# Shutdown Facility Risk Management Assessment at the Savannah River Site

**June 2019**

Office of Enterprise Assessments
U.S. Department of Energy

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## Acronyms

| | |
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| AAP | Annual Assessment Plan |
| AMNMS | Office of the Assistant Manager for Nuclear Material Stabilization |
| APAP | Annual Performance Assurance Plan |
| BIO | Basis for Interim Operation |
| CFR | Code of Federal Regulations |
| CRAD | Criteria and Review Approach Document |
| CSE | Cognizant System Engineer |
| CY | Calendar Year |
| DOE | U.S. Department of Energy |
| DOE-SR | DOE Savannah River Operations Office |
| EA | Office of Enterprise Assessments |
| FHA | Fire Hazard Analysis |
| FPP | Fire Protection Program |
| FR | Facility Representative |
| ITM | Inspection, Testing, and Maintenance |
| MAR | Material at Risk |
| NMMP | Nuclear Maintenance Management Program |
| PuFF | Plutonium Fuel Form |
| RBOF | Receiving Basin for Offsite Fuels |
| S&M | Surveillance and Maintenance |
| SRNS | Savannah River Nuclear Solutions, LLC |
| SRS | Savannah River Site |
| SSC | Structure, System, and Component |
| TFHA | Transitional Fire Hazard Analysis |
| TSR | Technical Safety Requirements |

# Shutdown Facility Risk Management Assessment
# at the Savannah River Site
# April 15-18, 2019

## Summary


**Scope:**
This assessment evaluated shutdown facility risk management through fire protection, surveillance, and maintenance activities performed by the management and operations contractor, Savannah River Nuclear Solutions, LLC (SRNS). Fire protection program activities were assessed at C Reactor and Building 235-F, and surveillance and maintenance activities were assessed at those two shutdown facilities, as well as F Canyon Complex and the Receiving Basin for Offsite Fuels. In addition, the Savannah River Operations Office (DOE-SR) oversight processes were assessed.

**Significant Results for Key Areas of Interest:**
Fire Protection Program
Observation of facility interiors, review of records, and interviews with individuals responsible for fire protection demonstrated that implementation of the fire protection program is adequate and appropriately graded. Fire protection inspection, testing, and maintenance requirements have been significantly reduced at C Reactor due to the removal of combustibles, de-energization of many electrical circuits, and entry limits. The remaining facility, Building 235-F, which continues to undergo deactivation, has adequate fire protection activities.

Surveillance and Maintenance Programs
Review of records, interviews with facility staff, and observation of rounds indicated that the contractor appropriately uses the same surveillance and maintenance processes for shutdown facilities as for operating facilities. The assessed shutdown facilities are adequately maintained, including the credited ventilation and structural systems. SRNS adequately conducts surveillance activities at shutdown facilities to ensure that operations remain within the envelope of the safety analysis and that credited systems continue to perform their necessary safety functions.

Federal Oversight
Line management oversight processes allow DOE-SR to maintain sufficient knowledge of activities at the assessed shutdown facilities to make informed decisions about hazards. DOE-SR adequately implements its oversight processes and effectively evaluates contractor performance.

Best Practices and Findings
The real property asset management program's use of a screening process to identify critical deficiencies and the computerized maintenance management system to track them as deferred maintenance items is considered a Best Practice.

There were no Findings identified as part of this assessment.

**Shutdown Facility Risk Management**
**Assessment at the Savannah River Site**

## 1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Environment, Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of shutdown facility risk management at the Savannah River Site (SRS). This assessment evaluated the effectiveness of the site management and operations contractor, Savannah River Nuclear Solutions, LLC (SRNS), in managing the risk associated with permanently shutdown facilities through timely surveillances and appropriate maintenance activities.

EA performed this assessment at SRS from April 15-18, 2019.

## 2.0 SCOPE

EA assessed the fire protection program (FPP) activities at Building 235-F and C Reactor. EA also assessed the surveillance and maintenance (S&M) activities at Building 235-F, F Canyon Complex, C Reactor, and the Receiving Basin for Offsite Fuels (RBOF) and reviewed the DOE Savannah River Operations Office (DOE-SR) processes for shutdown facility oversight. This review scope was in accordance with the *Plan for the Office of Enterprise Assessments Assessment of Shutdown Facility Risk Management at the Savannah River Site, April 2019*.

## 3.0 BACKGROUND

The DOE complex includes nuclear and radiological facilities dating back to the Manhattan Project and the beginning of the Cold War. Some of these facilities are still in use, some are undergoing active deactivation and decommissioning, while others have ceased operation but are awaiting final disposition. Facilities in this third category present unique risks due to their inactive nature. The 2017 collapse of Hanford's PUREX Tunnel 1, built in 1956 and last used in 1965, is a recent example of the potential risks posed by the older, inactive nuclear facilities in the DOE complex.

Building 235-F was built in the 1950s and used primarily for plutonium and neptunium component production processes, which were conducted in shielded hot cells and glovebox lines. The last process line ended work in 1983, and in 2006 all special nuclear material, except for holdup, was removed from Building 235-F. Deactivation activities are currently ongoing in the Plutonium Fuel Form (PuFF) process cells; the safety basis for these activities is documented in a basis for interim operation (BIO). Building 235-F is currently a hazard category 2 nuclear facility due to the holdup of nuclear material, including large quantities of plutonium-238 in the PuFF process cells.

F Canyon Complex was built in the 1950s to process plutonium and other nuclear materials. F Canyon ceased operation in 2002, and FB-Line ceased operation in 2005. Plans for decommissioning the complex have not yet been finalized. F Canyon Complex is currently a hazard category 2 nuclear facility, with its combined safety basis covered by a recently-approved documented safety analysis for interim operation. There are no current activities in F Canyon, and access is restricted to an annual walkdown.

C Reactor began operation in 1955, and produced nuclear materials for use at SRS and elsewhere in the DOE Complex. C Reactor ceased operation in 1985, with no ability to restart. All reactor fuel has been

removed from C Reactor, and the storage basin was grouted in 2012. C Reactor is currently a hazard category 2 nuclear facility with a documented BIO due to the large amount of reactor moderator (heavy water) containing tritium that is still stored there. There are no current activities in C Reactor.

RBOF was constructed and opened in the 1960s. RBOF has been de-inventoried of all nuclear fuel, targets, resin, and bulk chemicals. The largest remaining quantity of radioactive material in the facility is the activation products in scrap material in the basins. Additionally, there are greater than hazard category 3 levels of plutonium-238 in the sludge in the basins. However, due to the lack of credible accidents that could result in releasing all the material, RBOF is categorized as a Radiological Facility, as documented in an auditable safety analysis. There are no current activities in RBOF, and access is restricted to semi-annual walkdowns.

Within SRNS, oversight of these four facilities is divided between two groups. Building 235-F and F Canyon Complex, both located in F Area, are under the F Area Complex organization, which is also responsible for F/H Laboratory and other F Area facilities. C Reactor and RBOF are under the Spent Fuel Project, which includes facilities at C, L, and H Areas. Within DOE-SR, all four facilities receive oversight from the Office of the Assistant Manager for Nuclear Material Stabilization (AMNMS).

## 4.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*. EA implements the independent oversight program through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. Organizations and programs within DOE use varying terms to document specific assessment results. In this report, EA uses the terms "deficiencies, findings, and opportunities for improvement" as defined in DOE Order 227.1A. In accordance with DOE Order 227.1A, DOE line management and/or contractor organizations must develop and implement corrective action plans for the deficiencies identified as findings. Other important deficiencies not meeting the criteria for a finding are also highlighted in the report and summarized in Appendix C. These deficiencies should be addressed consistent with site-specific issues management procedures.

As identified in the assessment plan, this assessment considered requirements related to facility S&M listed in 10 CFR 830, *Nuclear Safety Management*; DOE Order 420.1C, *Facility Safety*; and DOE Order 430.1C, *Real Property Asset Management*. Aspects of these requirements are included in the criteria and lines of inquiry of the criteria and review approach documents (CRADs) used by the assessment team.

The assessment team used the following sections of EA CRAD 31-12, Revision 1, *Fire Protection Program Criteria and Review Approach Document*:

- FP.1: A comprehensive FPP is established in DOE facilities to ensure effective implementation and control of all fire protection activities.

- FP.4: Inspection, testing, and maintenance (ITM) activities are properly planned, scheduled, and performed to ensure that fire protection systems can reliably perform their intended safety functions when required.

The assessment team used the following sections of EA CRAD 31-15, Revision 0, *Safety Systems Management Review Criteria and Review Approach Document*:

- SS.4: Maintenance activities are properly planned, scheduled, and performed to ensure that safety systems can reliably perform intended safety functions when required.

- SS.5: Surveillance and testing activities are properly performed in accordance with technical safety requirements (TSR) surveillance requirements and specific administrative controls.

- SS.8: Federal safety oversight programs are established and effective in ensuring that safety systems can reliably perform as intended.

The assessment team also used elements of HSS CRAD 45-21, Revision 1, *Feedback and Continuous Improvement Assessment Criteria and Approach – DOE Field Element*, to collect and analyze data on DOE-SR oversight activities related to shutdown facility risk management.

The assessment team examined key documents, such as work packages, inspection results, procedures, documented safety analyses, policies, and deferred maintenance lists. The assessment team also conducted interviews with key personnel responsible for facility fire protection and S&M; observed operator rounds; and walked down accessible portions of the facilities. The members of the assessment team, the Quality Review Board, and EA management responsible for this assessment are listed in Appendix A. A detailed list of the documents reviewed, personnel interviewed, and observations made during this assessment, relevant to the findings and conclusions of this report, is provided in Appendix B.

EA has not conducted a recent assessment of these SRS shutdown facilities. Therefore, there were no previously identified items for follow-up during this assessment.

## 5.0 RESULTS

### 5.1 Fire Protection Program

The objective of this portion of the assessment was to verify that SRNS has established requirements for a comprehensive FPP at the shutdown facilities to ensure the effective implementation and control of all fire protection activities.

*Criteria:*

- *A documented FPP exists as required by applicable safety criteria and includes the elements and requirements for design and operations, emergency response, fire analysis and assessments, and site-specific fire protection criteria. (10 CFR Part 830; 10 CFR Part 851; DOE Order 420.1C, Attachment 2, Chapter II)*

- *Fire hazard analyses (FHAs) have been adequately revised to accommodate changes to the facility, processes (operations), occupancy, safety basis, or baseline needs assessment, or when new fire safety risks are introduced. (DOE Order 420.1C, Attachment 2, Chapter II)*

SRNS has established an FPP that ensures adequate implementation of the programmatic requirements of 10 CFR Part 830, 10 CFR Part 851, and DOE Order 420.1C, Attachment 2, Chapter II, at the shutdown facilities. The FPP is implemented through a series of procedures in Manual 2Q, *Fire Protection Program*. Manual 2Q adequately addresses ITM, impairments, hot work, training, FHAs, and combustible controls, as well as other required topics.

**Building 235-F Fire Protection**

The Building 235-F BIO does not credit any fire protection-related structures, systems, and components (SSCs) (such as fire sprinklers) with a safety function, but does credit the FPP with specific safety functions, including reducing the frequency and intensity of any fires that may occur by controlling ignition sources, limiting the amount of flammable and combustible liquids and transient combustible materials in the vicinity of waste, and reducing the contribution of in-situ (fixed) combustibles in adjacent rooms.

Based on observed conditions, minimal combustible loading exists in Building 235-F. Negligible transient combustibles and minimal in-situ combustible loading were observed. For example, combustible carpet tiles and wall panels that were present when the building was operational have been removed, and most surfaces are now concrete. The assessment team reviewed three sample work packages for Building 235-F to ensure that they were reviewed for minimization of combustibles. In each case, the work packages were appropriately reviewed and they documented the approval of the Fire Protection Coordinator.

In addition, many electrical circuits have been de-energized. However, lights (including emergency lights) remain operational. Building 235-F remains occupied due to ongoing deactivation activities in the PuFF process cells. During the walkdown, the assessment team observed that required life safety features, such as a fire alarm system, portable fire extinguishers, emergency lights, and exit signage, were all present and in service. The assessment team reviewed a sample of functional tests of emergency lights and exit signs and test records for the fire alarm system and determined that they were adequate. Moreover, the signage on both fire doors and fire walls states that they carry a fire resistance rating, a practice that exceeds the code of record requirements.

**C Reactor Fire Protection**

The current C Reactor BIO does not credit any fire systems as safety class or safety significant. The BIO credits the FPP as an administrative control only. The removal of combustibles is thorough and effective, and combustibles are minimal in most areas, the wooden training props in the unused control room being a notable exception.

The C Reactor FHA has not been updated since 2009. The FHA describes occupant loads of 40-75 people per day and facility operations (such as storage of site artifacts, maintenance training activities, and security training) that are no longer applicable. The FHA also does not address the transition from operation to deactivation. Manual 2Q, Procedure 2.14, Section 5.6, requires a transitional fire hazard analysis (TFHA) for C Reactor, yet none exists. A TFHA must identify existing fire protection features and define conditions necessary before they can be permanently removed and must address tasks remaining during deactivation. Most fire life safety features that were present during operation have been removed (fire extinguishers) or abandoned in place (exit signs, emergency lights), yet SRNS could not locate a documented basis for their removal. The FHA does not describe the current or future status of the facility, nor has it been replaced with a TFHA, which has contributed to the lack of a documented basis for the removal of life safety features. (**Deficiency-SRNS-1**) Entry into most parts of facility is limited to those who are signed on to the entry plan for the building. The entry plan puts additional requirements on the entrants, such as carrying a flashlight, which mitigates the removal of the life safety features.

**Fire Protection Program Conclusion**

Overall, implementation of the FPP is adequate and appropriately graded. The removal of combustibles, the de-energization of many electrical circuits, and entry limits are defensible bases for reduction of fire protection features. However, SRNS has not developed a TFHA for C Reactor to specifically address fire hazards during transition.

## 5.2 Fire Protection Inspection, Testing, and Maintenance

The objective of this portion of the assessment was to verify that the fire protection systems can reliably perform their intended safety functions when required.

*Criterion:*

- *Surveillance and testing of the fire protection system demonstrates that the system is capable of accomplishing its safety functions and continues to meet applicable system requirements and performance criteria. (DOE Order 420.1C, Attachment 2, Chapter II; applicable NFPA codes and standards from the site-specific contract)*

**Building 235-F Fire Protection Inspection, Testing, and Maintenance**

For Building 235-F, the assessment team reviewed inspection records for the fire alarm system, which showed that the required inspections were adequate. Based on a review of the initial acceptance test records for the fire alarm system, testing was thorough and well documented. For example, the assessment team questioned whether there were sufficient fire alarm devices to be heard everywhere, but the acceptance test records indicated acceptable sound level measurements throughout the second floor accessible areas. Visual inspection of a sample of tritium (self-illuminating) exit signs showed that they were clearly labelled with legible expiration dates, and no exit signs had expired. Field testing of several emergency lights showed that the tested lights functioned as expected. Visual inspection of portable fire extinguishers indicated current inspection tags, charged pressure gauges, and appropriate locations with clear access. Overall, ITM of Building 235-F fire protection features are adequate.

**C Reactor Fire Protection Inspection, Testing, and Maintenance**

The fire protection ITM requirements have been significantly reduced for C Reactor due to the low combustible loading and limited occupancy status. Most fire extinguishers, exit signs, and emergency lights have been removed or abandoned in place, so no inspection or maintenance is needed. The exception is the personnel wing in C Reactor and the shelter area on the +15 level. For these areas, fire extinguishers, exit signs, and emergency lights remain and are operational based on sample testing and review of inspection tags. The limited ITM reflects an appropriate graded approach to resource use at these facilities.

**Fire Protection Inspection, Testing, and Maintenance Conclusion**

Building 235-F, which continues to undergo deactivation, has adequate ITM activities. Fire protection ITM requirements have been significantly reduced at C Reactor due to the low combustible loading and limited/no occupancy status. Overall, fire protection inspection and maintenance are adequate and appropriately graded in the shutdown facilities.

### 5.3 Surveillance and Maintenance Programs

The objective of this portion of the assessment was to verify that SRNS has established requirements for S&M programs at the shutdown facilities. Per DOE Order 430.1C, S&M activities maintain the facility safety envelope and may include periodic inspection and maintenance of structures, systems, and equipment to ensure that, at a minimum, any contamination is adequately contained and that the potential hazards to workers, the public, and the environment are eliminated or mitigated and controlled.

*Criteria:*

- *Maintenance activities are properly planned, scheduled, and performed to ensure that safety systems can reliably perform their intended safety functions when required. The nuclear maintenance management program (NMMP) description document is submitted for approval by the Field Office Manager at least every three years. (DOE Order 433.1B, Maintenance Management Program for DOE Nuclear Facilities, Attachment 2)*

- *Maintenance processes are in place for corrective, preventive, and predictive maintenance and to manage the maintenance backlog. (DOE Order 433.1B, Attachment 2)*

- *Surveillance and testing activities are properly performed in accordance with TSR surveillance requirements and specific administrative controls. (10 CFR 830 Subpart B, Appendix A, Paragraph G)*

SRNS has established programs that ensure adequate S&M of the shutdown facilities, including the facility disposition program, NMMP, safety basis programs, and real property asset management program. Shutdown facilities managed by SRNS appropriately use the same S&M processes as SRNS operating facilities. The Conduct of Maintenance Manual, Manual 1Y, includes appropriate procedures for maintenance management and work control, as well as processes for corrective, preventive, and predictive maintenance. Records are adequately maintained by the computerized maintenance management system (Asset Suite), and work is planned, scheduled, and executed in accordance with the NMMP as described in SRNS-C-1600-2011-00001, *Nuclear Maintenance Management Program Description Document*, which was approved by the DOE field offices, including DOE-SR, on May 9, 2018. The NMMP satisfactorily addresses corrective, preventive, and predictive maintenance. Although the results of the condition assessment surveys conducted under the real property asset management program are published, some organizations within SRNS were not well informed of the survey results. For example, F Area engineering and maintenance personnel were not aware of recent surveys performed by the site services business support group. Sharing information between separate groups may improve organizational efficiency.

Manual 1C, Procedure 101, *Facility Disposition Program Overview*, includes a discussion of S&M activities, including the development of S&M plans. S&M plans were developed for the RBOF and C Reactor facilities, but are out of date and do not reflect current facility conditions. SRNS acknowledged that the S&M plans are out of date and has started updates to these plans.

SRNS has established appropriate performance metrics for maintenance, including backlog. The maintenance backlog is tracked, and the maintenance needs of shutdown facilities are adequately integrated with those of operating facilities and are served by the same maintenance crews. The assessment team interviewed multiple maintenance managers, who stated that the maintenance backlog was appropriate for the maintenance planning cycle. The assessment team did not identify any issues with the maintenance backlog. The computerized maintenance management system appropriately includes tasks to periodically inspect and/or service safety SSCs in accordance with the manufacturers'

recommendations for preventive maintenance. Manual 1Y, Procedure 8.20, *Work Control Procedure*, appropriately addresses scheduling of maintenance in the facility integrated schedule.

SRNS has issued a Risk Reduction Plan for the Spent Fuel Project that appropriately identifies legacy materials and the disposition path and schedule, when known. In particular, removal of highly corrosive zinc bromide from the C Reactor Purification Wing Shielding Windows is included.

Surveillance activities requiring maintenance support, such as transmitter setpoint determination and/or calibration, are planned, scheduled, and executed in accordance with the NMMP. Surveillances required by the safety basis documents and other daily surveillances are appropriately incorporated into facility round sheets, are tracked through the Surveillance and Testing Database, and are included in the work scheduling and integrating processes, with one exception noted in Section 5.5, below. An assessment team member accompanied an operator on the 235-F/292-2F Building surveillance rounds. The operator appropriately conducted the surveillance rounds and demonstrated an understanding of the recorded data.

SRNS has developed a process for managing real property that includes a methodology for prioritizing and tracking deficiencies identified during condition assessment surveys. Manual 1.01, Procedure 5.5, *Real Property Asset Management*, defines the process whereby deficient conditions identified during condition assessment surveys are provided to the facility for execution of the SRS Condition Assessment Survey Deferred Maintenance Determination Process to define the subset of deficiencies that are critical to asset preservation. These deficiencies become deferred maintenance items, and are subsequently tracked using the computerized maintenance management system, helping to ensure that resources are applied to the most pressing needs. Using a screening process to identify critical deficiencies and the computerized maintenance management system to track them as deferred maintenance items is considered a **Best Practice**.

**Surveillance and Maintenance Programs Conclusion**

SRNS has established programs that ensure adequate S&M of the shutdown facilities. SRNS appropriately uses the same S&M processes for shutdown facilities as for operating facilities. The NMMP satisfactorily addresses corrective, preventive, and predictive maintenance, and the maintenance backlog is appropriately managed. Surveillances, with the exception noted in Section 5.5, below, required by the safety basis documents are appropriately incorporated into facility round sheets, tracked through the Surveillance and Testing Database, and included in the work scheduling and integrating processes. The real property asset management program's use of a screening process to identify critical deficiencies and the computerized maintenance management system to track them as deferred maintenance items is considered a **Best Practice**.

## 5.4 Ventilation and Structural Systems Maintenance Activities

The objective of this portion of the assessment was to verify that maintenance activities are properly planned, scheduled, and performed to ensure that the safety systems (ventilation and structural systems) remaining in the shutdown facilities can reliably perform their intended safety functions.

*Criteria:*

- *The safety system is included in the nuclear facility maintenance management program and the DOE-approved Nuclear Maintenance Management Plan. (DOE Order 433.1B, Attachment 2).*

- *Maintenance processes for the system are in place for corrective, preventive, and predictive maintenance and to manage the maintenance backlog, and the processes are consistent with the system's safety classification. (DOE Order 433.1B, Attachment 2)*

- *The system is periodically inspected in accordance with preventive maintenance requirements. (DOE Order 433.1B, Attachment 2)*

- *Maintenance activities associated with the system, including work control, post-maintenance testing, material procurement and handling, and the control and calibration of test equipment, are formally controlled to ensure that changes are not inadvertently introduced, the system fulfills its requirements, and system performance is not compromised. (DOE Order 420.1B, Chapter V and DOE Order 433.1B, Attachment 2)*

Three of the four shutdown facilities examined (i.e., all except Building 235-F) do not have active SSCs that are credited with mitigating consequences to the facility worker. However, to support periodic facility inspections, these facilities still appropriately maintain SSCs, such as stairs for access to multiple elevations, lighting in certain areas, non-credited ventilation systems, and roofing systems to prevent rainwater intrusion.

**Building 235-F Safety System Maintenance**

Building 235-F is currently undergoing deactivation work intended to reduce the available material at risk (MAR) in order to reduce accident consequences to facility workers. The workers performing the MAR reduction activities are temporary tenants in Building 235-F. Maintenance needs noted by these workers are appropriately reported to the facility operations staff, who then initiate and approve work requests to ensure scheduling of applicable maintenance activities (i.e., corrective maintenance). The facility operations staff also appropriately performs periodic rounds in the facility to remain cognizant of facility and equipment status. The credited interlocks and ventilation systems are adequately maintained using the computerized maintenance management system.

The Building 235-F structure and associated building ventilation are appropriately credited with providing a pathway to the credited sandfilters and stack. Periodic inspections, scheduled using the computerized maintenance management system, are adequate to detect degradation prior to it impacting system performance. The facility uses procedure E7 3.48, *Conduct of Engineering Structural Integrity Program*, to adequately ensure that engineering experts assess structural conditions. However, SRNS was unable to produce a copy of the SAIC letter report, *Inspection of 235-F Building Cracks*, which is cited in U-BIO-F-00003, *Basis for Interim Operation for Building 235-F Deactivation*, the current safety basis for Building 235-F. (**Deficiency-SRNS-2**) The Building 235-F BIO states, "Visual evaluations of the walls, floor slabs, …and girders, particularly the critical structural connections, were conducted in 1989 and 1990. These evaluations did not reveal any symptoms of overstressing, serious cracking, or other indicators of strain as reported in an SAIC letter report, *Inspection of 235-F Building Cracks*." Without a retrievable document demonstrating the basis for the safety basis assertion, the conclusion is left unsupported.

**Ventilation and Structural Systems Maintenance Activities Conclusion**

Shutdown facilities managed by SRNS are adequately maintained, including the credited ventilation and structural systems. Preventive maintenance is appropriately used to preclude unanticipated equipment failure, while corrective maintenance is appropriately used to restore deficient conditions to acceptable performance. However, SRNS was unable to produce a reference document cited in the safety basis for Building 235-F.

## 5.5 Ventilation and Structural Systems Surveillance Activities

The objective of this portion of the assessment was to verify that surveillance and testing activities are properly performed in accordance with TSR surveillance requirements and specific administrative controls.

*Criteria:*

- *Requirements relating to testing, calibration, or inspection assure that the necessary operability and quality of safety SSCs is maintained; that facility operation is within safety limits; and that limiting control settings and limiting conditions for operation are met. (10 CFR 830.3 and Table 4)*

- *Instrumentation and measurement and test equipment for the system are calibrated and maintained. (10 CFR 830.122 Criterion 8)*

SRNS procedure 1Q 12.1, *Control of Measuring and Test Equipment*, adequately defines the requirements and responsibilities for the control of measuring and test equipment, including calibration standards.

For the three shutdown facilities that have no active SSCs, surveillance activities are appropriately limited to periodic facility inspections. In C Reactor, heavy water (previously used as reactor coolant and moderator) is stored in two tanks. The wall thickness of these tanks is measured periodically by non-destructive examination technicians and reported to the appropriate cognizant system engineer (CSE). However, the CSE stated that he did not compare moderator storage tank wall thickness to established performance criteria before accepting it for continued service, as required by DOE Order 420.1C. Instead, the CSE compared it to previous values. (**Deficiency-SRNS-3**)

**Building 235-F Safety System Surveillance**

U-TSR-F-00005, *Technical Safety Requirements Savannah River Site Building 235-F Deactivation*, adequately defines the surveillance requirements and associated frequency to ensure reliable operation of credited systems. SRNS also provided a listing from the computerized maintenance management system showing completion dates for required surveillance activities. The listing demonstrated that surveillances are adequately performed within the acceptable frequency.

The safety basis document, U-BIO-F-00003, credits the enclosure integrity program as an administrative control (AC 5.7.2.15) for mitigating a number of postulated hazard events. M-TRT-F-00038, *235-F Enclosure Integrity Program Description Document*, describes the four areas with enclosures containing MAR and describes three major programs for ensuring enclosure integrity: the radiological control program, periodic inspections of enclosure integrity, and routine process parameter trending. However, contrary to the requirements for process parameter trending in M-TRT-F-00038, the enclosure vacuum for the old metallurgical laboratory is not included on facility roundsheets. (**Deficiency-SRNS-4**) SRNS has appropriately entered 2019-CTS-004284 into the sitewide commitment tracking database to track the resolution of this issue.

**Ventilation and Structural Systems Surveillance Activities Conclusion**

Shutdown facilities managed by SRNS adequately conduct surveillance activities to ensure that operation remains within the envelope of the safety analysis and that credited systems continue to perform their necessary safety functions. However, one surveillance credited as an administrative control is not being

performed. Also, the moderator storage CSE did not use established performance criteria to accept the moderator storage tanks for continued service.

### 5.6 Savannah River Operations Office Oversight

The objective of this portion of the assessment was to verify the adequacy of DOE-SR's oversight in ensuring that the risks at shutdown facilities are appropriately managed.

*Criterion:*

- *All applicable DOE organizations must: (1) establish and implement an effective oversight program consistent with DOE P 226.1B and the requirements of this order, and (2) maintain sufficient technical capability and knowledge of site and contractor activities to make informed decisions about hazards, risks, and resource allocation; provide work direction to contractors; and evaluate contractor performance. (DOE Order 226.1B Section 4)*

DOE-SR has established and implemented oversight programs that evaluate SRNS's performance and compliance with requirements applicable to the four assessed shutdown facilities. DOE-SR plans its oversight activities for a calendar year (CY) using the annual performance assurance plan (APAP). This plan covers the entire site and is used to ensure that all six key elements from DOE Guide 226.1-2A, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*, are reviewed at least every three years. Based on the APAP, each DOE-SR line organization develops their annual assessment plan (AAP) for the CY. The assessment team determined that the CY 2018 and CY 2019 AAPs for AMNMS were appropriately applying resources based on the activities at each facility.

The level of Facility Representative (FR) coverage for F Canyon Complex, C Reactor, and RBOF defined in the AAP is "seldom." Although "seldom" is less frequent than the base coverage recommendation of "occasional" in DOE-STD-1063-2017, *Facility Representatives*, this level of coverage is appropriate given the inactive nature of these three facilities. Review of 2018 and 2019 assessment reports and interviews with an FR indicate that the AMNMS staff perform oversight activities at F Canyon Complex, C Reactor, and RBOF about once a year. This frequency of oversight for the facilities is currently effective, given the high level of experience among the FRs and their familiarity with the facilities. However, due to staff turnover and as time passes since the facilities became inactive, a new FR may need to spend more time at the "seldom" covered facilities in order to provide the same quality of oversight. The FR coverage for Building 235-F is "frequent," based on the material removal activities occurring at the facility, and allows the FRs adequate time to assess the contractor's work.

DOE-SR staff also provide adequate oversight of non-routine activities. In 2018, DOE-SR performed a vital safety system assessment of the 292-2F diesel generator, associated with Building 235-F, just before the system was downgraded from safety significant to general service in the latest revision of the BIO. In 2019, DOE-SR performed a similar assessment for the A and B train diesels associated with F Canyon Complex. During 2018, the safety basis for F Canyon Complex was revised, and AMNMS performed a thorough review of the facility criticality safety basis to ensure that the new safety basis appropriately captured nuclear criticality safety controls. By performing assessments in response to infrequent changes, DOE-SR is appropriately applying limited resources in a graded approach.

**Savannah River Operations Office Oversight Conclusion**

Line management oversight processes allow DOE-SR to maintain sufficient knowledge of the activities at the assessed shutdown facilities in order to make informed decisions about hazards. DOE-SR adequately implements its oversight processes and effectively evaluates contractor performance. Although the

current DOE-SR staff are able to perform adequate oversight with only "seldom" coverage, less experienced staff may need to spend more time in order to achieve the same quality of oversight.

## 6.0 FINDINGS

The assessment team did not identify any findings during this assessment. Deficiencies that did not meet the criteria for a finding are listed in Appendix C of this report, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

## 7.0 OPPORTUNITIES FOR IMPROVEMENT

No opportunities for improvement were identified as part of this assessment.

## Appendix A
## Supplemental Information

**Dates of Assessment**

Onsite Assessment: April 15-18, 2019

**Office of Enterprise Assessments (EA) Management**

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## Appendix B
## Key Documents Reviewed, Interviews, and Observations

### Documents Reviewed

- 01642352 01, Work Order Package, *235-F, S/A Det & Alarm System Test*, Revision 1, 04/30/2018
- 01680280 01, Work Order Package, *235000F, Annual Fire System Testing*, Revision 1, 11/30/2018
- 1Q 12.1, *Control of Measuring and Test Equipment*, Revision 20, 8/9/2018
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**Interviews**

- Spent Fuel Project Facility Manager
- Spent Fuel Project Inactive Facilities Lead
- Spent Fuel Project Work Control Manager
- Spent Fuel Project Process Engineering Manager (acting)
- Spent Fuel Project Moderator Storage Cognizant Engineer
- Spent Fuel Project Nuclear Safety Lead
- Spent Fuel Project Radiation Protection Manager
- Spent Fuel Project Operator
- Site Services Real Property Asset Management Program Manager
- Site Services Real Property Asset Management Program Condition Assessment Survey Administrator
- Central Engineering Structural Mechanics Engineer
- Central Engineering Pressure Protection Engineer

- Building 235-F Engineering Support
- Building 235-F Risk Reduction Project Manager
- F Area Complex Facility Manager
- F Area Complex Operations Support Manager
- F Area Complex Nuclear Safety Lead
- F Area Complex Maintenance Manager
- F Area Complex Waste and Chemical Management Engineer
- F Area Complex Engineering Manager
- F Area Complex Deactivation Team Lead
- Fire Protection Coordinator
- Fire Protection Engineer
- Fire Protection Engineering Manager
- DOE-SR Fire Protection Subject Matter Experts (2)
- DOE-SR Facility Representative

**Observations**

- Field walkdown of C Reactor (105-C)
- Field walkdown of RBOF exterior
- Field walkdown of F Canyon Complex outside facilities and canyon exterior
- Field walkdown of Building 235-F
- Operator Round for 235-F/292-2F Building Surveillances

## Appendix C
## Deficiencies

Deficiencies that did not meet the criteria for a finding are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

- **Deficiency-SRNS-1**: Contrary to the requirements of Manual 2Q, Procedure 2.14, Section 5.6, the current FHA for C Reactor does not adequately identify existing fire protection features or define conditions necessary before they can be permanently removed during the transition to shutdown.

- **Deficiency-SRNS-2**: Contrary to the requirements of 10 CFR 830.6, SRNS could not produce a reference document cited in the safety basis for Building 235-F (U-BIO-F-00003).

- **Deficiency-SRNS-3**: Contrary to the requirements of DOE Order 420.1C, Attachment 2, Chapter V, Section 3.c.(3).(c), the spent fuel program moderator storage cognizant system engineer did not compare moderator storage tank wall thickness to established performance criteria prior to accepting the tank for continued service.

- **Deficiency-SRNS-4**: Contrary to the requirements of the BIO for Building 235-F, administrative control AC 5.7.2.15, and M-TRT-F-00038, the enclosure vacuum for the old metallurgical laboratory is not recorded for process parameter trending. SRNS has initiated 2019-CTS-004284 to address this issue.