRSO Manager's engagement and co-approval of the Strategic Plan, the SRSO Deputy Manager's involvement in spearheading this initiative across NNSA, the SRSO Assistant Manager for Mission Assurance's participation on the HPI Steering Committee, and SRSO's commitment to the HPI plan implementation. Tritium Program Operations management has demonstrated strong commitment to and expectations for the principles of HPI through several venues. The Tritium Program has implemented all aspects of the site HPI implementation plan, the organization has piloted several of the site's HPI initiatives, and Tritium Program workers are leading the site in participation in error reporting (a tracking and trending tool introduced within the last year for self-reporting errors). Initial HPI error reporting results have already revealed some common error precursors, and actions to address those precursors have been addressed through the organization's corrective action review board. Error reporting is ongoing, and management recognizes that further development and analysis of error reporting results is necessary.


**Equipment at the Tritium Facility**

**Tritium Program management has effectively implemented several noteworthy mechanisms to enhance and improve conduct of operations, including pause periods, the senior supervisory watch (SSW) program, and the coaching tour program.** The Tritium Program Operations pause period was an excellent mechanism for senior Tritium Program Operations management to communicate accomplishments, challenges, and expectations to workers. The SSW program is established when senior supervision is needed in a facility to bring additional judgment, experience, and knowledge to bear on a facility evolution or evolutions. In the SSW program, senior managers representing several disciplines provide senior oversight of activities during assigned watch periods and help resolve operational and maintenance issues. The coaching tour program provides the same level of senior management involvement as the SSW program, but is more focused to provide oversight and coaching with respect to leadership, integrity, decision-making, and enforcement of standards in a mentoring and instructional setting.

**The Tritium Program organization has established robust processes for requesting, prioritizing, scheduling, planning, preparing, assigning, implementing, reviewing, approving, and critiquing maintenance work activities.** Noteworthy aspects of these processes include: (1) assigning high-priority, emergent maintenance needs to a Fix-It-Now team; (2) using a rolling eight-work-week schedule with dedicated work week managers to support efficient planning, preparation, and implementation of scheduled work; (3) using field procurement engineers to pull repair parts into kits and electronically update the Field Material Tracking System report to facilitate issuance of ready-to-work work packages; (4) identifying in each work package the procedures that must be retrieved from the Document Control System and verified to be the latest revision prior to use; (5) promoting craft and technician entry of maintenance history narratives following work completion; and (6) institutionalizing the T+1 Work Week Manager's Report and critique meeting with required follow-up and tracking to closure of identified problems and opportunities for improvement.

**The CM program is comprehensive; the overall program is commendable and is performing effectively.** The *Conduct of Engineering and Technical Support Manual* includes the appropriate elements of the CM program as defined by DOE-STD-1073, *Configuration Management.* Key computer systems supporting program implementation (SmartPlant Foundation, Asset Suite, In-Process Implementation, and Field Material Tracking System) communicate with each other, are easily accessible and used by multiple levels within each organization, and support database updating by staff members who are directly involved in the activities that created the need for the update.

**SRSO uses an aggressive approach to drive continuous improvement in contractor performance through effective use of assessments, self-assessments, operational awareness data, management walkthroughs, and the contractor assurance system.** SRSO has established aggressive expectations for documented and frequent management walkthroughs in procedures. SRSO is a relatively small site office and has a motivated and cohesive management team and support staff. The SRSO safety system oversight engineer's weekly meeting with Tritium Program senior engineering management is a noteworthy practice. Performance in nuclear safety, performance assurance, and mission assurance is also effective.

# 3 Weaknesses

Although most aspects of nuclear safety are effective, there are weaknesses in some aspects of the basis for worker protection actions during a seismic event and periodic safety system assessment by system engineers.

SRS Tritium Facility

**Safety analysis report (SAR) documentation does not adequately describe the rationale for the worker protection strategy for seismic events.** The TEF SAR and supporting technical documents do not adequately document the rationale and considerations for selecting administrative controls (ACs) over engineered controls as a means to protect workers against radiological hazards during a design-basis seismic event, and does not adequately document that the credited safety-significant ACs are adequate to prevent worker exposure from exceeding the threshold criteria. Further, although the emergency worker evacuation is a safety-significant AC, there are no periodic drills to train workers specifically for the seismic hazard conditions, and no associated performance requirements are specified to demonstrate the adequacy of the adopted hazard control strategy.

**SRNS does not fully meet DOE Order 420.1B, *Facility Safety,* and SRNS requirements for periodic review of operability, reliability, and material condition of safety systems.** The SRNS *Conduct of Engineering and Technical Support Manual* does not fully address DOE Order 420.1B requirements for safety system assessments. While the annual System Health Reports are prepared by system engineers to fulfill the requirements of this order, these reports do not provide all the necessary information to support an assessment of the system's material condition, its ability to perform design and safety functions, or its physical configuration as compared to system documentation, nor do they provide the present-condition information specified as mandatory in the SRNS manual procedure titled *SSC Performance Monitoring*.

# 4 Results

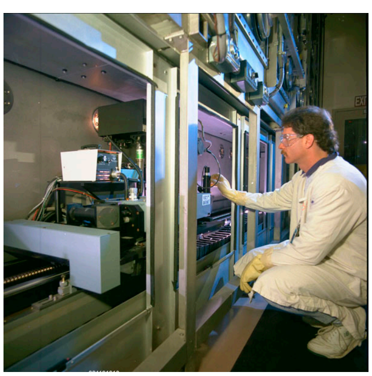
The following sections provide a summary assessment of the SRSO and SRNS activities that Independent Oversight evaluated during this inspection.

## Engineering Design and Safety Basis

Independent Oversight reviewed two primary systems within the TEF: the Fire Suppression and the Glovebox Oxygen Monitoring systems. Along with the suppression system, the site infrastructure fire water supply system, which is not classified as a safety system, was assessed to verify that a reliable water source existed to provide water to TEF. In addition, the glovebox pressure relief system was reviewed to verify design adequacy. Engineering of the selected systems was examined from the standpoint of their design and performance for mitigating the bounding accident conditions postulated and analyzed in the TEF SAR. The technical basis for surveillance testing of these systems was also reviewed.

Overall, with respect to nuclear safety, the design of the facility, of the systems reviewed, and of their supporting and interfacing systems is robust, with conservative safety margins. Operating experience demonstrates that the systems have been reliable. The system engineers and other engineering support staff are technically well qualified. They demonstrated a strong sense of ownership of assigned responsibilities and a questioning attitude. The safety basis documents provide clear descriptions of the facility, its systems and components, and normal operations and accident conditions. However, a significant concern associated with safety basis documentation identified in this inspection is the lack of rationale for the selection of controls for the protection of facility workers in the event of a design basis earthquake (further discussed below).

Independent Oversight assessed the features and strategy associated with addressing the possible radiological consequences in the TEF of a design basis seismic event. For this event, the potential exists that tritium could be released from its primary confinement. Although the DOE preferred strategy for worker protection controls for such an event are engineered controls, such as fully seismically qualified safety significant glovebox secondary confinements, SRNS selected ACs as the control measure. These controls consist of the worker identifying that a seismic event is occurring and worker training to evacuate the facility upon sensing the event. Although these controls appear adequate and adequately analyzed, the SAR and its supporting documents and analyses do not document the rationale for choosing ACs over engineered controls and do not document analyses of how these controls would prevent worker exposures in this event from exceeding the criteria requiring hazard mitigation.



**Work Activities at Tritium Facility**

The facility emergency preparedness program has been identified in the SAR as a technical safety requirement (TSR) AC. This AC performs a safety-significant function. DOE STD-3009 requires that the discussion of the emergency preparedness program in the SAR focus on "demonstrating that emergency preparedness planning adequately encompasses the facility hazard discerned in hazard analyses." However, the emergency preparedness program AC does not specifically address the hazard discerned in hazard analyses (i.e., the design basis seismic event), and performance requirements relied upon during a seismic event are not SACs. Further, no specific performance measures presently are in place for the required response actions and associated drills. There are no periodic drills simulating seismic event conditions that are specifically designed to train personnel and ensure that facility workers will respond, clear passageways, and evacuate correctly and in a timely manner to a safe location, taking into account potential physical obstructions and equipment failures.

Another concern relates to the water supply to the safety-significant Fire Suppression system. The Tritium Program has implemented a memorandum of understanding (MOU) with the Site Infrastructure organization for a reliable source of fire water supply. Although the MOU is mentioned in the TSR AC addressing the fire protection program, the MOU provisions, such as the required minimum fire pump availability, storage tank availability, conformance with National Fire Protection Association standards, and notifications of impairments or system testing, all of which have safety implications, are not identified as limiting conditions of operation (LCOs) or SACs.

## Configuration Management

Independent Oversight's review of CM included the requirements of DOE Order 420.1B and also included a review of selected aspects of the unreviewed safety question (USQ) screening process required by 10 CFR 830 Subpart B, which ensures control of the analyzed and documented safety basis of a nuclear facility. The Independent Oversight team's review focused on various facility configuration products related to the Fire Suppression and Glovebox Oxygen Monitoring systems, such as system design descriptions, drawings, calculations, modification change packages, and USQ screenings, which were in turn evaluated against configuration control procedures to ensure conformance. At the same time, the facility CM procedures were reviewed to assure compliance with DOE requirements and guidelines.

The key elements of the CM program implemented by the Tritium Program are identified in the *Conduct of Engineering and Technical Support Manual* and include the appropriate attributes defined by DOE-STD-1073, *Configuration Management*. In particular, the manual includes procedures for the design of new configuration-controlled safety structure, systems, and components (SSCs), including process safety software; processes for conducting modifications to existing configuration controlled SSCs; drawing control; engineering calculations; independent design verification; and methods for providing engineering support to SRS facilities. Although there are some weaknesses in the USQ process, the implemented CM program is generally comprehensive and the overall program is performing effectively. (SRNS sponsored an external review of the USQ process as part of contract transition, which identified significant systemic weaknesses in implementation of the process at several SRS nuclear facilities, and for which corrective actions are in progress.)

## Surveillance and Testing

The review of the surveillance and test procedures and associated activities verified that the Glovebox Oxygen Monitoring system is operable and capable of performing its safety basis function within the analyzed operating parameters and the specified safety-significant system settings. The surveillance and test procedures for the TEF glovebox oxygen monitor transmitter generally were technically correct and adequately performed. During the TEF glovebox oxygen cell replacement and glovebox oxygen check/calibration, one procedural error was found, notably a missed step in the procedure. To correct this error, the facility followed its formal process for reviewing and approving changes to procedures and subsequently placed the revision in facility document control on August 27, 2009. Tracking procedures and processes for TSR-required surveillances have been established and are being implemented effectively. Surveillances were conducted within the TSR periodicity/frequency requirements. Instrumentation and measurement and test equipment for system surveillances were calibrated and maintained for the performed procedures.

## Specific Administrative Controls

SRNS has established processes for translating SACs to work instructions (e.g., procedures, work packages). SRNS personnel are adequately trained to satisfactorily comply with SACs and perform surveillances and inspections for SAC-related items. The inventory control SAC is partially automated, and most facilities either have established or are migrating toward electronic procedures that appropriately incorporate SAC requirements.

SRNS performed an implementation verification review, and SRSO and SRNS assessments have identified and prompted corrective actions for a number of implementation deficiencies. However, assessments and other feedback have not resulted in improvements that address the difficulty of applying a limit of zero transient combustibles in certain process hoods. Processes are not completely effective in a few minor respects because of weaknesses in translating SACs to work activities. Site-specific guidance documents are not sufficient to ensure long-term effectiveness of SACs. Notwithstanding these shortcomings, Independent Oversight observed no deficiencies in implementing SACs at the activity level.

## Operations

Conduct-of-operations processes at the Tritium Program facilities are effectively implemented. Operators performed operations activities professionally, efficiently, and in accordance with applicable procedures and the SRNS conduct of operations manual. For example, control room area and field activities, such as access control, communications, log keeping, and shift turnover, were formal and effective. Control room operators and shift management also responded appropriately to alarms and abnormal conditions, and TSR LCO activities were accurately evaluated, executed, and tracked.

With few exceptions, operations procedures are concise and technically accurate, and they provide adequate detail for effective performance of the activities. The electronic procedure process used in TEF is notable in that it provides an effective mechanism to remove many human error precursors in human performance. In a few cases, procedures were overly complicated or not optimally written from a human performance perspective.

Tritium Program management has placed an increased emphasis on operator training, including increased use of the simulators at HANM and TEF. Recent initiatives (in the last six months) to focus more on use of the HANM simulator have significantly improved the performance and effectiveness of continuing operator training. The simulator staff is knowledgeable, highly experienced, professional, and receptive to suggested enhancements in instructor and training program performance. During an observed training session, effective teamwork was evident in problem solving activities. Independent Oversight observed that several physical limitations visibly detract from the training environment and inhibit full effectiveness, particularly for team building, communication, and HPI exercises. Differences between the simulator and the control rooms are significant. While providing a more realistic space for the simulators would be a large and long-term capital investment, several smaller differences might be more easily addressed with reasonable resources.

Tritium Program operations management is strongly committed to HPI initiatives, and field implementation of HPI tools is evident. The Tritium Program has implemented all aspects of the site HPI implementation plan, and its workers are leading the site in participation in error reporting. Initial HPI error reporting results have already revealed some common error precursors, which are being addressed. HPI initiatives have good momentum at present; however, it is too soon to fully measure the success of these initiatives. Continued strong management attention and commitment at all levels are needed to fully realize the effects of the HPI initiatives and reduce the occurrence of errors and the probability of significant events.

Tritium Program facilities and management continue to face significant challenges to operations, resulting from several sources: the facilities are complex, and the multiple operations by different operators or shifts with the same systems, coupled with the vast number of valves in the systems, present challenges to maintaining a high level of confidence in the alignment status of specific valves. The age of the Tritium Program facilities contributes to the increased need for one-time use procedures, often to address equipment problems caused by aging and degradation. Workforce reductions are requiring transformation to a more central operating organization, with increasing requirements for operator and worker cross-training and qualification in multiple facilities. Unless the organizational differences between facilities for the same types of activities are addressed, operators and other workers will be required to learn and use two or more different processes for essentially the same operations.

## Maintenance

The SRNS Maintenance Implementation Plan comprehensively defines the site maintenance program, includes all the features and activities necessary to effectively maintain safety-related systems, and is compliant with the requirements of DOE Orders 433.1A, *Maintenance Management Program for DOE Nuclear Facilities,* and 430.1B, *Real Property Asset Management*. Appropriate maintenance work processes have been established to request, implement, and critique maintenance work activities. Further, the site's computerized maintenance management program effectively supports the various stages of work processes and includes a detailed and comprehensive Tritium Program Master Equipment List. This computerized program also provides the relational database structure for comprehensive listing of SSC maintenance history narratives, and it effectively supports trending, preventive maintenance optimization, and procurement. Because the Tritium Program infrastructure includes essentially all SSCs and equipment, the Deferred Maintenance list and DOE's Facilities Information Management System (FIMS) database are maintained effectively through periodic requests for updated information from assigned system engineers. System engineers are also required to identify and justify needed projects to maintain operational readiness, and all Tritium Program Deferred Maintenance list items are projects that have been reviewed and approved by the Change Control Board. As a result, the Tritium Program organization does not conduct and report the results of condition assessment surveys or maintain a separate Condition Assessment Information System database. The prioritized fiscal year 2008 Deferred Maintenance list includes a large number of needed refurbishment and replacement projects, and its growth over previous years was an often-repeated concern during management interviews.

Finally, to support continuous improvement, the maintenance organization conducts frequent self-assessments, promptly responds to identified concerns, and has begun a number of initiatives to enhance maintenance performance and productivity. These initiatives include the Opportunity Drawer (a repository for ready-to-work, planned, small work packages for use when scheduled work is stalled or completed early), the Quick Fix Report (a listing of requested work that can be performed by any member of the maintenance staff based on their training without further hazard analysis or planning), and transfer of selected, appropriate preventive maintenance activities to Operations.

## Procurement

SRNS has established robust requirements and processes to ensure that parts and assemblies procured for safety-related service are appropriately qualified for their intended service. The assigned system engineer appropriately determines the technical and quality assurance requirements and the critical characteristics that must be confirmed; the engineer also develops the required test procedures and recommends resolution of discrepant material issues and deficiencies in test results. Corrective maintenance work packages for Tritium Program safety-significant systems routinely include documentation of review and approval of the results of receipt inspections and post-maintenance testing. SRNS has also appropriately implemented processes for receiving, inspecting, labeling, segregating, storing, and controlling shelf life; ensuring required preventive maintenance while in storage; and transferring and maintaining required chain-of-custody and traceability documentation for procurement level 1, 2, and 3 items.

## System Engineer Program

The SRNS design authority program encompasses the system engineer program requirements defined in DOE Order 420.1B, *Facility Safety,* and the design authorities assigned to the safety-significant Fire Suppression and Glovebox Oxygen Monitoring systems were appropriately qualified as system engineers. These system engineers were knowledgeable and cognizant of their system's operational status, maintenance, operational history, and needed system improvements. The reviewed emergent work and preventive maintenance work packages for safety-significant systems included appropriate post-maintenance test requirements, which were appropriately reviewed and approved by system engineering. Maintenance staff confirmed system engineer support for troubleshooting activities. Appropriate controls have been established to ensure that most of this order's requirements are adequately met.

SRNS does not fully meet DOE Order 420.1B and SRNS requirements for safety system assessments that include periodic review of operability, reliability, and material condition. Although the annual System Health Reports prepared by system engineers contain information that, if taken as a whole, could support a reader's qualitative assessment of some system attributes, the reports do not provide all the necessary information to support an assessment of the system's material condition, ability to perform design and safety functions, or physical configuration as compared to system documentation, and they do not provide the present-condition information specified as mandatory in the SRNS manual, Procedure 3.04, *SSC Performance Monitoring*. The Tritium Program is engaged in a number of positive initiatives to enhance the system engineer program, including: (1) development of a System Engineer's Notebook; (2) communication of new "Tritium Program Engineering Expectations," including requirements for enhanced System Health Reports, performance and documentation of periodic system walkdowns, maintenance of a System Engineer's Notebook providing or referencing specified system documentation, and engagement in the system life planning process development and implementation; (3) development of a software process, using a portable tablet computer, to support real-time documentation of the results of system walkdowns, with plans to pilot use before the end of the year; and (4) piloting the development and use of the System Engineer's Notebook and formal documentation of required periodic system walkdowns (to be initiated soon) with the use of walkdown and notebook software tools (still being developed) for use on a portable tablet computer. Although the planned efforts are appropriate, they do not fully address the current deficiencies in system assessments.

## SRSO Oversight

SRSO has implemented effective oversight processes that are compliant with DOE Order 226.1A, *Implementation of Department of Energy Oversight Policy,* and DOE Policy 226.1A, *Department of Energy Oversight Policy*. SRSO performs such assessments as operational awareness, quality assurance, maintenance, programmatic, management system, and self-assessments, all of which evaluate the effectiveness of contractor and site office assurance systems. A strong management walkthrough program enhances SRSO oversight.

The SRSO oversight program is maturing, and Facility Representatives, the safety system oversight engineer, and other technical staff are performing a number of assessments. The results of this Independent Oversight inspection indicate that SRSO has been identifying issues and aggressively pursuing resolution. In addition, many aspects of SRSO improvement initiatives that were in the early stages of development or implementation during the 2006 Independent Oversight inspection and the 2006 NNSA Savannah River Site Office gap analysis for DOE Order 226.1, *Implementation of DOE Oversight Policy,* have been completed successfully. SRSO is also committed to HPI, with the active involvement and support of the Manager, the Deputy Manager, and the Assistant Manager for Mission Assurance.

# 5 Conclusions

Work at the Tritium Facility

With some isolated exceptions, the current SRNS nuclear safety programs and processes at the Tritium Program facilities are effective. Facility and safety system design is generally robust, with conservative safety margins. Operating experience demonstrates that the systems have been reliable. The system engineers and other engineering support staff are technically well qualified, and they demonstrated a strong sense of ownership of assigned responsibilities and an appropriately questioning attitude. Various programs, such as the CM program, surveillance and test procedures, SACs, conduct of operations, maintenance, and procurement, are effectively implemented, with only a few shortcomings. In addition, many aspects of the SRNS system engineering program and the SRSO oversight processes are effectively implemented, and SRNS and SRSO management are strongly committed to using the HPI initiatives to make further improvements in operations. Although improvements are needed in the areas of SAR documentation related to the worker strategy for seismic events and in the system engineer program (some of which are being addressed by recent initiatives), the current SRSO oversight and SRNS management focus at the Tritium Program facilities is appropriate.

# APPENDIX A
# Supplemental Information

## A.1 Dates of Review

| | |
|---|---|
| Planning Visit | August 4-6, 2009 |
| Onsite Inspection Visit | August 17-27, 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 A. Eckroade, Director, Office of Independent Oversight
John Boulden, Acting Director, Office of Independent Oversight and Office of Enforcement
Thomas Staker, Director, Office of Environment, Safety and Health Evaluations
Steven Simonson, Director, Office of Emergency Management Oversight
William Miller, Deputy Director, Office of Environment, Safety and Health Evaluations

### A.2.2 Quality Review Board

| | | | |
|---|---|---|---|
| William Eckroade | John Boulden | Thomas Staker | William Miller |
| George Armstrong | Dean Hickman | Robert Nelson | William Sanders |
| Pete Turcic | | | |

### A.2.3 Review Team

Steven Simonson, SRS Overall Inspection Team Leader
Shiv Seth, Nuclear Safety Team Leader

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|---|---|---|---|
| James Coaxum | Ivon Fergus | Ed Greenman | Tim Martin |
| Joe Panchison | Don Prevatte | Ed Stafford | Jacob Wechselberger |

### A.2.4 Administrative Support

Laura Crampton
Tom Davis

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