



Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

DEC 15 2017

The Honorable Sean Sullivan
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004

Dear Chairman Sullivan:

SUBJECT: Transmittal of Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2012-1 Implementation Plan (IP) Annual Report for Fiscal Year 2017

This letter transmits the Annual Report committed in Section 6 of the Department's IP. Included in the Annual Report are deliverables for the following annually occurring actions:

- Action 1-13: Update planning schedule to reflect Plutonium Fuel Form cells 1 through 5 deactivation actions for the upcoming 12 months.
- Action 3-3: Develop an updated F-Area drill plan that explicitly includes the participation expectations for all facilities and construction sites surrounding Building 235-F and planned drill dates. Annual updates are expected to be provided in December each calendar year until the hazard is removed or mitigated.
- Action 3-4: Execute at least one formally assessed drill each year based on a radiological release from Building 235-F that includes successful demonstration of the ability to adequately protect workers in all facilities and construction sites surrounding Building 235-F. Annual updates are expected to be provided in December each calendar year until the hazard is removed or mitigated.

We will continue to work with your staff to effectively respond to the concerns raised in the recommendation and complete the IP.

If you have any questions, please contact me or have your staff contact Tony Polk, Nuclear Materials Programs Division Director at (803) 208-2854.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jack R. Craig".

for Jack R. Craig
Savannah River Site Manager

NMPD-18-0009

2 Enclosures:

- 1. FY 2017 Annual Report for the
United States Department of
Energy IP for DNFSB
Recommendation 2012-1**
- 2. 2017 Building 235-F Exercise
After Action Report**

cc w/Encls:

**Joe Olencz, AU-1.1
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Patricia Lee, EM-3.11
Albert Baione, EM-3.111**

**Enclosure 1: Letter, Craig to Sullivan, SUBJECT:
Transmittal of Defense Nuclear Facilities Safety
Board Recommendation 2012-1 Implementation
Plan Annual Report for Fiscal Year 2017, dated**

DEC 15 2017

**Fiscal Year 2017
Annual Report
for the
United States Department of Energy
Implementation Plan
for
Defense Nuclear Facilities Safety Board
Recommendation 2012-1
Revision 0**



Savannah River Site Building 235-F Safety

Washington, DC 20585

December 2017

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EXECUTIVE SUMMARY

This Annual Report fulfills the requirement of Section 6.0 of the United States Department of Energy (DOE) Implementation Plan (IP) for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2012-1, *Savannah River Site (SRS) Building 235-F Safety*. Section 6.0 states:

“To ensure that the various departmental implementing elements and the Board remain informed of the status of plan implementation, the Department will provide an annual, written report that identifies commitments completed during the year and summarizes progress made that year on open commitments.”

Submission of this Annual Report also addresses the following specific IP Actions:

Action 1-13: Update planning schedule to reflect Plutonium Fuel Form (PuFF) cells 1 through 5 deactivation actions for the upcoming 12 months.

Action 3-3: Develop an updated F-Area drill plan that explicitly includes the participation expectations for all facilities and construction sites surrounding Building 235-F and planned drill dates. Annual updates are expected to be provided in December each calendar year until the hazard is removed or mitigated.

Action 3-4: Execute at least one formally assessed drill each year based on a radiological release from Building 235-F that includes successful demonstration of the ability to adequately protect workers in all facilities and construction sites surrounding Building 235-F. Annual updates are expected to be provided in December each calendar year until the hazard is removed or mitigated.

DOE entered FY 2017 under a Continuing Resolution (CR), which again restricted the funding available for Department of Energy Savannah River (DOE-SR) projects, including 235-F Risk Reduction. Despite this, DOE-SR, in balancing risks and priorities, continued to allocate funds for the project. Funding was provided for continuing technical and planning work to support the beginning of Material at Risk (MAR) removal.

Attachment 1 contains a table that lists specific IP Actions completed in FY 2017, those to be completed in FY 2018 and the completion dates for subsequent IP actions.

FISCAL YEAR 2017 PROGRESS

DOE-SR made significant progress preparing for the initiation of deactivation activities, including substantial field progress. The specific IP Actions completed to date are listed in Attachment 1 beginning on page 8. The key accomplishments in FY2017 are as follows:

Restoring cell infrastructure in PuFF cells 1 & 2: Restoring the cell infrastructure included draining the water-filled windows, removing the outer windows and cleaning the remaining inner windows. Lights were installed in the cavity to illuminate the interior of the cells.

Enhanced characterization: Enhanced characterization was performed on cells 1&2 by placing the detectors and Gamma Ray Imager in the window cavity. The Savannah River National Laboratory (SRNL) conducted these measurements. SRNL is currently analyzing the data recorded.

Electrical and Mechanical Isolation of cells 3-5: Engineering completed the review of drawings and field walk downs to verify all penetrations into the cells were identified. Work packages were generated to direct the electrical air gapping or blanking off all penetrations. This was completed to ensure the safety of the workers while working in the cells.

Cell Window Remediation in East Maintenance for cells 3-5: Restoring visibility in the cells included the removal of the outer window assembly and the four-inch-thick gelatin filled container. After the gel filled container was removed a protective barrier was installed to protect the inner window from damage.

Wing Cabinet Window Remediation in East Maintenance for cells 3 & 4: Restoring visibility in the cells included the removal of the outer window assembly and the four-inch-thick gelatin filled container. After the gel filled container was removed a protective barrier was installed to protect the inner window from damage. Window remediation is required to restore visibility and to allow enhanced characterization to be performed.

Electrical and Mechanical Isolation of cells 3 & 4 Wing Cabinet: Engineering completed the review of drawings and field walk downs to verify all penetrations into the cells were identified. Work packages were generated to direct the electrical air gapping or blanking off of all penetrations. This was completed to ensure the safety of the workers while working in the cells.

Demonstration of In-Cell Vacuum: SRNL designed a portable vacuum small enough to be placed inside the PuFF cells to remove fine particulates during the MAR removal process. The demonstration verified the electrical connections worked and the Risk Reduction Technicians

could assemble, operate and disassemble the vacuum while in the cells. The vacuum will be used to assist in MAR removal in cells 1-5.

MAR Removal from cell 6: Some material was removed from cell 6. The removal of material proved to be more difficult than planned due to the amount of vacuum the cells are under. F Area engineering recommended adjustments of the ventilation system to reduce the amount of vacuum; however, credited alarm set points prohibited the vacuum from being reduced to a point where relief was noticed during the bagging out process. Operations also replaced the gasket on the air lock door in an effort to create a better seal between the cell and the bag out port. Again, little effect was observed during the bag out process. Planned revisions to the safety basis will allow the vacuum set point of the low differential pressure alarm to be decreased. This should solve the issue with collapsing containments used for waste removal.

Deactivation Basis for Interim Operation (BIO) Revision: The BIO and Technical Safety Requirements (TSR) for 235-F were revised to support intrusive work to begin in cells 1 and 2. The changes include:

1. Downgrading the 292-2F diesel generator from Safety Significant (SS) to Defense in Depth/Important to Safety (DID/ITS). The hierarchy of controls did not justify maintaining the diesel as SS. By maintaining the diesel as DID/ITS, maintenance cost will be reduced. Replacement parts for DID/ITS equipment do not require NQA-1 certification. Commercial parts are readily available resulting in increased in-service availability of the diesel.
2. Redefining “terminate activities” to allow some personnel to enter the building during certain Limiting Condition of Operation (LCO) conditions.
3. Increasing the Plutonium Equivalent Curies (PEC) loading limit of waste containers. Increasing the PEC value in each drum will reduce the number of waste containers generated during the MAR removal process. Waste containers generated will be WIPP compliant when shipped to Solid Waste for storage and characterization.
4. Revising the cell low differential pressure alarm vacuum setpoint to allow the vacuum to be decreased. The new setpoint is consistent with the setpoint used while the facility was in operation. Reducing the vacuum will facilitate the bag out of waste.

The revised Safety Basis documents for Building 235-F deactivation (BIO and TSR) have been reviewed and approved by DOE.

Use of the Mock-up: The mock-up continues to be used to refine techniques and keep the operators proficient on tasks that will be performed in the facility.

PLANNED PROGRESS FOR FISCAL YEAR 2018

For FY 2018 the department identified the need to fund risk reduction activities in 235-F to meet DNFSB Recommendation 2012-1 commitments. The President's FY 2018 Budget Request balances SRS Nuclear Material Program risks and priorities and includes \$3.5M for 235-F activities. FY 2018, as in previous years, began with a Continuing Resolution causing additional funding uncertainty. As Congress works to develop a budget, the current House and Senate markups have the potential to further reduce the SR budget for Nuclear Materials activities and put 235-F funding at risk. During the CR, SR has elected to fund 235-F at the President's Budget level despite the funding risks. While we will implement the revised BIO and prepare to initiate MAR removal activities in cells 1 through 5, we currently anticipate funding will not support physical MAR removal during FY 2018. DOE-SR and its contractor are actively working to secure funding necessary to support physical MAR removal during FY18.

The specific IP Actions due in FY 2018 are listed in Attachment 1 beginning on page 10. The specific activities that will be undertaken in FY 2018, based on current funding projections, are listed below:

1. Implement the Deactivation BIO and authorizing work to begin in PuFF cells 1 through 5. (Supports IP Action 1-8)
2. Complete Enhanced Characterization Measurements for cells 1-4 wing cabinets. This involves Savannah River Nuclear Laboratory (SRNL) taking its final set of measurements to gather the data needed for a final report on Non-Destructive Assay (NDA) results in cells 1-4 wing cabinets. This will conclude the initial characterization of the PuFF cells and attached wing cabinets. (Supports IP Actions 1-8 and 1-9)
3. Electrically and mechanically, isolate PuFF cells 1 and 2 along with the associated wing cabinets. This will ensure that, to every extent practical, electrical or mechanical lines penetrating the cells have been isolated. (Supports IP Action 1-8)
4. Resolve the vacuum issues and associated problems with removing waste from cell 6. (Supports IP Action 1-8)
5. Develop an F Area drill plan for all facilities and construction sites surrounding Building 235-F. Supports IP Action 3-3)
6. Conduct a formally assessed drill based on a postulated release from Building 235-F. (Supports IP Action 3-4)

ANNUAL UPDATE ON DRILL PERFORMANCE

Action 3-4: Drill Conduct and Evaluation

On April 25, 2017, SRS conducted the FY 2017 Site Evaluated Exercise, which also served as the required deliverable for Action 3-4 identified in the Implementation Plan for DNFSB Recommendation 2012-1, "Savannah River Site Building 235-F Safety." Participants included the SRS Emergency Response Organization (ERO), MOX Services, Waste Solidification Building (WSB), and F-Tank Farm of Savannah River Remediation (SRR), Mixed Oxide Facility (MOX) Fire Wardens, and Centerra LLC, Savannah River Site (Centerra-SRS).

The drill scenario was based on a cell fire involving PuFF Cell 1 resulting in a filtered radioactive release from Building 235-F. Building 235-F was evacuated and protective actions were implemented for the remainder of F-Area, including MOX, WSB and F-Tank Farm. The event was classified as a Site Area Emergency, resulting in the activation of the site's Emergency Operations Center. The ERO for F-Area, as well as the site-level ERO, responded to the emergency, mitigated the situation, and planned for recovery and return to operation.

The Site Exercise was completed with a grade of "Met". The overall performance of personnel assigned to F-area indicated that the facility's ERO, including the Technical Support Staff, is capable of responding effectively to a radiological release from Building 235-F and implementing protective actions to protect personnel in adjacent facilities and construction sites.

One Finding was identified related to some Public Address (PA) speakers being inaudible in and around the Northside of 235-F. However, the facility issued a high priority work request after the exercise and the PA system was repaired immediately. The speakers were tested and found to be audible in those locations.

The following positives were noted:

- Establishment of the unified command structure at the Incident Command Post (ICP)
- Obtaining and maintaining good situational awareness
- Prompt implementation of protective actions by F-Area personnel
- Good teamwork demonstrated by the Technical Support Room staff in developing and briefing the Recovery Plan Outline.
- Facility's first-time performance of the new and challenging scenario

Attachment 1

Table of IP Actions Completed and Planned

IP Milestones Completed		
Action	Action Description	Due Date
1-1	Complete project deactivation planning for PuFF Cells 1-9.	5/30/13
1-2	Issue the Building 235-F Deactivation BIO (which supersedes the S&M BIO) to include deactivation activities in PuFF cells 6 through 9.	12/23/13
1-3	Restore cell infrastructure in PuFF cells 6 through 9.	7/31/15
1-4	Complete a Readiness Assessment (RA) for initiation of deactivation activities in PuFF cells 6 through 9 and implement the Deactivation BIO.	5/31/16
1-5	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	12/23/13
1-6	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	1/30/15
1-10	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	1/29/16
1-12	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	1/31/17
1-13	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	1/31/18
2a-1	Development of Building 235-F specific Transient Combustible Control Program.	2/15/13
2a-2	Evaluate fixed combustibles and define the fixed combustible removal, encapsulation, or isolation scope.	3/4/13
2a-3	Complete removal, encapsulation or isolation of fixed combustibles scope.	1/30/15
2b-1	Evaluate electrical components and define the scope for de-energization of components and the process for control of the resultant configuration.	3/4/13
2b-2	Complete electrical de-energization scope, including equipment removal, as practical	1/30/15
2c-1	Complete evaluation of existing FDAS for functionality and maintainability.	10/30/12
2c-2	Develop a Fire Alarm and Detection Design Study that will recommend the PuFF FDAS system design enhancements (to include criteria, scope, and schedule) for S&M and deactivation phases.	4/1/13
2c-3	Complete installation and acceptance testing of the PuFF FDAS for S&M and deactivation phases. Note that installation and testing were conducted in FY 2014, but not all test deficiencies were resolved as of 9/30/2014.	1/30/15
3-1	Develop a Calendar Year (CY) 2013 drill schedule for F-Area detailing planned drill dates involving Building 235-F including participation by all facilities and construction sites surrounding Building 235-F.	1/31/13

IP Milestones Completed (cont.)		
Action	Action Description	Due Date
3-2	Perform review of existing protective action plans and procedures to ensure that personnel are protected from the hazards associated with a radiological release from Building 235-F, and implement additional controls, as required.	2/28/13
3-3	Develop an updated F-Area drill plan that explicitly includes the participation expectation for all facilities and construction sites surrounding Building 235-F and planned drill dates. Continue to include in F-Area drill plan until the hazard is removed or mitigated. Note: After initial submittal, this is required to be submitted annually.	4/1/13 12/31/14 12/31/15 12/31/16 12/31/17
3-4	Execute at least one formally assessed drill each year, based on a postulated radiological release from Building 235-F that includes successful demonstration of the ability to adequately protect workers in all facilities and construction sites surrounding Building 235-F. Note: After initial submittal, this is required to be submitted annually.	8/29/13 5/14/14 5/15/15 4/19/16 4/25/17

IP Milestones Due in FY2018		
Action	Action Description	Due Date
1-7	Revise the Hazard Analysis, and if necessary the Building 235-F Deactivation BIO to include deactivation activities in PuFF cells 1 through 5.	4/30/18
1-8	If needed, complete a readiness assessment for initiation of deactivation activities in PuFF cells 1 through 5 and implement the revised Deactivation BIO.	7/31/18
3-3	Develop an updated F-Area drill plan that explicitly includes the participation expectation for all facilities and construction sites surrounding Building 235-F and planned drill dates. Continue to include in F-Area drill plan until the hazard is removed or mitigated. Note: After initial submittal, this is required to be submitted annually.	12/31/18
3-4	Execute at least one formally assessed drill each year, based on a postulated radiological release from Building 235-F that includes successful demonstration of the ability to adequately protect workers in all facilities and construction sites surrounding Building 235-F. Note: After initial submittal, this is required to be submitted annually.	12/31/18

IP Milestones due in "Out Years"		
Action	Action Description	Due Date
1-9	Using enhanced characterization techniques, identify a list of significant components and/or equipment to be removed for MAR reduction in cells 1 through 5.	1/31/19
1-11	Restore cell infrastructure in PuFF cells 1 through 5.	11/30/18
1-14	Complete the deactivation of cells 1 through 9. This will include waste removal.	1/31/20
1-15	Using enhanced characterization techniques, derive a final [Post Deactivation] MAR value to be used for end-state selection and regulatory acceptance. This will demonstrate mitigation of the hazard and resultant risk reduction.	6/30/20
1-16	Revise the 235-F Deactivation BIO once the MAR is removed and acknowledge the facility meets the requirements of 10 CFR Part 830 to protect the maximally exposed off-site individual to within the established DOE-S TD-3309 evaluation guidelines and protect the co-located and facility worker within the accepted Savannah River Site guidelines of 100 rem.	5/31/21
3-3	Develop an updated F-Area drill plan that explicitly includes the participation expectation for all facilities and construction sites surrounding Building 235-F and planned drill dates. Continue to include in F-Area drill plan until the hazard is removed or mitigated. Note: After initial submittal, this is required to be submitted annually.	12/31/19
3-4	Execute at least one formally assessed drill each year, based on a postulated radiological release from Building 235-F that includes successful demonstration of the ability to adequately protect workers in all facilities and construction sites surrounding Building 235-F. Note: After initial submittal, this is required to be submitted annually.	12/31/19

Attachment 2

235-F Schedule FY2018 – FY2019

	FY18												FY19												
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Remediate East maint. windows for cells 3-5	Field work	Field work	Field work																						
Perform enhanced characterization in East maint. cells 3 & 4 and issue report					Work by SRNL	Work by SRNL	Work by SRNL	Work by SRNL																	
Execute work package for mechanical isolation				Field work																					
Electrical isolation cells 3-5	Field work	Field work	Field work																						
Remediate East maint. windows for cell 1		Planning	Field work	Field work																					
Perform enhanced characterization in East maint. cells 1&2 and issue report					Work by SRNL	Work by SRNL	Work by SRNL	Work by SRNL																	
DOE approval of BIO/TSR		Planning	Planning					IP Deliverable																	
Implement BIO for cells 1&2				Field work	Field work	Field work																			
Develop technique and test equipment for assaying waste cuts		Planning	Planning	Planning	Field work																				
Design/develop method for waste removal in cells 1&2		Planning	Planning	Planning													IP Deliverable								
Develop grouting technique														Planning	Planning	Planning									
Electrical/mechanical isolation cells 1&2		Planning	Planning	Planning	Planning	Planning	Planning	Planning	Field work																
Decon/ waste removal cells 3-5											IP Deliverable		Field work	Field work	Field work	Field work	Field work	Field work	Field work	Field work					
Grout select components in cells 3-5																									Field work
Decon cells 1&2																Field work	Field work	Field work	Field work	Field work	Field work	Field work	Field work	Field work	Field work
Grout select components in cells 1 and 2																									Field work
Characterization Cells 1-9																									
Project closeout Safety Basis Revision and implementation																									

■ Field work
■ Planning
■ Work by SRNL
■ IP Deliverable

**Attachment 3
2018 F-Area Complex EP Drill Schedule**

**Emergency Preparedness Coordinator: Rafael Bango
Facility Point of Contact: Lakela Lofton**

	April
Date	04/18/18
Type	235-F Radiological Release with Protective Actions (Evaluated) (MOX and SRR will be invited to participate)

APPROVAL: Lakela Lofton
F-Area Complex Facility Manager


Signature

12/4/17
Date



Savannah River
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2017 Building 235-F Exercise After-Action Report

Defense Nuclear Facilities Safety Board
Recommendation 2012-1, Action 3-4

Approved by:



Michael L. Gilles, Facility Manager, F-Area Complex

6/6/17

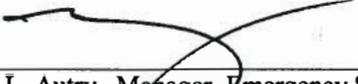
Date



Thomas J. Diaz, Manager, Emergency Management

6/6/17

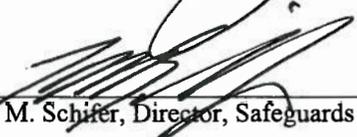
Date



Michael L. Autry, Manager, Emergency Services

6/6/17

Date



Lee M. Schifer, Director, Safeguards Security & Emergency Services

6/6/17

Date

2017 Building 235-F Exercise After-Action Report

EXECUTIVE SUMMARY

As outlined in the Implementation Plan for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2012-1, Action 3-4, Savannah River Site (SRS) committed to executing at least one formally assessed exercise based on a radiological release from Building 235-F that includes successful demonstration of the ability to protect workers in adjacent facilities and construction sites. This report serves as the deliverable for this action.

On April 25, 2017, an exercise was conducted that involved a cell fire involving PuFF Cell 1 resulting in a filtered radioactive release from Building 235-F. The intent of this exercise was to demonstrate the ability of the F-Area Emergency Response Organization (ERO) to protect workers in all facilities and construction sites surrounding 235-F. Exercise participants included Savannah River Nuclear Solutions (SRNS), the Waste Solidification Facility (WSB), Savannah River Remediation (SRR), Mixed Oxide Facility (MOX) Fire Wardens, and Centerra LLC, Savannah River Site (Centerra-SRS). (Unless needed otherwise for clarification, “SRS” will be used throughout the remainder of this document when referencing SRNS, SRR, MOX, WSB and Centerra-SRS exercise participants.)

SRS Player and Controller performance was assessed using the established Objectives, Criteria, and Lines-of-Inquiry (LOIs) contained in the SRNS Assessment Performance Objectives & Criteria manual, Functional Area 13 (FA-13), “Emergency Preparedness.”

The exercise was conducted safely and without incident by all Players, Controllers, Observers and Evaluators. Players met the objectives as outlined in the scenario manual for a satisfactory exercise. A Strength was recognized for the SRS Fire Department, who responded to three actual events elsewhere on site, two at exercise initiation and one during the exercise. The Fire Department handled those emergencies, but continued to support the Building 235-F annual exercise with reduced manpower for an effective exercise.

One Finding was identified related to some Public Address (PA) speakers being inaudible in and around the Northside of 235-F. However, the facility issued a high priority work request after the exercise and the PA system was repaired immediately. The speakers were tested and found to be audible in those locations.

The following positives were noted:

- Establishment of the unified command structure at the Incident Command Post (ICP)
- Obtaining and maintaining good situational awareness
- Prompt implementation of protective actions by F-Area personnel
- Good teamwork demonstrated by the Technical Support Room staff in developing and briefing the Recovery Plan Outline.
- Facility’s first time performance of the new and challenging scenario

The following Player Opportunities for Improvement (OFIs) were identified:

- Poor contamination control and survey techniques by Radiological Protection Department inspectors at the dress down lines
- No clear communications from the field to the control room on the location of the fire.

2017 Building 235-F Exercise After-Action Report

Several OFIs related to the Controller Organization were noted that could have affected the performance of Players or caused some drill artificiality.

Additional improvements that were identified are referenced in Attachment 1.

As required by Manual 6Q, SRS Emergency Plan Management Program Procedures, EMPP-006, “Standards for the Development and Conduct of Facility Emergency Preparedness Drills,” the corrective action for the Finding is included in this report as Attachment 2. The OFIs will be addressed by promulgating this report as a Lessons Learned document to appropriate personnel. These actions will be reviewed and revised as necessary, assigned to the appropriate personnel for action, and tracked to closure in the Site Tracking, Analysis, and Reporting (STAR) database.

The overall performance of F-Area’s ERO, as demonstrated in this exercise, indicates that the facility is capable of responding effectively to a radiological release from 235-F and implementing protective actions to protect personnel in facilities and construction sites surrounding 235-F. As required by the Implementation Plan for DNFSB Recommendation 2012-1, SRS will continue to conduct drills/exercises involving radiological releases from Building 235-F at least annually.

2017 Building 235-F Exercise After-Action Report

SCENARIO SUMMARY

Inside Building 235-F, routine work was being performed in Cell 1. A hut had been constructed to support work activities associated with waste removal from Cell 1 in East Maintenance. An operator initiated actions to startup the HEPA-filter vacuum system. During this process, a spark occurred that caught waste, cabinet gloves, and cables in the wing cabinet on fire. The fire spread into the cell area.

Because of the spreading fire, workers evacuated the area and proceeded to an airlock. The fire spread from the HEPA-vacuum and burned a cabinet glove causing a breach of Cell 1. The fire and smoke in Cell 1 overwhelmed the in-cell HEPA-filter, causing the filter to fail and stop the cell ventilation. The PuFF Low Delta P alarm was received in the 235-F Shift Operating Base (SOB) and via monitor in the F-Area Complex Control Room.

Due to the release of contamination when personnel evacuated East Maintenance, the Continuous Air Monitors (CAMs) received High Alpha Activity alarms in Airlock 1008. As personnel exited from the airlock area, an operator tripped over hoses and fell to the floor. During the fall, their coveralls ripped, exposing bare skin and a compound fracture to their arm. Contamination was present on their outer clothing and their exposed skin. While exiting the room, the operator became overwhelmed by the pain of the injury and collapsed to the floor outside Door 1008. CAM alarms were seen and heard throughout the hallway.

The F-Area Complex Shift Operations Manager (SOM) was notified of the fire in Cell 1 and the injury that occurred during the evacuation. The Savannah River Site Operations Center (SRSOC) Emergency Duty Officer (EDO) was notified of the fire and injury and requested to dispatch fire and Emergency Medical Services (EMS) assets. The SOM directed an evacuation for Building 235-F and issued a Remain Indoors protective action for the remainder of the area.

After reviewing the Emergency Action Levels (EALs), the SOM contacted the SRSOC to discuss emergency categorization and classification. With the concurrence of the EDO, the SOM classified the event as a Site Area Emergency (SAE) using SAE-1.3 *Cell Fire Involving PuFF Cell 1, Filtered Release*, being met due to a fire in Cell 1 and the absence of Roof Tunnel 4 Lo Vacuum alarm on 480-B8 panel. Upon classification, the SOM assumed the role of Area Emergency Coordinator (AEC).

The Savannah River Site Fire Department (SRSFD) arrived at the designated upwind location and received a turnover briefing from the ISC and RPD, which included a description of the event, the extent of injury, operational concerns, and known hazards. The Fire Department Captain assumed the position of Incident Commander (IC) for the event and established an Incident Command Post (ICP). The ISC informed the AEC that the ICP was established and the FDIC had assumed command.

EMS was directed by the IC to the injured person. Once located, the patient was packaged for removal from the contaminated area per procedures. RPD personnel were designated to accompany the patient to the hospital in the ambulance per procedure.

2017 Building 235-F Exercise After-Action Report

RPD personnel established appropriate radiological boundaries. Personnel that had been in the incident scene area were monitored for contamination and appropriate decontamination practices were implemented. Hot, Warm, and Cold zones were established to handle doffing of contaminated PPE.

A mitigation strategy for facility stability was developed by the IC with concurrence from the AEC.

Upon arrival at the EOC, the Technical Support Room (TSR) staff established contact with the F-Area Complex Control Room and received a briefing on the status of the event. The IC and AEC reported to the TSR Coordinator that the facility was in a safe and stable condition, allowing the TSR Coordinator to discuss termination of the event and initiation of recovery planning with the Emergency Director and Emergency Manager.

As directed, the TSR Coordinator assumed the role of Recovery Manager, formed the recovery team comprised of other EOC staff members, and developed a Recovery Plan Outline. Once the Recovery Plan Outline was completed, the Recovery Manager briefed the Emergency Director and Emergency Manager and requested approval of the outline. After approval of the Recovery Plan, the emergency classification was terminated by the Emergency Director.

2017 Building 235-F Exercise After-Action Report

EVALUATION SUMMARY

The overall rating for this exercise was “**MET**”.

Detailed Controller/Evaluator comments, which provide an in-depth assessment of each objective and criterion evaluated during the exercise, are included as Attachment 1. Some criteria are not listed in Attachment 1, which appears to be a break in numbering. Those criteria were either not evaluated or had no Strengths, Good Practices, Improvement Items, or Findings identified, in which case the criterion is evaluated as “Met”.

Objective	Rating
1: Safety	Met
2: Protective Actions	Met
3: Mitigation	Met
4: Radiological and Chemical Monitoring	Met
5: Emergency Categorization and Classification	Met
6: ERO Operations	Met
7: First Aid and Medical	Met
8: Notifications and Communications	Met
9: Offsite Interactions	Not Evaluated
10: Consequence Assessment	Met
11: Public Information	Not Evaluated
12: Recovery and Reentry	Met
13: Facilities and Equipment	Met
14: Exercise Control and Conduct	Met

ATTACHMENT 1 – Detailed Comments

Objective 1: Demonstrate Facility and site ERO members perform response activities safely.

This Objective was MET, indicating that player performance met expectations. Players at all venues conducted response activities safely and in accordance with site policy and practices.

Criterion 1.01: Facility and site ERO members perform response activities safely. (Critical)

Good Practice:

Safety was a primary focus area during the exercise. The Safety Engineer and Lead Controller discussed the potential hazards in detail prior to the exercise with the players and the controller organization. The exercise was conducted with no injuries and in a safe manner.

Objective 2: Demonstrate the ability to develop and implement appropriate protective actions in accordance with approved procedures.

This Objective was MET, indicating that player performance met expectations. Players determined and implemented appropriate protective actions throughout F-Area.

Criterion 2.01: Determine/implement protective actions for the facility/area. (Critical)

Good Practices:

1. The AEC and other control room staff frequently monitored the wind direction, updated the map to reflect changes, and notified the incident scene to check wind direction.
2. The appropriate protective actions of Evacuation for 235-F and Remain Indoors for the remainder of F-Area were implemented promptly upon assessment of the event.

Criterion 2.04: Perform personnel accountability. (Major)

Good Practice:

The accountability for Building 235-F was completed within 13 minutes of the evacuation.

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Criterion 2.06: Non-essential personnel perform protective actions as instructed. (Major)

Good Practice:

All F-Area Complex, SRR, WSB and MOX Fire Wardens implemented protective actions and adhered to PA instructions as directed to do so.

Improvement Item:

One F-Area Complex individual was found to be outside smoking and another F-Area Complex individual left one building to go to another during the Remain Indoors protective action. These individuals were addressed by facility management after the exercise.

Objective 3: Demonstrate the ability to properly mitigate, stabilize conditions and gain control over the emergency situation in accordance with procedures.

This Objective was MET, indicating that player performance met expectations. Players took appropriate actions to provide patient care and minimize the release of hazardous material.

Criterion 3.03: SRSFD personnel mitigate the emergency effectively. (Major)

Good Practice:

Fire Department responders arrived quickly on the scene and acted decisively to ensure their own safety, manage patient care, and perform scene size-up to implement initial mitigative actions. They took appropriate precautions to address the unresponsive contaminated injured patient and included RPD personnel in the transport.

Criterion 3.04: Security personnel mitigate the security crisis effectively/properly. (Major)

Good Practice:

Centerra Law Enforcement provided good support to the fire department and ICP while maintaining security for the area.

Criterion 3.05: Appropriate actions are taken to protect and account for emergency responders at the scene. (Major)

Good Practices:

1. All SRSFD personnel were tracked during their on-scene operations as required by the SRSFD accountability procedure.
2. The F-Area Complex facility ERO personnel dispatched from the Control Room to the Incident Command Post were accounted for by signing out when they left and reporting back when they arrived to their designated location.

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Criterion 3.06: Alarm Response and Abnormal Conditions.

Good Practice:

Control Room personnel promptly pulled the correct Alarm Response Procedures and Abnormal Operating Procedures upon receiving the alarms.

Objective 4: Demonstrate the ability to minimize exposure and control chemical and radiological conditions as appropriate in accordance with primary emergency response priorities.

This Objective was MET, indicating that player performance met expectations. Opportunities for Improvements were noted in radiological survey techniques and contamination control practices at the dress down lines.

Criterion 4.01: Monitor and control radiological and chemical conditions and exposures in the incident facility consistent with the emergency response priorities, procedures, and guidelines. (Critical)

Good Practices:

1. RPD Inspectors continually monitored portable air samples and ensured personnel not in PPE were radiologically safe.
2. The RPD First Line Manager at the ICP demonstrated good situational awareness by recognizing the wind shifts could potentially affect the ambulance while exiting. He conferred with the IC and the ambulance was rerouted to exit via a safer path.
3. The RPD First Line Manager (FLM) at the Hot/Warm/Cold Zones took immediate action to relocate personnel that were not wearing respirators farther south of the Step-Off Pads (SOP) to avoid any potential airborne/cross-contamination issues that might have occurred with wind migrations.

Criterion 4.04: Demonstrate the ability to handle contaminated, non-injured personnel appropriately. (Major)

Improvement Item:

During the FD bunker gear dress down some of the techniques by some RPD inspectors were subpar, i.e., turbo frisking and dropping potentially contaminated gloves on top of their instruments. However, the RPD controller for this area gave them contamination levels according to their poor practices.

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Objective 5: Accurately categorize/classify, upgrade, downgrade and/or terminate the emergency in a timely manner and in accordance with approved procedures.

This Objective was MET, indicating that player performance met expectations. Events in progress were evaluated against established criterion to appropriately categorize and classify the emergency accurately within the 15 minute timeframe.

Criterion 5.01: Initial event categorization/classification is made appropriately. (Major)

Good Practice:

The event was correctly classified as a Site Area Emergency approximately nine minutes after notification. The classification was made by the AEC in conjunction with the EDO. The EDO Information Form was completed and faxed to SRSOC. The Incident Command Post (ICP) was promptly notified of the declaration to encourage situational awareness.

Improvement Item:

The EDO initially did not concur with the classification due to reading the Emergency Activation Level requirements wrong. The SOM immediately discussed the event indicators with the EDO and the issue was resolved. Peer-checking and self-checking prevented any further delays on the classification.

Objective 6: Activate and operate emergency response facilities in an effective and timely manner based on the type and extent of emergency in accordance with approved procedures.

This Objective was MET, indicating that player performance met expectations. Emergency Response Organization (ERO) members reported to their assigned facilities and performed their assigned duties as expected. Players used procedures well and demonstrated good command and control. There were Opportunities for Improvements in communications.

Criterion 6.01: Activated ERO members must report and perform their assigned duties. (Critical)

Good Practices:

1. ERO personnel provided very good support to the SOM/AEC. The facility ERO arrived quickly, announced their positions, and began performing their tasks without delay.
2. The TSR was organized and functioned efficiently. The individual members appeared to understand their functions and immediately took action upon arrival. The TSR checklists and the WebEOC displays were utilized throughout the event. Hand written forms were provided to the administrative person and the notes were added to WebEOC.

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Criterion 6.02: Demonstrate command and control.

Good Practices:

1. The Captain did an excellent job in establishing goals and objectives for the SRSFD to effectively treat the injured person and mitigate the incident scene.
2. The AEC maintained a strong command presence throughout the exercise, setting priorities for the facility and the area to maintain control of the event.

Criterion 6.03: Demonstrate effective communications.

Good Practices:

1. The AEC conducted several informative briefings while soliciting feedback and input from other Control Room staff. The AEC always gave prior notice of when briefings were being held as to have everyone's attention.
2. Communications among the TSR staff were very good, making good use of the communications channels and information sources provided by the Fire Department Specialist and the Operations Oversight Representative.
3. Public Address (PA) announcements were clear, concise and at the proper frequencies as stated in the procedures.
4. The Technical Support Coordinator conducted several detailed briefings and requested each position provide updates on their actions. Several good discussions occurred to determine the team's approach to event stability and review of the termination criteria. The Fire Department Specialist and Engineering Advisor demonstrated good teamwork by providing good updates and following up on questions asked by the staff.

Improvement Items:

1. When notified of a fire in the East Maintenance Room and upon receiving the PuFF Cell Low Differential Pressure alarm, the AEC was conservative in his approach to classifying the event. However, he should have been more persistent in asking the ISC for a specific location of the fire within the East Maintenance Room.
2. Three-Way communication was used effectively and consistently. However, an instance was noted where closed-loop communication was not apparent. In this instance, the SOM stated that the ICP was located at 701-4F. The operator repeated the location as 707-1F. The SOM followed up with "Yes, that is correct. The Incident Command Post is at 701-4F." The Operator then made a PA announcement with the incorrect ICP location. The location was later correctly communicated on a follow up announcement.
3. The Incident Command Post (ICP) was set up close to the fire engine making it difficult for some of the controller organization to hear. The IC

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should have moved the ICP further away to make certain no information was lost due to the loud engine.

4. As the exercise progressed, drillsmanship became lax at the ICP and the use of “This is a Drill” was not used as much.
5. It was noted in F-Tank Farm that facility Control Rooms should refrain from making PA announcements during area-wide announcements.

Criterion 6.04: Demonstrate effective use of procedures.

Good Practice:

The facility ERO utilized their checklists and ensured they were complete. The Day Relief SOM did a good job of ensuring the appropriate procedures were in use and properly completed by Control Room personnel. He also assisted the AEC in making certain all actions were complete in the AEC/FEC checklist.

Objective 7: Demonstrate the ability to provide appropriate medical care for injured personnel in accordance with approved procedures.

This Objective was MET, indicating that player performance met expectations. Injured personnel were provided EMS assistance to the level of injury.

Criterion 7.01: Emergency Medical Services personnel provide proper emergency medical care for injured and/or contaminated/injured personnel. (Major)

Good Practice:

An RPD inspector and an operator, both of whom are first aid qualified, chose to stay with the injured person. They tried to keep the patient calm while conscious. Once the patient became unresponsive, the RPD inspector surveyed him, removed as much of the PPE, and covered contaminated clothing as possible. The operator kept the Control room as well as the ICP updated on the status of the patient.

Criterion 7.02: Emergency Medical Services personnel provide proper emergency medical care for injured and/or contaminated/injured personnel. (Major)

Good Practices:

1. Fire Department personnel demonstrated proper assessment and treatment of the critically injured person.
2. Fire Department personnel did a good job in describing treatment and preparation techniques for transport. There was not a patient contamination kit on the gurney that was pre-staged in the building. The EMTs did a great job improvising with the sheets on the gurney to wrap the patient in order to control the contamination. {See Criterion 14.02}

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Objective 8: Perform all onsite and offsite notifications in accordance with approved procedures.

This Objective was MET, indicating that player performance met expectations. Players performed the required onsite notifications adequately. No offsite notifications were made during this exercise.

Objective 10: Assess the actual or potential onsite and offsite consequences and develop onsite protective actions and offsite protective action recommendations in accordance with approved procedures.

This Objective was MET, indicating that player performance met expectations. Players assessed the potential consequences of a hazardous material release as part of the continuing evaluation of protective actions onsite. Wind direction and habitability surveys were constantly monitored by players at the ICP and in the Control Room to ensure safety.

Objective 12: Perform recovery activities in accordance with approved procedures.

This Objective was MET, indicating that player performance met expectations. Players developed an appropriate Recovery Plan Outline and ensured that all applicable termination criteria were met before recommending termination of the emergency.

Objective 13: Demonstrate the adequacy and functionality of facilities and equipment to support emergency operations.

This Objective was MET, indicating that facilities and equipment were adequate and met expectations. A Finding was noted in the inaudibility of some of the PA speakers in and around the Northside of 235-F.

Criterion 13.01: Facilities and equipment are adequate, functional and safe to operate. (Critical)

Finding:

Some of the Public Address (PA) Speakers were muffled or inaudible in and around the North side of 235-F. A high priority work-request was put in after the exercise to troubleshoot and/or repair the PA as soon as possible. The PA system was repaired immediately. The speakers were tested and found to be audible in those locations.

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Objective 14: Demonstrate the ability of the Controller/Evaluator organization to effectively conduct an exercise.

This Objective was MET. A scenario was developed based on hazards assessments, the exercise was controlled safely, and the performance was evaluated appropriately. Noteworthy comments were made in the challenges of the new scenario and that it had never been used by the facility. Several Improvement items were identified.

Criterion 14.01: Develop a scenario that is based on hazards assessment documents, that is realistic, and minimizes the use of generic, non-specific simulations. (Major)

Strength:

The scenario was based on hazards assessment documents. It was challenging and added much realism to the situation presented.

Criterion 14.02: Effectively control a drill/exercise in accordance with the rules of conduct and in a manner that maximizes free-play by participants and ensures that sufficient opportunity is provided for all objectives to be met. (Major)

Good Practice:

Controllers did a good job of providing verbal visualizations to the players at the incident scene.

Improvement Item:

Two actual events requiring medical transport occurred just prior to the initiation of the exercise in F Area. As a result, a second ambulance was not available to support the exercise. A contingency plan was implemented which involved placing a training gurney in building 235-F for the entry team and using the available ambulance for clean transport of patients. The gurney did not include a patient contamination kit, such as the one that would have been found on an ambulance. This drill artificiality would not have occurred if the second ambulance was available. The Drill Lead needs to ensure the proper equipment and supplies are in place to allow sufficient opportunity for demonstration.

Criterion 14.03: Conduct the drill/exercise safely. (Major)

Improvement Items:

1. The role-player did an excellent job of playing the injured person. However, when he simulated being unresponsive, the controllers should have switched him out for a mannequin. This would have decreased the potential for anyone to step on or trip over him.
2. Although the area was rolled backed, the radiological postings on the outer doors of the building were not changed and still indicated that the

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area was posted as an RBA. Personnel did not cross an actual RBA boundary to the outside. However, this was an oversight on the part of the Drill Lead and RPD controllers.

3. A controller at the incident scene exited the rolled back clean area (papered area) and into an RBA. He then proceeded back onto the clean area; potentially contaminating the papered area. He was stopped by RPD that were stationed at the area for this purpose. The controller was subsequently surveyed and released. The potentially contaminated area was surveyed as well and extended out as part of the RBA.

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ATTACHMENT 2 – Corrective Actions

- 1) Develop a Lessons Learned document from the 235-F Exercise and disseminate to affected F-Area personnel.
 - a) Deliverable includes a copy of the rosters documenting completion. Assigned to Batersa Mitchem.

- 2) Issue a Work Request to troubleshoot and/or repair PA speakers in and around the Northside of Building 235-F.
 - a) **ACTION COMPLETE** – A high priority work-request was put in after the exercise to troubleshoot and/or repair the PA as soon as possible. The PA system was repaired immediately. The speakers were tested and found to be audible in those locations.
 - b) Deliverable includes a copy of the Work Requisition. Assigned to Wilmot Gilland.