



**Department of Energy**  
Savannah River Operations Office  
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Aiken, South Carolina 29802

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DNFSB SAFETY BOARD

DEC 22 2015

The Honorable Joyce L. Connery  
Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue, NW, Suite 700  
Washington, DC 20004

Dear Chairman Connery:

**SUBJECT:** Transmittal of Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2012-1 Implementation Plan (IP) Annual Report for Fiscal Year 2015

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 1-10: 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.

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".

*JRC*  
Jack R. Craig  
Savannah River Site Manager

NMPD-16-0017

Honorable Connery

2

DEC 22 2015

Enclosure:

Fiscal Year 2015 Annual Report  
for the United States Department  
of Energy IP for DNFSB  
Recommendation 2012-1  
12/31/2015

Cc w/encl:

Monica Regalbuto, EM-1  
Ken Picha, EM-20  
Matthew Moury, EM 40  
Todd Lapointe, EM 41  
Mari-Josette Campagnone, HS-1.1

Enclosure: Recommendation,  
Subject: FY 2015 Annual Report for  
US DOE IP for DNFSB  
Recommendation 2012- 12/31/2015,  
Dated: **DEC 2 2 2015**

**Fiscal Year 2015  
Annual Report  
for the  
United States Department of Energy  
Implementation Plan  
for  
Defense Nuclear Facilities Safety Board  
Recommendation 2012-1**



***Savannah River Site Building 235-F Safety***

**Washington, DC 20585**

**December 31, 2015**



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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 1-10: Update planning schedule to reflect Plutonium Fuel Form (PuFF) cells 1 through 5 deactivation actions for the upcoming 12 months. (See Attachment 1)

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. (See Attachment 2)

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.

In Fiscal Year (FY) 2015, the Department of Energy Savannah River (DOE-SR) continued momentum from FY 2014. Field work on two key 2012-1 commitments regarding the testing of the Fire Detection and Alarm System (FDAS) (Action 2c-3) and the completion of the Readiness Assessment for initiation of deactivation activities in PuFF cells 6-9 and implement Deactivation Basis for Interim Operation (BIO) (Action 1-4) were completed and completion reported to the Board. Substantial progress was made on restoring cell infrastructure in PuFF cells 6-9.

The Department of Energy entered FY 2015 under a Continuing Resolution (CR), which again constrained the funding available for DOE-SR projects, including 235-F Risk Reduction. Despite this, DOE-SR balanced risks and priorities and continued to allocate funds for the Project. Funding was provided for technical and planning work to support beginning Material at Risk (MAR) removal, for implementing the Deactivation BIO and for accomplishing tangible field work.

Attachment 3 contains a table that lists specific IP actions completed in prior FYs, actions completed in FY 2015, those planned to be completed in FY 2016, and the projected completion dates for subsequent out-year IP actions.



## **FISCAL YEAR 2015 PROGRESS**

DOE-SR made significant progress on preparing for the initiation of deactivation activities, including substantial field progress. The key accomplishments in FY 2015 are as follows.

FDAS Upgrade. The fire detection and alarm system was installed in FY14 however four items required resolution before the system could be placed in service. These were:

1. Stray voltage in cabling connecting buildings 292-2 F and 235 F.
2. Stray voltage in heat detector cabling in the 235-F cable trays.
3. Fire alarm horn sound levels failing to meet or exceed ambient sound levels by 15 dbA within two rooms.
4. Fire panel batteries failing a load test.

These items were resolved and the functionality of the upgraded FDAS system was verified, before putting the upgraded system into service. This completed in January 2015.

Use of the Mock-up. The mock-up has been fully developed to support a wide range of activities. These include training, conduct of Job Performance Measures (JPMs), process and procedure validation, tool testing and development, logistics and ergonomics planning, equipment selection and check-out, and a range of similar activities. Process development for manipulator replacement has been the major focus for the mock-up. The mock-up environment now includes fully functioning manipulators (both Model L and Model G), supplied air, simulated ventilation and air flow, a containment hut built to the actual specifications expected to be needed, and a variety of task-specific containment enclosures.

Deactivation BIO Implementation. DOE-SR completed the Readiness Assessment (RA) for the initiation of deactivation activities in PuFF cells 6-9 which allowed the facility to implement the revised BIO in July. The RA identified eight pre-start findings, seven post-start findings and 13 opportunities for improvement. All pre-start items were closed and validated by DOE-SR and the Deactivation BIO was implemented on August 25.

Restore Cell Infrastructure. Planning and approvals were completed to support the removal of the outer shield windows on cells 6-9. Water was drained from shield window 8.

Enhanced Characterization of Cells 6-9. Savannah River National Laboratory (SRNL) planned to characterize the interior of the PuFF cells by performing assays through the remaining inner windows following outer window removal rather than inserting detectors into the cells. To assist in the measurements, the project purchased a Gamma Ray Imager that will be utilized to help identify where the radioactive material holdup is located in the cells. The equipment was purchased and tested in the lab.

## **PLANNED PROGRESS FOR FISCAL YEAR 2016**

The key specific activities that will be undertaken in FY 2016, based on current funding, are listed below.

1. Complete Cell Infrastructure Restoration. This includes establishing visibility into the cells by removing outer cell windows, cleaning the outer surface of the inner cell windows, and installing a protective mesh over the window area to protect it from impact during future evolutions such as manipulator replacement. It also includes establishing lighting (exterior to the cells) and installing gloves as needed.
2. Complete Enhanced Characterization Measurements for cells 6-9. This involves Savannah River National Laboratory (SRNL) taking its final set of measurements (in-cell measures) to gather the data needed for a final report on Non-Destructive Assay (NDA) results in cells 6-9. The final report is expected in January 2016
3. Begin field repair or replacement of manipulators in cells 6-9 as needed.
4. Mechanically and electrically isolate cells 6-9. This ensures that, to the extent practical, all electrical or mechanical lines penetrating the cells have been isolated.
5. Remove MAR from cells 6-9. Waste will be removed and packaged for disposal. The Risk Reduction team intends to deploy a vacuum designed by SRNL to remove fine particles. Additional assays will be conducted in FY 17 after MAR removal and results compared to Enhanced Characterization results before decontamination activities to determine the effectiveness of removal methods.

## **ANNUAL UPDATE ON DRILL PERFORMANCE**

### **Action 3-4, Drill Conduct and Evaluation**

On May 5, 2015, the Savannah River Site (SRS) conducted the FY 2015 Site Evaluated Exercise, which also served as the required deliverable for Action 3-4 identified in the Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2012-1, "Savannah River Site Building 235-F Safety." Participants included the SRS Emergency Response Organization (ERO), Savannah River Remediation (SRR) and Centerra LLC, Savannah River Site (Centerra-SRS).

The drill scenario was based on a routine fuel truck delivery to 235-F. The driver lost control of the truck which impacted the building, causing a radioactive material release. Building ventilation was compromised by the impact. Building 235-F was evacuated and protective actions were implemented for the remainder of F-Area. The event was classified as a Site Area Emergency, resulting in the activation of the site's Emergency Operations Center. The Emergency Response Organization (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 Emergency Response Organization (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. Improvement opportunities were identified in the in the areas of:

- Radiological control practices
- Communication of consequence assessment information
- Adequacy of facilities and equipment
- Exercise conduct and control

Attachment 4 is the After Action Report (Action 3-4 Deliverable) detailing drill conduct including lessons learned. Corrective actions to address the areas for improvement are tracked in the Site Tracking, Analysis and Reporting system (STAR).

#### **Radiological Control Practices**

The initial Command Post was set up too close to the incident. Upon arrival, the Battalion Chief assumed command from the Fire Station Captain and moved the Incident Command Post back. The second Command Post location was still too close to the hazards presented by 235-F.

Lesson Learned: The historical data of the 235-F facility should have prompted a better assessment of the potential dangerous radiological concern existing at the facility.

#### **Communication of Consequence Assessment Information**

The TSR Communicator and other positions struggled with the setup of the OPNET 1 Conference Net. The EM Advisor had to assist to get all parties online.

Lesson Learned: Accurate and timely communication is vital to accident response and mitigation.

#### **Adequacy of Facilities and Equipment**

The PA was inaudible or hard to understand on the northwest end of 772-1F

Lesson Learned: PA is required to be audible in occupied areas of the facility to ensure personnel are aware of protective actions that may be required.

During the conference calls in the TSR, static noise was observed and reported. A functional test of the newly installed ear pieces in the TSR should be performed to troubleshoot the problem.

Lessons Learned: Testing of new equipment should be performed prior to placing in service to ensure equipment meets the required standards.



### **Exercise Conduct and Control**

Field props need to be improved to better simulate an actual event. Controllers should provide better visualization to the players at the incident scene.

Lesson Learned: Props should be effective in creating an environment as close to an actual event as possible. Where that is not possible controllers should provide information as to what the players would be seeing if it were a real event.

MOX Services and the Waste Solidification Facility (WSB) participated in a drill conducted on April 15, 2015 to demonstrate their ability to properly and promptly implement protective actions. MOX Service participation was assessed and their objectives were met.

235-F Schedule FY2016-FY2017

Attachment 1

	FY16												FY17														
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Restore cell infrastructure cells 6-9 (Examples could include removing windows, installing gloves, restore lighting or replacing manipulators if needed) IP deliverable 1-3	Yellow	Yellow*		Green	Green																						
Annual Report to DNFSB																											
Update Planning for next 12 months IP deliverables 1-10 and 1-12 (Likely will be combined with the annual reports)							Yellow*													Yellow*							
Enhanced characterization (Measurement to better locate and quantify the residual Pu-238 to aid in planning and execution of deactivation)	Yellow	Yellow	Yellow	Green	Green	Yellow																					
Electrical/mechanical isolation cells 6-9 (Supports the control of hazardous energy within the cells)	Yellow	Yellow	Yellow	Green	Green	Green																					
Waste Removal/Decon 6-9 (Methods could include vacuuming,strippable coatings, tools to remove equipment)						Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green													
Recharacterize Cells 6-9 (Determine effectiveness of removal/decon activities)																Green	Green	Yellow									
Eng. Design cells 3-5		Yellow	Yellow																		Yellow						
Update waste handling program. Revise procedures to support cells 3-5 (Apply lessons learned from cells 6-9)																Yellow	Green	Green									
Perform Readiness Assessments for cells 3-5: Contractor and DOE (If Required)																			Yellow	Green	Yellow	Green					
Restore cell infrastructure cells 3-5																									Green	Green	Green
Electrical/Mechanical isolation cells 3-5																								Yellow	Yellow	Yellow	Yellow

Schedule Date: 11/30/2015

- Planning activities
- Field work
- Annual Report Due Date
- Deliverable Date per IP

**Attachment 2**

**2016 F-Area Complex EP Drill Schedule**

**Emergency Preparedness Coordinator: Batersa Mitchem  
Facility Point of Contact: Amanda Barnes**

	<b>APRIL</b>
<b>Date</b>	<b>04/20/16</b>
<b>Type</b>	<b>235-F Radiological Release with Protective Actions</b>  <b>(Evaluated)</b>  <b>(MOX and SRR will be invited to participate)</b>

**APPROVAL:**

Amanda Barnes  
**F-Area Complex Operations Manager**

  
**Signature**

12/10/15  
**Date**



**Attachment 3**

**Table of IP Actions Completed and Planned**

<b>Action</b>	<b><i>IP Actions Complete In Prior Fiscal Years</i></b>	<b><i>Completion Date</i></b>
2c-1	Complete evaluation of existing FDAS for functionality and maintainability.	10/30/12
3-1	Develop a Calendar Year (CY) 2013 drill schedule for F-Area detailing planned frill dates involving Building 235-F including participation by all facilities and construction sites surrounding Building 235-F.	1/31/13
2a-1	Development of Building 235-F specific Transient Combustible Control Program.	2/15/13
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
2a-2	Evaluate fixed combustibles and define the fixed combustible removal, encapsulation, or isolation scope.	3/4/13
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
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
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.	4/1/13
1-1	Complete project deactivation planning for PuFF Cells 1-9.	5/30/13
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.	8/30/13
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.	10/31/13
1-5	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	12/31/13
3-4	Execute at least one formally assessed drill each year...	5/14/14
2a-3	Complete removal, encapsulation or isolation of fixed combustibles scope.	9/24/14
2b-2	Complete electrical de-energization scope, including equipment removal, as practical	9/24/14

<b>Action</b>	<b>IP Actions Completed In Fiscal Year 2015</b>	<b>Completion Date</b>
1-6	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	12/31/14
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. <i>Note that this is required to be submitted in December of each year under the provisions of the IP.</i>	12/31/14
2c-3	Complete installation and acceptance testing of the PuFF FDAS for S&M and deactivation phases.	1/30/15
1-4	Complete a Readiness Assessment (RA) for initiation of deactivation activities in PuFF cells 6 through 9 and implement the Deactivation BIO.	6/30/15
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.	8/14/15
<b>Action</b>	<b>IP Actions Planned For Completion In Fiscal Year 2016</b>	<b>Planned Date</b>
1-3	Restore cell infrastructure in PuFF cells 6 through 9.	12/31/15
1-10	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	12/31/15
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.	12/31/15
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.	4/20/16
<b>Action</b>	<b>"Out-Year" IP Actions, Completion Projections</b>	<b>Projected Due Date</b>
1-12	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	12/31/16
1-13	Update planning schedule to reflect PuFF cells 1 through 5 deactivation actions for the upcoming 12 months.	12/31/17
1-7	Revise the HA, and if necessary the Building 235-F BIO to include deactivation activities in PuFF cell 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
1-11	Restore cell infrastructure in PuFF cells 1 through 5.	11/30/18

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
1-14	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


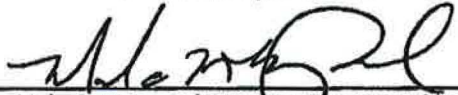
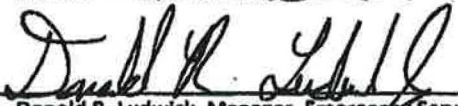
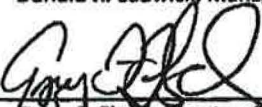

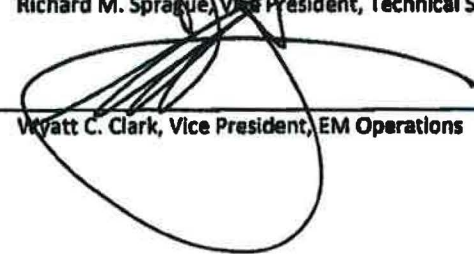




# Building 235-F Assessed Drill After-Action Report Revision 1

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

Approved by:

 _____ William R. Tadlock, Facility Manager, F-Area Complex	<u>6/23/15</u> Date
 _____ Melanie M. Lepard, Manager, Emergency Management	<u>6/23/15</u> Date
 _____ Donald R. Ludwick, Manager, Emergency Services	<u>6/23/15</u> Date
 _____ Greg R. Floyd, Director, SS&ES	<u>6/23/15</u> Date
 _____ Richard M. Sprague, Vice President, Technical Services	<u>6/23/2015</u> Date
 _____ Wyatt C. Clark, Vice President, EM Operations	<u>6/29/2015</u> Date

## 2015 Building 235-F Exercise After-Action Report

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### REVISION LOG

Pages Affected	Description of Revision
3	Note: Modified wording.
18	Attachment 3: Corrected typo in Attachment number.

# 2015 Building 235-F Exercise After-Action Report

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## EXECUTIVE SUMMARY

As outlined in the Implementation Plan for Defense Nuclear Facilities Safety Board 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 adequately protect workers in adjacent facilities and construction sites. This report serves as the deliverable for this action.

On May 5, 2015 an exercise was conducted that involved an external event, impacting Building 235-F, resulting in an unfiltered radioactive release. The intent of this exercise was to demonstrate the ability of F-Area Emergency Response Organization to adequately protect workers in all facilities and construction sites surrounding 235-F. Savannah River Remediation (SRR), Centerra LLC, Savannah River Site (Centerra-SRS) and Savannah River Nuclear Solutions (SRNS) were participants in this exercise. (Unless needed otherwise for clarification, "SRS" will be used throughout the remainder of this document when referencing SRNS and SRR exercise participants.)

SRS Contractor 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. Participants met the objectives as outlined in the scenario manual for a satisfactory exercise. Positives were noted in the prompt implementation of protective actions by F-Area personnel and the orderly command structure of the F-Area Complex's Control Room. However, the exercise identified several opportunities for improvement, weaknesses and a deficiency within the Savannah River Site Fire Department (SRSFD). Most notably, Savannah River Site Fire Department (SRSFD) did not fully assess the potentially dangerous radiological hazards associated with Building 235-F and some fire response personnel were in the Hot Zone without the proper Personnel Protective Equipment (PPE). Although the Radiological Protection Department (RPD) responded adequately to get the affected fire response personnel out of the Hot Zone, RPD should have recognized more quickly that the fire response personnel were in a potentially airborne radiological area and were possibly contaminated had the initial Fire Department Incident Commander (FDIC) received an immediate turnover from facility personnel prior to entering the perimeter area of Building 235-F the potential exposure risks may have been prevented. 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," corrective actions for these issues are included in this report as Attachment 3. The remaining items will be addressed by promulgating this report as a Lessons Learned document to appropriate personnel. These actions will be reviewed and revised, if necessary, assigned to the appropriate personnel for action, and tracked to closure in the Site Tracking, Analysis, and Reporting (STAR) database.



## 2015 Building 235-F Exercise After-Action Report

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The overall performance of F-Area's Emergency Response Organization, 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, SRS will continue to conduct drills/exercises involving radiological releases from Building 235-F at least annually.

**Note:** MOX Services and the Waste Solidification Facility (WSB) participated in a drill conducted on April 15, 2015 to demonstrate their ability to properly and promptly implement protective actions. MOX Services participation was assessed and their objectives were met. The MOX Services drill report is included as Attachment 2.

### SCENARIO SUMMARY

A fuel truck carrying both diesel and gasoline was en route to 235-F to refuel the 235-F and 292-2F diesel fuel tanks. The driver lost control of the fuel truck and it crashed into the west side of 235-F at the West Man Trap penetrating through the double doors partially into the 235-F facility. Structural damage occurred to 235-F at the West Man Trap location as well as to the concrete plenum that was located on the west vertical wall of 235-F. The ventilation plenum was compromised causing a vacuum alarm when the concrete plenum was damaged. The truck driver was wearing his seatbelt and escaped the accident with minor injuries.

An F-Area Complex operator was en route to meet the fuel truck driver when he observed the accident and the fuel truck igniting into flames. The fire and smoke were clearly visible to the operator and the fuel truck driver. The F-Area Complex operator notified the Shift Operations Manager (SOM) of the accident and truck fire; injured victim; and structural damage to the building that had occurred.

The SOM notified the Savannah River Site Operations Center (SRSOC) of the incident and requested SRSFD fire and Emergency Medical Services (EMS) assets. In addition, the SOM sent a first aid responder to care for the injured person.

Two RPD personnel were initiating source checks for the 292-2F stack monitor when the event occurred. A Radiological Control Inspector (RCI) headed to the 292-2F facility observed the accident and notified the RCI entering into 235-F and the RPD First Line Manager (FLM) that an accident had occurred and the truck was on fire. The RCI assumed response duties.

An announcement was made for personnel to Evacuate and stay clear of 235-F and the perimeter area. Then a "Remain Indoors" Public Address (PA) announcement was made, informing personnel in F-Area about the emergency. The SOM informed the Emergency Duty Officer (EDO) of the protective action message.

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-1.1, "External Event Impacting 235-F, Unfiltered Release." The verbal report of the truck impacting the building indicated an external event causing structural damage to the building. Receipt of the vacuum alarm

## 2015 Building 235-F Exercise After-Action Report

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indicated an unfiltered release, satisfying the conditions of the EAL. Upon classification, the SOM assumed the role of Area Emergency Coordinator (AEC).

The First Aid responder provided care for the injured truck driver and provided turnover to SRSFD EMS personnel. RPD members surveyed the driver for contamination and found no contamination. EMS provided first aid treatment for minor injuries.

The SRSFD extinguished the truck fire. Runoff was contained to the immediate area; no runoff made its way to any storm drains. RPD surveyed the SRSFD prior to exiting the fire area and found contamination on protective clothing (helmets, coats, pants, and/or boots). PPE was removed prior to exit. After bunker gear removal, firefighters were determined "clean" and released to SRSFD management.

The SRS Emergency Operations Center (EOC) was activated. Upon arrival in 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 emergency.

Once the damage to the West end of 235-F was adequately covered, the hazardous mixed waste runoff was contained, and the E5 Exhaust Fans were verified to be operating, the FDIC and the AEC reported to the TSR 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 Managers (Role-played).

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



## 2015 Building 235-F Exercise After-Action Report

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### EVALUATION SUMMARY

The overall rating for this exercise was "MET".

Detailed Controller/Evaluator SCD-4 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, Weaknesses or Deficiencies 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

# 2015 Building 235-F Exercise After-Action Report

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## **Attachment 1 – Detailed Controller/Evaluator 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 Practices

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

### **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, including accounting for personnel directed to evacuate Building 235-F.

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

##### Good Practices

1. The appropriate protective actions of Evacuation for 235-F perimeter then sequentially Remain Indoors were implemented for all of F-Area including SRR promptly upon assessing the event.

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

##### Good Practices

1. All F-Area Complex and F-Tank Farm personnel implemented protective actions and adhered to PA instructions as directed to do so.

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### **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 actions to minimize or stop hazardous material releases in progress. Issues were noted relative to the Fire Department's response, turnover with the facility, and the location of the Incident Command Post. When taken in the larger context of all mitigative actions, these issues do not indicate an overall inability to effectively mitigate the emergency.

#### **Criterion 3.01: The facility ERO mitigates the emergency effectively. (Major).**

##### Good Practices

1. The initial notification from the operator to the Control Room was good with clear and concise event information.
2. The SOM/AEC quickly assessed the events and alarms as given and demonstrated good situational awareness and a strong readiness to respond.

##### Improvement Item

1. The operator/ISC at the scene self-identified he should have moved upwind quicker and been more attentive to the injured victim while he was notifying the control room.

##### Weakness

1. The facility turnover provided to the arriving Fire Department units was inadequate. Additionally, the arriving Fire Department personnel assumed command of the incident without receiving an adequate turnover from the facility. A more determined and deliberate approach by both parties may have prevented the FD from going too close to the potential 235-F hazards.

#### **Criterion 3.02: The site ERO mitigates site-level emergency situations effectively and provides adequate support to the facility to assist in mitigating facility-level emergencies. (Major).**

##### Good Practice

1. The TSR staff spent some time assessing facility mitigation strategy and they wanted to reduce protective actions once they were sure the scene was stable and secured. The Technical Support Coordinator (TSC) requested status of re-entry control, visuals of scene damage, Roof vacuum at gage 2981 and status of the tarp application. The EM Advisor stepped in and helped the team focus on release stoppage and scene conditions to verify event stability.

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

#### Improvement Items

1. The initial Command Post was set up too close to the incident. Upon arrival, the Battalion Chief assumed command from the Fire Station Captain and moved the Incident Command Post back, but the second Command Post location was still too close to the hazards presented by 235-F.
2. The FD did not consider the potential for the water runoff from firefighting operations to be contaminated.

#### Weakness

1. The historical data of the 235-F facility should have prompted a better assessment of the potentially dangerous radiological concern existing at the facility.

#### Deficiency

1. Some fire response personnel were in the hot zone without the proper PPE (i.e., respiratory protection and/or bunker gear) which would have resulted in potential exposure hazards.

### **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. A Weakness was noted in that RPD did not immediately recognize that some personnel were not wearing appropriate PPE.

### **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. Radiological conditions were monitored through use of appropriate radiological control practices. Habitability surveys for the ICP and the CR were at frequent intervals. RPD Inspectors established an area for contaminated EMT/Firefighters to dress down and monitored the contamination and air activity routinely in this area.
2. The RPD inspectors did a good job of directing and assisting the FD personnel in doffing their bunker gear. Good technique of frequent glove changes, especially during personnel surveying.



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**Criterion 4.03: Demonstrate command and control of facility RPD and Industrial Hygiene personnel and activities.**

### Good Practices

1. RPD inspectors at the scene did a good job of immediately surveying themselves as well as the ISC and victim. RPD also did a good job ensuring the victim was ok.
2. RPD Inspector did a good job stopping FD personnel from crossing into the hot/warm/cold zones without PPE.

### Weakness

1. RPD should have recognized some of fire response personnel were in a potentially airborne radiological area without the proper PPE and/or possibly contaminated sooner. However when recognized, RPD acted promptly to get the affected personnel out of the hot zone and to the nearest DECON Station (simulated).

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

This MET Objective was MET, indicating that player performance met expectations. Events in progress were evaluated against established criteria to appropriately categorize and classify the emergency accurately in a timely manner.

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

### Good Practice

1. The event was correctly classified as a Site Area Emergency approximately 8 minutes after the 4-Lo Vacuum Alarm. The classification was made by the AEC in conjunction with the EDO. The EDO Information Form completed and faxed to SRSOC. The Incident Command Post (ICP) was promptly notified of the declaration to encourage situational awareness (noted improvement from 2014).

**Criterion 5.02: Categorization/classification is continuously reassessed to determine upgrade, downgrade or termination, as appropriate. (Major)**

### Good Practice

1. The Engineering Advisor did a good job of explaining event consequences to the TSR staff. He validated the Emergency Action Level as a SAE-1.1; reviewed details of the implemented protective actions; and was knowledgeable of Pu-238 potential consequences, building ventilation configuration. The Engineer Advisor performed a quality evaluation of the reported building damage. He briefed the staff on the Pu-238 characteristics

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and determined to stay with the default source term based on the location of the release.

**Objective 6: Activate 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.

**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. Once the event was classified as an SAE-1.1 and ERO pager code 01-2-1-3 was provided, the Operations Specialist was requested to perform the actions he would need to take as a result of receiving the pager activation code. The Operations Specialist contacted the F-Area Complex Control Room, asked for a safe route out of the area and communicated the results to the TSR staff. (TSR staff was pre-staged for the exercise.)
3. The TSR staff was timely in validating all of the pre-tasks identified on the TSR board. In addition, the TSR staff did a good job of completing the termination criteria and discussing the results with the Command Room (ED role-player). This ultimately led to approval to initiate recovery plan outline development.

**Criterion 6.02: Demonstrate command and control.**

**Good Practices**

1. The SOM/AEC displayed strong command and control by delegating tasks appropriately, allowing him to focus on overall management of the facility, area and the emergency. Additionally, the AEC conducted very good briefings, to include notifying the personnel prior to the briefing by telling them to stop and listen to the information, giving each person a chance to provide feedback and formally concluding the briefings.
2. The TSC established good command & control, shared initial information received from a call from the facility and set priorities for the team. He was calm and deliberate in his approach with briefings and interfacing with others. He continuously interfaced with the appropriate team members to maintain the big picture. In addition, the EM Advisor asked good detailed

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questions with the team to ensure mitigation approaches were validating scene conditions.

### Weakness

1. The SRSFD Station Captain did not demonstrate good command and control. Supporting examples include not fully considering the hazards associated with the facility, not ensuring responders were wearing the appropriate PPE prior to entering the event area, and establishing the initial Incident Command Post too close to the point of release.

### **Criterion 6.03: Demonstrate effective communications.**

#### Good Practices

1. The DOE Operations Oversight Representative position did well collecting information from his DOE-Facility Representative and ensuring information was consistent with the team. In addition, the TSC ensured he was involved in the briefings and discussions.
2. The TSC conducted several good detailed briefings and requested each position to provide updates on things they were involved in. Several good discussions occurred to determine the team's approach to event stability and review of the termination criteria. The TSC and Engineering provided good updates and follow-up on questions asked by the Emergency Director Role-player.

#### Improvement Item

1. The TSR Communicator and other positions struggled some with setup of the OPNET 1 Conference Net. The Communicator properly dialed into the conference, got the Control Room on the net but did not press the conference button the second time to allow team to hear the facility information. The EM Advisor discovered this and helped correct and get all parties on line.
2. The status board in the control room manually updated by an ERO member showed very good handwriting technique and captured all details of the event but did not include the times. Including the times by the details as they occurred would have created a better timeline of events.

### **Criterion 6.05: Demonstrate effective use of procedures.**

#### Good Practices

1. The facility ERO utilized their checklists and ensured they were completed. The Analytical FLM did a good job of ensuring the appropriate procedures were in use and filled out to completion by the control room personnel. She also assisted the AEC in making certain all actions were completed in his checklist.

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### Improvement Items

1. The Engineering Staff brought copies of the F Area Complex L2-1-EPIP-001, EAL Classification procedure rather than utilizing the document control copies (4) available in the TSR.
2. An engineering review of documents in the TSR Technical Library for F-Area Complex including 235-F (Bios, DSAs, etc.) revealed updates are needed based on their knowledge of revision changes.

### **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 medical assistance to the level of injury.

### Good Practices

1. The First Aid Responder arrived with the appropriate PPE, conducted a 90-second survey assessing the victim and provided medical treatment within their level of training. The FA responder also did a good job keeping the victim calm and gathering past/present medical history. A thorough briefing was provided to the EMS once on scene.
2. Fire Department EMS personnel demonstrated proper assessment of the victim after receiving turnover from the First Aid Responder and RPD. The paramedics did a good job in describing treatment and preparation techniques for transport to Site Medical.

### **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 in a timely manner. No offsite notifications were made during this exercise.

### **Criterion 8.01: Perform onsite notifications. (Critical)**

#### Good Practice

1. Timely, accurate, clear and concise PA announcements were made in F-Area. H-Tank Farm Control Room was promptly notified of the event and protective actions issued for F-Area to include F-Tank Farm. Correct event notifications were made to facility management, DOE and DNFSB per operations notification procedure.



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**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 and offsite.

**Objective 12: Perform recovery activities 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 and offsite.

**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. Improvement items were noted regarding the ability to hear and understand the PA announcements in a one area and static in the headsets at the TSR.

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

Improvement Items

1. The PA was inaudible or hard to understand on the northwest end of 772-1F.
2. During the conference calls in the TSR, static noise was observed and reported. A functional test of the newly installed ear pieces in the TSR should be performed to troubleshoot the problem.

**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 drill was controlled safely, and performance was evaluated appropriately. However, opportunities for improvement were noted.

**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)**

Improvement Items

1. The Control Room personnel told the TSR Communicator that the facility exercise was terminated. The TSR Controller directed exercise activities to continue.
2. Although field props at the incident scene area have evolved, improvement is still needed to better depict an actual event in progress.

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3. The controllers should have provided better verbal visualizations to the players at the incident scene.
4. Better coordination should be developed by the controllers when players are taken out of play while the exercise is still in progress to lessen confusion amongst the players.
5. Direct interaction between an Evaluator and Players was observed at the Incident Scene area. This conduct was neither addressed nor stopped by the Controllers and Observers witnessing the contact.

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## Attachment 2 – MOX Services Drill Report

### Summary:

#### **TORNADO DRILL:**

Date – 15 Apr 2015

Time – 1134

The drill was initiated with a pre-announcement that a Drill was to be held in F-Area for the WSB and MOX. At approximately 1131 a Tornado Warning was announced and personnel were to be prepared for changing conditions. At 1134, F-Area Control Room announced the Tornado Alert and all personnel were to “Shelter.” At 1140 the TAC was cleared and sheltered. At 1141 the BAD was sheltered. At 1142 the MAC, EEC, CAC and BTS were all sheltered. At 1145 the PAF was sheltered. The Drill Coordinator was informed of all personnel sheltered. At 1150 the F-Area Control Room was informed that all MOX activities had been completed and all personnel sheltered. At 1156 the Drill was terminated. Generally the drill was a reasonable success but there are identified issues that need to be resolved. Personnel responded as expected and orderly entered the MFFF, BAD, BTS and the PAF Shelters. The drill was moved from noon to 1130 due to advancing weather conditions that would place personnel in a rain shower that was imminent.

### Concerns:

#### Administration Building (BAD):

The PA system was spotty in some areas

Three individuals returning from lunch were not aware of the drill but responded once they heard the announcement (excellent response)

#### MOX Administration Complex (MAC):

No identified problems but one vehicle was observed returning to the building near the end of the drill which we assumed to be someone returning from lunch

#### Construction Administration Complex (CAC):

Approximately 15-20 personnel sheltered at the pre-drill announcement

Two men were directed more than once to take shelter but they did move following the second prod from the Fire Wardens

Three personnel returned from lunch and immediately went to the shelter (excellent response)

#### Technical Support Building (BTS):

There are only Two Fire Wardens who did a super job of sweeping the building and moving personnel to shelter (excellent work with minimum personnel)

#### Equipment Engineering Complex (EEC):

No identified problems

#### Process Assembly Facility (PAF):

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One Laydown area employee arrived late at the shelter due to walking distance, another was determined as missing and did not respond. They were in radio contact with their supervisor. The PA system in the shelter does not work, requires repair.

Apparently personnel left the PAF Parking Lot in a government vehicle just as the announcements were made (there are conflicting reports of exactly when the vehicle left, one states after the announcements and one states as the announcements were being made)

Personnel need to be made aware that they cannot sit on items stored there.

### Mixed Oxide Fuel Fabrication (MFFF):

Personnel working on the upper levels transited to the lower levels and were informed that this was not necessary

### Secured Warehouse:

A lack of permanent Fire Wardens cause some personnel to not immediately shelter and they delayed movement but finally did shelter

### Craft Building:

Like the Secured Warehouse there are no permanent Fire Wardens to sweep the building

### General Concern:

Presently we are relegated to using personal cell phones for communications between the Chief Fire Wardens / Drill Controllers for communications. This puts a big onus on them to maintain their phones and their expenses. We either need dedicated radios for EP Drills or cell phones for the major players.

### Recommendations:

1. Send out a communications requesting management to assign more Fire Wardens
2. Resolve the issue with personnel hiding during the drill, obtain names and provide to supervision
3. Investigate the PA system in the BAD (NNSA Area) and PAF Shelter and make repairs as needed
4. Determine the personnel who left the PAF area in the government vehicle
5. When there are sufficient Fire Wardens in the CAC, assign some to sweep the Craft Building and Secured Warehouse
6. Investigate having MOX cell phones provided for the EP and Chief Fire Wardens use.

### Actions in Progress:

- 1 Phones have been requested from IT
- 2 Following the drill additional personnel have volunteered for Fire wardens increasing the available man-power

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- 3 Presently attempting to determine the names of those who failed to respond to the drill announcements
- 4 Wise is in the process of verifying the problems in the BAD
- 5 The PAF Speakers are out due to the recent lighting strike that blew the system and new ones are on order for replacement.



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### Attachment 3 –Corrective Actions

- 1) Brief all SRSFD personnel on the radiological characteristics and hazards associated with Plutonium-238 (Building 235-F radiological concerns).
  - a) Deliverables include a copy of the briefing package and completed Class Implementation Rosters documenting completion. Assigned to Rob Still. Due Date 9/30/2015
- 2) Review and revise, as necessary, Fire Department preplans for inclusion of special hazards or needs for specific command post location outside of the facility. Assigned to Rob Still. Due Date 9/30/2015
- 3) Brief all F-Area RPD personnel on situational awareness during radiological exposure and contamination concerns while working with other response organizations, i.e. SRSFD.
  - a) Deliverables include a copy of the briefing package and completed Class Implementation Rosters documenting completion. Assigned to Terry Pifer. Due Date 9/30/2015
- 4) Troubleshoot, repair and/or replace telephone headsets in the Technical Support Room that have static noise. Assigned to Michael Davenport. Due Date 9/30/2015
- 5) Develop a Lessons Learned document from the 235-F Exercise and disseminate to affected F-Area personnel.
  - a) Deliverables include copy of the briefing package and completed Class Implementation Rosters documenting completion. Assigned to Batersa Mitchem. Due Date 9/30/2015

