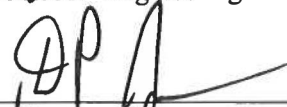


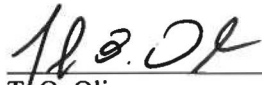
## Deactivation Project Final Report Building 235-F, Metallurgical Building

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### History of Revisions

<b>Revision</b>	<b>Date</b>	<b>Revised Section</b>	<b>Change</b>
0	2/27/23	All	Initial Issue

## Acronym List

ABL	Actinide Billet Line
ACM	Asbestos Containing Material
AHA	Assisted Hazard Analysis
ALARA	As Low As Reasonably Achievable
AMIS	Asset Management Information System
ARA	Airborne Radioactivity Area
BCP	Baseline Change Package
BIO	Basis for Interim Operation
BLDG	Building
C&D	Construction and Demolition
CA	Contamination Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DCP	Design Change Package
DID/ITS	Defense-in-Depth/Important-to-Safety
DOE-SR	Department of Energy, Savannah River Operations Office
DPP	Deactivation Project Plan
E&I	Electrical & Instrumentation
EC&ACP	Environmental Compliance & Area Completions Project
ECA	Environmental Compliance Authority
EE/CA	Engineering Evaluation/Cost Analysis
EEC	Environmental Evaluation Checklist
ELLV	Electrical, Low Voltage
ELNH	Electricity, 480V
EPA	Environment Protection Agency
FAI	Facility Acceptance Inspection
FCDP	Facility Condition Documentation Package
FDAS	Fire Detection and Alarm System
FLM	First Line Manager
FP	Fire Protection
FY	Fiscal Year
GBEX	Glovebox Exhaust
GCO	Generator Certification Official
GS	General Service
HCA	High Contamination Area
HEPA	High Efficiency Particulate Air
HPI	Human Performance Improvement
HRA	High Radiation Area
HVAC	Heating, Ventilation and Air Conditioning
ISMS	Integrated Safety Management System
JS	Job Specific
LAWV	Low Activity Waste Vault
LLW	Low Level [Radioactive] Waste

LWG	Lead Work Group
MAR	Material-at-Risk
MOU	Memorandum of Understanding
MT	Modification Traveler
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NONA	Notice of NEPA Approval
OML	Old Metallurgical Laboratory
OOS	Out of Service
PBI	Performance Based Incentive
PCB	Polychlorinated Biphenyl
PEF	Plutonium Experimental Facility
PIC	Potential Impact Category
PPE	Personal Protective Equipment
PuFF	Plutonium Fuel Form [Facility]
RA	Radiation Area
RBA	Radiological Buffer Area
RCRA	Resource Conservation and Recovery Act
REM	Roentgen Equivalent Man
RMA	Radiological Material Area
RME	Radiation Monitoring Equipment
RSER	Removal Site Evaluation Report
RREX	Room Exhaust
S&M	Surveillance and Maintenance
SAA	Satellite Accumulation Area
SC	Site Clearance
SCDHEC	South Carolina Department of Health and Environmental Control
SI	Site Infrastructure
SOB	Shift Operating Base
SRNS	Savannah River Nuclear Solutions
SRS	Savannah River Site
SS	Safety Significant
SSC	Structure, System and Component
TFHA	Transitional Fire Hazards Analysis
TRU	Transuranic [Waste]
TSR	Technical Safety Requirements
TWD	Technical Work Document
USQ	Unreviewed Safety Question
VTs	Ventilation Transition Sequence
W/O	Work Order

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## 1.0 Summary

Building 235-F was constructed in the 1950's as part of the original Savannah River Plant and was used for a variety of missions since that time. As a result of its many missions, the process areas within Building 235-F were radiologically contaminated along with associated exhaust systems and support equipment (e.g., inert gas purification systems). To reduce the risk associated with this radiological contamination, F-Area initiated a deactivation project in 2013 that targeted the 235-F Plutonium Fuel Form (PuFF) Facility. Although the project made some progress decontaminating the PuFF Facility, the project was halted in 2019 in favor of decommissioning Building 235-F, which will take the building to a final end state where the radiological contamination is immobilized. In support of this new approach for risk reduction, F-Area initiated and executed a subsequent deactivation project (the subject of this report), which prepared Building 235-F for Safe Storage<sup>1</sup> and eventual decommissioning.

As mentioned in the previous paragraph, the primary goal of the deactivation project was to prepare Building 235-F for Safe Storage and eventual decommissioning. In support of this goal, F-Area and its support organizations (hereafter referred to as the Project Team) performed the following primary activities:

- Fixed and removed radiological contamination outside process enclosures and outside exhaust ventilation components
- Repaired seals on process enclosures
- Modified ventilation
- Installed surveillance lighting along select corridors
- Except for the newly installed surveillance lighting, air-gapped utilities
- Removed pressure safety valves and vented vessels.
- Replaced/relocated all utilities passing over Building 235-F
- Removed non-radiological, hazardous materials
- Removed radiological materials
- Removed ceiling tiles and transient combustibles
- Drained vessels and lines containing water and water treatment chemicals
- Modified exterior components to prevent the accumulation of rainwater
- Removed trailers in yard south of Building 235-F

In total, the deactivation project addressed/completed approximately 100 end points over a period of approximately 3.5 years, with most end points being completed during Fiscal Year (FY) 2022. The Revision 0, Deactivation Project Plan (DPP) for Building 235-F (V-PMP-F-00247, Reference 9.1) was issued in June 2020, shortly after project start in July 2019. The DPP was revised and reissued in September 2020 to address comments received from the Department of Energy, Savannah River Operations Office (DOE-SR). The deactivation project was largely complete by 9/30/22. At that time, the Project Team

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<sup>1</sup> The Glossary of Manual 1C (Reference 9.2) defines the term "Safe Storage" as the "stage, after Deactivation and before Decommissioning, when the facility is in a passively safe and stable condition awaiting decommissioning."

had (1) completed end points interior to Building 235-F, (2) isolated the building both mechanically and electrically, and (3) reconfigured the supply and exhaust ventilation, which included the shutdown of all supply and exhaust fans within the building (Reference 9.3). Exterior end points were the primary remaining deactivation activities to be completed in FY23. All deactivation activities were completed on 2/27/23, which ends the period covered by this report. The total cost for the deactivation project (which was a “cost-funded” project) was approximately \$17 million with the following approximate breakdown by FY: FY19 – \$0.3 million, FY20 – \$6.8 million, FY21 – \$4.3 million, FY22 – \$4.2 million, and FY23 – \$1.2 million (all in burdened dollars).

In summary, the deactivation project fully achieved its goals/objectives, and fully prepared Building 235-F for long-term Safe Storage while awaiting decommissioning.

## 2.0 Scope

The purpose of this report is to document for the record what was done to the facility as a part of the deactivation project, and the condition the facility was left in for long-term Safe Storage while awaiting decommissioning. The requirement for this report is found in the Facility Disposition Manual 1C, Procedure 303, “Preparing a Deactivation Project Final Report” (Reference 9.4).

## 3.0 Deactivation Activities Completed

In total, the deactivation project addressed/completed approximately 100 end points (as defined by Reference 9.1 [V-PMP-F-00247]) over a period of approximately 3.5 years, with most end points being completed during FY22. The deactivation project fully achieved its goals/objectives, and fully prepared Building 235-F for Safe Storage while awaiting decommissioning.

The deactivation project included the following major activities,<sup>2</sup> which are further described in Section 3.02 and Appendix A of this report:

- Eliminate or reduce hazards (52)
- Eliminate or reduce contamination (11)
- Remove and dispose of bulk process material (1)
- Remove valuable assets for possible sale or reuse (9)
- Remove and dispose of wastes (11)
- Monitor and control conditions (1)
- Refurbish or install (3)
- Document and label (5)
- Engineering evaluation (5)

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<sup>2</sup> The number in parentheses ( ) following the activity indicates the number of end points (within Reference 9.1) associated with the activity.

### 3.01 Project Management

The deactivation project was not a formal project conducted in accordance with Manual E11, “Conduct of Project Management and Control” (Reference 9.5) and Department of Energy (DOE) Order 413.3B, “Program and Project Management for the Acquisition of Capital Assets” (Reference 9.6). Instead, the project was managed by F-Area as a non-capital “cost” project in accordance with Manual 6B, “Program Management” (Reference 9.7). The labor force consisted of Savannah River Nuclear Solutions (SRNS) staff with subcontractors augmenting the SRNS staff.

### 3.02 Activities Completed

A primary goal of the deactivation project was to remove/mitigate hazards associated with remaining hazardous materials (both radiological and chemical). The Project Team achieved this goal through the completion of the following major activities:

- Fixed and removed radiological contamination outside process enclosures and outside exhaust ventilation components to the extent practical.
- Repaired seals on process enclosures to prevent migration of radiological contamination from these components during Safe Storage.
- Modified ventilation to keep process enclosures under negative pressure and to minimize unconditioned air entering process rooms. The modification included the shutdown of all fans within Building 235-F, the continued operation of the E5 Exhaust Ventilation fans in Building 292-2F, the sealing of supply and exhaust ductwork, the sealing of spaces adjacent to the 235-F north door, and the sealing of walls between ventilated and un-ventilated spaces.
- Removed non-radiological, hazardous materials including friable asbestos, lead-acid batteries, lead counterweights, fluorescent light bulbs, fire extinguishers, gas cylinders, ballasts containing polychlorinated biphenyls (PCBs), oils and refrigerants.
- Removed radiological materials (e.g., low level waste [LLW], transuranic [TRU] waste, sources, and tritium exit signs).
- Removed ceiling tiles and transient combustibles to minimize future mold/mildew and to reduce combustible loading.
- Drained vessels and lines containing water and water treatment chemicals.

In addition to the removal/mitigation of hazardous materials, the Project Team completed the following major activities:

- Installed surveillance lighting along select corridors to facilitate future surveillance and maintenance (S&M) and decommissioning.
- Except for the newly installed surveillance lighting, removed hazardous energy by air-gapping utilities (e.g., steam, electricity, and domestic

water) to the building, removing pressure safety valves, and venting vessels.

- Replaced/relocated all utilities passing over the facility.
- Modified exterior components to prevent the accumulation of rainwater.
- Removed trailers in yard south of Building 235-F.

### 3.03 Schedule

The deactivation project began in July 2019 when DOE-SR halted efforts to remove material-at-risk (MAR) from Building 235-F and directed SRNS to undertake a new deactivation project to prepare the building for decommissioning (Reference 9.8). The deactivation project was largely complete by 9/30/22. At that time, the Project Team had (1) completed end points interior to Building 235-F, (2) isolated the building both mechanically and electrically, and (3) reconfigured the supply and exhaust ventilation, which included shutdown of all supply and exhaust fans within the building (Reference 9.3). Exterior end points were the primary remaining deactivation activities completed in FY23. The end date for the deactivation project is the date when this completion report is issued.

The following table (Table 3.1) lists the Performance Based Incentive (PBI) milestones that were applicable to the deactivation project.

**Table 3.1 – Listing of PBI Milestones Applicable to the 235-F Deactivation Project**

Milestone #	Description (Notes 1 and 2)	Due Date	Actual Date
SRNS2020 EMO-3.01	Complete assay of Building 235-F Plutonium Experimental Facility (PEF), Old Metallurgical Laboratory (OML), Actinide Billet Line (ABL) and the ventilation system. Deliverable will be the approved Savannah River National Laboratory assay report.	2/28/20	1/27/20
SRNS2020 EMO-3.02	Complete modelling of the 235-F ventilation system and submit modification traveler (MT) to support deactivation of 235-F.	7/31/20	6/29/20
SRNS2020 EMO-3.03	Design and develop work package for electrical isolation at 235-F that will disconnect power to 235-F.	9/30/20	8/18/20
SRNS2021 EMO-3.01	Implement Rev. 5 of the 235-BIO/TSR (DOE-SR approval within 45 calendar days of submittal).	9/30/21	9/14/21
SRNS2021 EMO-3.04	Submit the Rev. 0 Engineering Evaluation/Cost Analysis (EE/CA) for 235-F Decommissioning to the regulatory agencies (i.e., SCDHEC and EPA) for review/approval. (See earlier revision of Reference 9.9)	9/30/21	8/26/21
SRNS2022 EMO-3.01	Complete 235-F Ventilation Modifications.	7/31/22	7/20/22
SRNS2022 EMO-3.02	Complete isolation of Building 235-F including temporary lighting, water isolation, steam isolation, electrical isolation, and diesel generator. All known contamination has been removed, fixed, or isolated to the extent practicable inside the building.	9/30/22	9/20/22
SRNS2022 EMO-3.06	Complete Revision 1 of SRNS-RP-2021-00001, Removal Site Evaluation Report (RSER) / EE/CA. (See Reference 9.9)	5/31/22	2/28/22
SRNS2023 EMO-3.01	Complete deactivation of 235-F by preparing the 235-F Deactivation Project Completion Report, the Surveillance and Maintenance Plan, and generating an MOU between F-Area Complex and EC&ACP to jointly decommission the 235-F facility.	3/1/23	3/1/23

Note 1 – BIO = Basis for Interim Operation, EC&ACP = Environment Compliance & Area Completion Project, EPA = Environmental Protection Agency, MOU = Memorandum of Understanding, SCDHEC = South Carolina Department of Health and Environmental Control, TSR = Technical Safety Requirements

Note 2 – In general, document references are not provided here, but are provided later in this document (e.g., MTs are discussed in the following table and Safety Basis documents are addressed in both the following table and Section 6.05).

The Project Team completed several key activities that supported the above milestones and the overall project schedule. Those key activities are listed in the following table (Table 3.2).

**Table 3.2 – Listing of Key Activities Applicable to the 235-F Deactivation Project**

Type	Applicable Date (Month/Year)	Activity
Planning per Manual 1C	9/19	Issued Revision 0 of Facility Condition Documentation Package (FCDP, Reference 9.10 is current version)
	6/20	Issued Revision 0 of the DPP (Ref. 9.1 is the current version)
	9/20	Issued Revision 1 of the DPP (Ref. 9.1) in response to comments from DOE-SR
	2/23	Issued Revision 0 of the 235-F Surveillance and Maintenance Plan (Ref. 9.11)
	2/23	Issued Revision 1 of the 235-F FCDP (Ref. 9.10)
Safety Basis	2/20	Issued Revision 4 of the 235-F Safety Basis (References 9.12 and 9.13 are the current versions)
	3/20	Initiated Revision 5 of the 235-F Safety Basis (References 9.12 and 9.13)
	8/20	Implemented Revision 4 of the 235-F Safety Basis (Reference 9.14)
	4/21	Issued Revision 5 of the 235-F Safety Basis (References 9.12 and 9.13)
	6/21	Received DOE-SR approval on Revision 5 of the 235-F Safety Basis (Reference 9.15)
	9/21	Implemented Revision 5 of the 235-F Safety Basis (Reference 9.16)
Design	8/22	Implemented “Transition S&M” Components of the 235-F Safety Basis (Reference 9.17)
	7/19	Issued MT (Reference 9.18) for new air compressor and heaters for 292-2F
	8/19	Issued MT (Reference 9.19) for electrical/mechanical isolations
	1/20	Issued initial design (Reference 9.20) for new air compressor & heaters for 292-2F
	4/20	Issued initial design (Reference 9.21) for electrical/mechanical isolations
	6/20	Issued MT (Reference 9.22) for ventilation modifications
	5/21	Issued MT (Reference 9.23) for surveillance lighting
	7-9/21	Issued design (References 9.24 through 9.26) for ventilation modifications
5/22	Issued initial design (Reference 9.27 is the current version) for surveillance lighting	

Appendix F of the DPP (Reference 9.1) is the baseline schedule for the deactivation project. Per the baseline schedule, the completion date for the deactivation project was March 30, 2023. The deactivation project is within schedule, i.e., the Project Team completed the project (via issuance of this report) prior to the target completion date. Table 5.1 and Appendix B of the DPP (Reference 9.1) provide a listing of deactivation activities by projected year. With only a few minor exceptions, the Project Team met or exceeded the listed projected years.

The durations for several project activities were longer than expected due to emergent or unforeseen obstacles. Specific issues are discussed in Section 7.0.

### 3.04 Cost

In total, the deactivation project addressed/completed approximately 100 end points over a period of approximately 3.5 years, with most end points being completed during FY22. The total cost for the deactivation project (which was a “cost-funded” project) was approximately \$17 million with the following approximate breakdown by FY: FY19 – \$0.3 million, FY20 – \$6.8 million, FY21 – \$4.3 million, FY22 – \$4.2 million, and FY23 – \$1.2 million (all in burdened dollars).

The original baseline budget for the project was approximately \$25 million with the following approximate breakdown by FY (Reference 9.1): FY19 – \$0.4 million, FY20 – \$6.5 million, FY21 – \$6.8 million, FY22 – \$8.0 million, and FY23 – \$3.5 million (all in burdened dollars). The project was completed within the original baseline budget. There is a substantial difference between the actual cost for deactivation versus the baseline cost. That difference is due to the following:

- The baseline cost was based on Savannah River Site (SRS) overheads of approximately 63%. SRS overheads were reduced to approximately 16% in FY22.
- The baseline cost included a bounding charge of \$2.5 million to account for charges prior to issuance of the cost estimate (Reference 9.28), which established the baseline cost. Actual costs for that time period (i.e., from July 2019 to January 2020) are estimated to be less than \$1 million.
- The cost estimate was a Class 3 estimate, which has an expected low accuracy of up to -20% (Reference 9.29).
- The Project Team improved worker efficiency via sharing of resources with other F-Area activities.
- The Project Team avoided some Design Engineering charges by performing some design in-house and by making use of redlines.

Project funding was allocated/authorized annually via the following Baseline Change Packages (BCPs):

- FY19 – BCP No. CR19M0093, 235-F Phase II Deactivation
- FY20 – BCP No. CR19M0191, SR-0041 Baseline Update FY20
- FY21 – BCP No. CR20M0192, SR-0041 Baseline Update FY21
- FY22 – BCP No. CR21M0189, SR-0041 Baseline Update FY22
- FY23 – BCP No. CR22M0153, SR-0041 Baseline Update FY23

The deactivation project resulted in a significant reduction in annual S&M costs for Building 235-F. Pre-deactivation, the annual S&M cost for Building 235-F

(includes the annual operation and maintenance costs associated with its support buildings) was approximately \$8 million (Reference 9.1). Post-deactivation, the annual S&M cost for Building 235-F and its support buildings will be approximately \$3.5 million (Reference 9.9). Most of this cost is associated with the operation and maintenance of the 292-2F Fanhouse, which continues to operate and continues to keep vacuum on the 235-F process enclosures.

## 4.0 Material Management

### 4.01 Salvage and Reuse Accomplishments

The Project Team completed the following salvage and reuse (the applicable deactivation end point [see listing in Appendix A] is indicated in parentheses):

- Recovered approximately 275 gallons of diesel fuel from storage tank in the 235-F Generator Enclosure (1G-RBM-01).
- Removed furniture and refrigerators from Trailers 235-11F and 245-6F and sent them to the SRS Salvage Yard (3A-RVA-01).
- Removed scrap metal from 281-28F and sent it to the SRS Salvage Yard (3A-RI-01).
- Removed temporary monitoring equipment from Room 131 of Building 235-F and transferred the materials to other users or storage areas in F-Area (1A-RVA-01).
- Removed radiation monitoring equipment (RME) from within Building 235-F and transferred the RME to Radiological Protection (RP) storage areas in F-Area or to other SRS users (includes two ARGOS personnel monitors, multiple constant air monitors, multiple retrospective air samplers and multiple count rate meters) (1A-RVA-02).
- Removed materials (e.g., supplies, computers, personal protective equipment (PPE), portable high-efficiency particulate air (HEPA) filtration equipment, RME, RP instruments) from Trailer 235-11F and transferred the materials to other users or storage areas in F-Area (3A-RVA-01).
- Recovered refrigerant from various equipment in Building 235-F and from the four heating, ventilating and air conditioning (HVAC) units attached to Trailers 235-11F and 245-6F (2A-ERH-01, 3A-ERH-04 and 3B-ERH-01).

### 4.02 Waste Disposal

The following table (Table 4.1) summarizes the wastes generated by the deactivation project. Included in the table are the sources for each class of waste, the disposal facility for each class of waste where applicable, the storage location of waste if not yet disposed, and quantities by volume for each class of waste.

**Table 4.1 – Summary of Waste Generated by the 235-F Deactivation Project**

Waste Classification (Note 1)	Waste Source	Disposed To (Note 1)	Estimated Volume (Notes 1 & 2)
Sanitary	Job control waste from non-radiological activities (e.g., packaging for plastic suits)	Three Rivers Landfill	Not tracked
Sanitary	Debris/rubble from the demolition of trailers	SRS C&D Landfill	~510 yd <sup>3</sup>
LLW	Deactivation activities in contaminated areas of Building 235-F	E-Area Slit Trenches	1,100 ft <sup>3</sup>
TRU	Deactivation activities intrusive to process enclosures of Building 235-F	E-Area TRU Pads	560 ft <sup>3</sup>
Universal	Fluorescent light bulbs (note that bulbs from East Maintenance [Room 1002] and East Service [Room 2010] were disposed as LLW)	N-Area Universal Waste Collection Point	70 ft <sup>3</sup> (~625 standard 4' bulbs)
Universal	Batteries from emergency lights and starter batteries from the 235-F diesel generator (Note 3)	N-Area Universal Waste Collection Point	~20 ft <sup>3</sup>
Hazardous	Paint chips (consolidated with other F-Area paint chips)	SAA at 211-9F (Note 5)	<1 ft <sup>3</sup>
Mixed	Manipulator masters containing lead, circuit boards and smoke detectors	Central Accumulation Area at 292-F (Note 5)	~25 ft <sup>3</sup>
PCB	Lighting ballasts (Note 4)	E-Area LAWV	63 ft <sup>3</sup>
ACM	Transite from installation of surveillance lighting	Three Rivers Landfill	<1 ft <sup>3</sup>
ACM	Windows from demolition of Trailers 235-11F; gaskets and insulation from air-gapping and draining of piping	SRS C&D Landfill	~100 ft <sup>3</sup>
Metallic Lead	Counterweights from PuFF Facility manipulators	772-1F B-25 Storage Area	~50 ft <sup>3</sup>
Used Oil (Non-Rad)	Oil draining activities in non-radiological areas of Building 235-F (e.g., compressors in Room 152 and diesel engine in generator enclosure)	F-Area Used Oil Collection Point (Note 5)  N-Area Used Oil Collection Point	25 gal  10 gal
Used Oil (Rad)	Deactivation activities in radiological areas of Building 235-F (e.g., PuFF Facility Hot Press)	F-Area Used Oil Collection Point (Note 5)	30 gal

Note 1 – ACM = asbestos containing material, C&D = Construction & Demolition, ft = feet, gal = gallons, LAWV = Low Activity Waste Vault, SAA = Satellite Accumulation Area, yd = yards

Note 2 – Volume estimates are from Reference 9.30 and interviews of F-Area Generator Certification Officials (GCOs), F-Area Environmental Compliance Function (ECA), Deactivation Lead, and Maintenance Managers.

Note 3 – Nickel/cadmium batteries from emergency lights were transferred to E-Area for reuse.

Note 4 – Ballasts containing PCBs were managed as LLW.

Note 5 - The Project Team transferred these wastes to the 235-F S&M Program for consolidation with other F-Area wastes, characterization, temporary storage, and disposal.

In addition to the waste listed above, the Project Team generated a significant quantity of wastewater from draining activities (e.g., see End Point No. 1B-ERH-03). The Project Team managed the wastewater as “scavenger wastewater” in accordance with Manual 3Q, Procedure 2.18 (Reference 9.31). The following table (Table 4.2) summarizes the wastewaters generated/managed by the Project Team.

**Table 4.2 – Summary of Scavenger Wastewaters Generated by the 235-F Deactivation Project**

Scavenger Wastewater ID	Source	Disposed To	Estimated Quantity (Gallons)
SWW-2021-026	PEF shield walls	Sanitary Sewer	700
SWW-2021-037	PuFF Facility gloveboxes (shield water from annular spaces)	Sanitary Sewer	1,200
SWW-2022-002	PuFF Facility East Maintenance small shield doors	Sanitary Sewer	135
SWW-2022-007	PuFF Facility shield windows	Sanitary Sewer	4
SWW-2022-010	PuFF Facility West Maintenance small shield doors	Sanitary Sewer	80
SWW-2022-011	PuFF Facility cooling water system	Sanitary Sewer	4
SWW-2022-012	PuFF Facility Hot Press Cooling Water System	Sanitary Sewer	190
SWW-2022-015	PuFF Facility East Maintenance large shield doors	Sanitary Sewer	1000
SWW-2022-023	PuFF Facility Main Cooling Water System	Sanitary Sewer	500
SWW-2022-025	PuFF Facility West Maintenance large shield doors	Sanitary Sewer	895
SWW-2023-005	Condensate from Breathing Air Compressor Operation	Sanitary Sewer*	330
Not yet assigned	PuFF Facility Main Cooling Water System (Exterior lines)	Undergoing Characterization**	100

\* The Project Team transferred this wastewater to the 235-F S&M Program for discharge to the sanitary sewer. (F-Area has received approval to dispose this wastewater to the sanitary sewer.)

\*\* The Project Team transferred this wastewater to the 235-F S&M Program for characterization, temporary storage at Building 211-9F, and disposal. The Project Team anticipates that the wastewater will be disposed to the sanitary sewer.

#### 4.03 Waste Minimization Accomplishments

The Project Team implemented a waste minimization program (Reference 9.32), which reduced the amount of waste generated and/or shipped for disposal. The program required the person responsible for an upcoming task to incorporate waste certification and characterization requirements into the preplanning for that task. The waste generator and/or task sponsor also had the responsibility, with GCO and ECA support, to identify potential pollution prevention techniques for incorporation into the technical work documents (TWDs) being developed for the planned waste-generating task.

Specific waste minimization successes are as follows:

- Rather than absorption and disposal as LLW, the Project Team subjected all collected wastewaters (see listing in Table 4.2) to radiological characterization even though they originated in process areas of Building 235-F. The characterization determined that all collected wastewaters (approximately 4,800 gallons) had little or no radiological content. Subsequently, the Project Team disposed the wastewaters to the sanitary sewer.
- Instead of disposal, the Project Team salvaged and/or reused removed materials to the extent practical (see Section 4.01 for specific examples).
- The Project Team abandoned in place the shield windows in East Maintenance (Room 1002) rather than disposing the windows. The

Project Team recognized that East Maintenance will be grouted during decommissioning and that the radiological content associated with the shield windows was stable/contained and trivial compared to that in Building 235-F's process enclosures.

- The Project Team also abandoned in place the HEPA filters in PuFF Facility gas purification equipment and in Room 2000 (see End Point Nos. 2C-ERC-01 and 2D-ERC-01 in Appendix A). The Project Team recognized that these areas will be grouted during decommissioning and that the radiological content associated with the HEPA filters was stable/contained and trivial compared to that in Building 235-F's process enclosures.
- The Project Team set aside shield windows—stored in Sealand containers outside Building 235-F—for eventual entombment in Vault 102 or 106 of Building 235-F. The Project Team received concurrence from the decommissioning authority (i.e., EC&ACP) that F-Area could return these components to Building 235-F as a preparatory action for decommissioning (Reference 9.33).<sup>3</sup>

In addition to the above specific waste minimization activities, the Project Team implemented the following “best practices” to minimize waste:

- Locating equipment (e.g., water pumps, air samplers, and refrigerant recovery equipment) requiring frequent access outside of contamination areas (CAs) and high contamination areas (HCAs) where possible
- Minimizing entry into CAs and HCAs by efficient work scheduling
- Removing packaging materials prior to taking the contents into CAs and HCAs
- Practicing good housekeeping (poor housekeeping generates waste)
- Utilizing re-useable supplies when possible

## 5.0 Occupational Exposure to Personnel

### 5.01 Personnel Injuries

The Project Team implemented an Integrated Safety Management System (ISMS) Program in accordance with SRNS Management Policies Manual 1-01, Policy 1.22, “Integrated Safety Management System” (Reference 9.34). Through implementation of the ISMS Program, the Project Team systematically identified hazards for all deactivation activities, and systematically implemented controls for any and all identified hazards. To systematically identify hazards and implement controls, the Project Team primarily relied on the programs/procedures in the following SRNS Manuals:

- 4B, “Training and Qualification Program”

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<sup>3</sup> The 235-F S&M Program is responsible for the eventual return of the components to Vaults 102 or 106.

- 2Q, “Fire Protection Program”
- 4Q, “Industrial Hygiene”
- 5Q, “Radiological Control”
- 8Q, “Employee Safety”
- 11Q, “Facility Safety Document”
- 2S, “Conduct of Operations”
- 1Y, “Conduct of Maintenance”

Key elements of the above manuals—implemented by the Project Team and which prevented injury—are as follows:

- Conducted weekly toolbox meetings and monthly safety meetings to emphasize safety and raise safety awareness.
- Controlled deactivation activities using TWDs, i.e., Manual 2S procedures, Manual 1Y work orders (W/Os), or Construction W/Os.
- Subjected all deactivation activities to the Assisted Hazard Analysis (AHA) process of Reference 9.35 and the unreviewed safety question (USQ) process of Reference 9.36.
- Conducted pre-job briefings before each deactivation activity.
- Emphasized Human Performance Improvement (HPI) tools (e.g., peer checking, self-checking, questioning attitude, timeouts, and SAFER<sup>4</sup>) during pre-job briefings and during performance of deactivation activities.
- Wore PPE as prescribed by AHAs and Radiological Work Permits (RWPs).
- Used only trained and qualified personnel to conduct deactivation activities.

The ISMS Program and the above specific measures were very effective in preventing injuries. During the deactivation project, there were no injuries during the execution of deactivation activities.

## 5.02 Personnel Radiological Exposures

The Project Team implemented measures to keep exposures As LowAs Reasonably Achievable (ALARA). Those measure included maximizing the distance from radiation sources, minimizing time in Radiation Areas (RAs) and High Radiation Areas (HRAs), using lead shielding, and using appropriate PPE.

The Project Team performed radiological work in accordance with Standing Radiological Work Permits (SRWPs) and Job Specific RWPs (JSRWPs). Applicable SRWPs and JSRWPs are listed in the following table (Table 5.1). Note that the 235-F S&M Program performed radiological work in accordance with the same SRWPs and JSRWPs.

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<sup>4</sup> See Reference 9.35 for a description of the SAFER process.

**Table 5.1 – SWRPs/RWPs Applicable to Deactivation at Building 235-F**

RWP	Type	Job Description Summary (Note 1)
19-FCA-001 20-FCA-001 21-FCA-001 22-FCA-001	Standing	Entry into Radiological Buffer Areas (RBAs) and/or Radioactive Material Areas (RMAs) and RAs located in RBA and/or RMAs to perform "Hands On" routine/repetitive radiological work. Examples of work permitted under this SRWP include handling radioactive material, RP surveillances/surveys/routines and activities approved by the RP FLM. This SRWP is also used for entry into RAs for tours, observations, walkdowns and other activities determined by RP First Line Manager (FLM).
19-FCA-002 20-FCA-002 21-FCA-002 22-FCA-002	Standing	Lab Coat entry into Contamination Areas (CAs) and Contamination Areas (CAs)/RAs to perform routine/repetitive activities, walkdowns, observations, audits, inventories, tours, inspections, operator rounds, RP Surveys, lockouts, equipment operation, and other minor activities approved by RP FLM.
19-FCA-003 20-FCA-003 21-FCA-003 22-FCA-003	Standing	Entry into CAs and/or CAs/RAs for the purpose of performing routine/repetitive activities, deconning, RP surveys, surveillances, operator rounds, minor maintenance and electrical work, walkdowns, housekeeping and other activities approved by RP FLM.
19-FCA-006 20-FCA-006 21-FCA-006 22-FCA-006	Standing	Entry into Airborne Radioactivity Areas (ARAs) within HCAs and/or RAs for activities considered routine/repetitive, minor Ops, Maint., electrical & instrumentation (E&I) work, RP surveys, and certain other activities approved by RP FLM.
19-FCA-008 20-FCA-008	Standing	Entry into ARAs within CAs and/or RAs for activities considered routine/repetitive, minor Ops, Maint., E&I work, RP surveys, and certain other activities approved by RP FLM.
19-FCA-009	Standing	235-F RR personnel to perform waste handling/repackaging within ARAs within HCAs and/or RAs for activities considered routine/repetitive, minor Ops, Maint., E&I work, RP surveys, and certain other activities approved by RP FLM.
22-FCA-103	Job Specific	HRA entries for 235-F personnel to perform bag port operations, replace gloves, sphincters, assemblies, blind flanges clear tubes, install/remove plastic containment and working in cell gloveports. Other activities approved under the RWP are electrical/mech. isolation/drain, RP surveys, decon, waste removal, handling and additional low risk activities approved by both the RP FLM and Lead Waste Group (LWG) FLM from authorized TWDs (procedures, AHA's, & work packages).
19-FCA-104	Job Specific	235-F RR Operations to perform bag port operations, replace gloves, sphincters, assemblies, blind flanges and clear tubes, installing/removing plastic containment, and working in cell gloveports in PuFF Cells 1-5. Other activities approved under the RWP are RP surveys, decon, waste removal, waste packaging and additional low risk activities approved by both the RP FLM and LWG FLM from authorized TWDs (procedures, AHA's, & work packages).
20-FCA-104 21-FCA-104	Job Specific	HRA entries for 235-F RR Operations to perform bag port operations, replace gloves, sphincters, assemblies, blind flanges and clear tubes, installing/removing plastic containment, and working in cell gloveports in PuFF Cells 1-9. Other activities approved under the RWP are RP surveys, decon, waste removal, packaging and handling and additional low risk activities approved by both the RP FLM and LWG FLM from authorized TWDs (procedures, AHA's, & work packages).
20-FCA-105	Job Specific	235-F RR Operations and Construction to perform ceiling tile removal and replacement within the 235-F Facility. Other activities approved under the RWP are RP surveys, decon, waste removal, waste packaging and additional low risk activities approved by both the RP FLM and LWG FLM from authorized TWDs (procedures, AHA's, & work packages).
21-FCA-105	Job Specific	Maintenance/E&I to mechanically/electrically isolate and drain fluids from equipment in PEF/Rm. 153 and associated equipment in Hot Press Auxillary/Rm. 2003, Inert Atmosphere/Rm. 2008, West Service/Rm. 2009 and East Service/Rm. 2010. Other activities approved under the RWP are RP surveys, Operations support, decon, waste removal, and additional low risk activities approved by both the RP FLM and LWG FLM from authorized TWDs (procedures, AHA's, & work packages).
22-FCA-106	Job Specific	Maintenance/E&I/Operations/Construction to perform final deactivation activities in 235-F. Other activities approved under the RWP are RP surveys, Operations support, sample, decon, repairs, waste removal, and additional low risk activities approved by both the RP FLM and LWG FLM from authorized TWDs (procedures, AHA's, & work packages).
22-FCA-107	Job Specific	HRA entries for 235-F personnel for Maintenance/E&I/Operations/Construction to perform final deactivation activities in 235-F. Other activities approved under the RWP are RP surveys, Operations support, sample, decon, repairs, waste removal, and additional low risk activities approved by both the RP FLM and LWG FLM from authorized TWDs (procedures, AHA's, & work packages).
19-FCA-108	Job Specific	HRA entries for 235-F RR Operations to perform bag port operations, replace gloves, sphincters, assemblies, blind flanges and clear tubes, installing/removing plastic containment, and working in cell gloveports in PuFF Cells 1-5. Other activities approved under the RWP are RP surveys, decon, waste removal, packaging and handling and additional low risk activities approved by both the RP FLM and LWG FLM from authorized TWDs (procedures, AHA's, & work packages).
19-FCA-110 20-FCA-110	Job Specific	Rigging and 235 RR Operations to perform maintenance, removal and any associated work on Cells 1-9 shielding windows. Also includes the removal of gel packs on the maintenance side, bagport operations, replace gloves, sphincters, assemblies, blind flanges and clear tubes, Operations support, housekeeping, decon, RP survey, install/remove electrical lock outs and other activities approved by both the RP FLM and LWG FLM or from authorized TWDs (procedures, AHA's, & work packages).

In accordance with above permits, RP tracked exposures using personnel dosimeters. From October 2019 to September 2022 (period of time when the Project Team deactivated the Building 235-F interior), the total exposure was 4.823 roentgen equivalent man (rem) and the maximum individual exposure was 0.752 rem. Note that these exposures were for the deactivation Project Team *and* the 235-F S&M Program. Available records do not allow RP to differentiate between deactivation activities and S&M activities. Even so, most of the exposures can be assigned to the Project Team because they made most entries into the East Maintenance (Room 1002) HRA in support of deactivation. (The exposures of 4.823 rem [total] and 0.752 rem [individual] are bounding with respect to the deactivation project.) There were no non-routine exposure incidents for the duration of the deactivation project.

## 6.0 Final Facility Condition

### 6.01 Physical Condition

In general, deactivation did not include the removal of installed equipment. Notable exceptions are the demolition of Trailers 235-11F and 245-6F and the gutting of the 281-28F concrete containment (see End Points Nos. 3A-RI-01 and 3A-RVA-02 in Appendix A). The deactivation did include the removal of individual components—containing hazardous materials—from equipment (e.g., see ERH-type end points in Appendix A). Examples are lead counterweights from manipulators, fluorescent bulbs and ballasts from lighting fixtures, and oils from vacuum pumps. The deactivation also included the removal of accountable, loose, and/or portable equipment including monitoring equipment in the Shift Operating Base (SOB) and RME throughout Building 235-F (see RVA-type end points in Appendix A).

The following hazardous materials and accountable equipment were not removed during deactivation:

- Coatings containing PCBs and/or Resource, Conservation and Recovery Act (RCRA) metals (e.g., lead)
- Lead counterweights in/on manipulators (see End Point No. 1B-ERH-08 for additional background)
- Lead shielding in shield doors, in annular spaces of gloveboxes, and at various locations on process enclosures (e.g., entry hood of ABL)
- Leaded glass in shield windows (many were removed prior to deactivation and are stored in Room 1002 or will be returned to Vault 102 or 106).
- Bulbs containing mercury in PuFF Facility cells and gloveboxes (see End Point No. GEN-ERH-10 for additional background)
- Oils in seal pots and vacuum pumps (see End Point No. 1F-ERH-01 for additional background on PEF seal pots and vacuum pumps)
- Accountable precious metals in the PuFF Facility (see records in the Asset Management Information System [AMIS])

In general, deactivation did not include the removal of radiologically-contaminated equipment because Building 235-F is a candidate for “in-situ decommissioning,” an end state where the radiological contamination is permanently fixed in place rather than removed. Thus, process enclosures (i.e., gloveboxes and cells), exhaust ventilation components (e.g., ductwork, dampers and fans), and support systems (e.g., inert gas purification) remain installed in Building 235-F. Considering their minor contribution to the overall radiological inventory and the decommissioning end state, the following contaminated components—originally identified for removal—were not removed during deactivation:

- HEPA filters in inert gas systems in Rooms 2008 and 2010 (see End Point No. 2C-ERC-01 for additional background)
- HEPA filters in the E1 Exhaust Ventilation System in Room 2000 (see End Point No. 2D-ERC-01 for additional background)

During deactivation, F-Area shutdown all *active* structures, systems, and components (SSCs) within Building 235-F and all active SSCs receiving power from Building 235-F (e.g., the S1 supply fans) except for the newly installed surveillance lighting (Reference 9.27). Four *passive* SSCs associated with the deactivated 235-F continue to provide a Safety Basis and/or Fire Protection function. The following table summarizes the Building 235-F SSCs—both *active* and *passive*—that continue to operate, provide a Safety Basis function, and/or provide a Fire Protection function.

Table 4.1 – 235-F SSCs That Operate and/or Provide Safety Basis/Fire Protection Function

SSC ID (Note 1)	Description	Functional Class (Note 2)	Function (Reference 9.12, except where noted)
BLDG	Concrete structure comprising 235-F	SS	(1) Maintains confinement of radioactive material after a vehicle impact, or fire event (2) Prevents structural collapse during and after a design basis NPH event which limits the amount of material-at-risk (MAR) impacted and released during the event
ELNH/ ELLV	Surveillance lighting and power to the lighting	GS	Illuminates ingress and egress paths within 235-F and allows workers to safely access 235-F in the performance of S&M
FP	Penetration seal associated with the surveillance lighting	GS	Per Engineering Standard 07270 (References 9.38) and Reference 9.39, prevents the spread of fire from the passage of excessive heat, hot gasses or flame under conditions of use for a period of three (3) hours

Various (e.g., GBEX)	Enclosure System that includes all the cells, gloveboxes, E1 exhaust ducts, enclosure exhaust damper stops, E1 exhaust fan housings, inlet and outlet damper housings and dampers, E1 exhaust HEPA filter housings, up to the E5 exhaust system tunnel/ductwork	GS, DID/ITS	Provides flow path through the system and a confinement boundary
RREX	E5 Exhaust Ventilation System ductwork (only those components within or attached to Building 235-F)	GS, DID/ITS	Provides confinement and air movement from the E1 Exhaust Ventilation System and other exhaust air ducts beginning at the roof tunnel interface to the E5 fans

Note 1 – BLDG = Building, ELLV = electrical, low voltage, ELNH = electricity, 480V, FP = fire protection, GBEX = glovebox exhaust, RREX = room exhaust

Note 2 – DID/ITS = defense-in-depth/important-to-safety, GS = general service, SS = safety significant

In addition to shutting down SSCs, F-Area coordinated the isolation of utilities to Building 235-F including steam, service water, domestic water, instrument air, sanitary sewer, communications, and electricity, except for an armored cable from 252-11F to 235-F, which provides power to the surveillance lighting (Reference (9.27)). The isolation of utilities is summarized as follows:<sup>5</sup>

- **Electricity** – Construction air-gapped electricity at two locations: Poles F3B526 and F3B367, both located east of Building 235-F outside the fence-line. Within Building 720-F, F-Area Maintenance air-gapped the feeder cables to the mini-power center on the roof of Building 235-F. See GEN-ERH-04.
- **Communications** – F-Area Maintenance air-gapped communications cables at the base of conduits entering the southwest corner of Building 235-F. These cables ran to Room 118 rather than Room 156. See GEN-ERH-05.
- **Steam** – Construction air-gapped the steam line north of Building 701-4F by removing an isolation valve. See GEN-ERH-06.
- **Water Sources** – Construction air-gapped a domestic water line at a below-grade location to the south of Building 235-F, just outside the fence-line. Construction also air-gapped a service water line within the 235-F Yard; however, this service was not actually connected to Building 235-F. Although not a source of hazardous energy, chilled water lines to/from 285-F/285-5F were drained and breached (2” holes were drilled in each pipe) at the base of 235-F’s exterior west wall. See GEN-ERH-07.
- **Instrument Air** (to Buildings 235-1F, 235-2F and 607-3F) - Construction air-gapped the line exiting the south wall of Building 235-F by cutting out a small section of pipe and capping the exposed ends. Construction also air-

<sup>5</sup> See the referenced end point in Appendix A for additional details on an isolation. Also, see M-DCP-F-19007 for applicable design.

gapped and capped the connection for a portable breathing air compressor. See 1E-RI-01.

- **Sanitary Sewer** – Construction grouted sanitary sewer connections within Building 235-F including shower drains, toilets, urinals, sinks, and floor drains. Vents through the Building 235-F roof remain open.
- **Out of Service (OOS) Plant Air** - F-Area Maintenance air-gapped the line north of Building 701-4F by cutting out a small section of pipe. See GEN-ERH-09.
- **235-F Diesel Generator** – Site Infrastructure (SI) deactivated the diesel generator, which included the removal of starter batteries. F-Area Maintenance then air-gapped the feeder cables above the diesel generator. See GEN-ERH-04 and 1G-ERH-04.
- **Overhead Lines** – SI removed (1) two cables and a basket to the southwest corner of Building 235-F, (2) a single cable and a basket to a location above the covered area at the west end of Building 235-F, (3) a pair of cables also to a location above the covered area at the west end of Building 235-F, and (4) multiple cables (in a single basket) to the northeast corner of Building 235-F. This last item was preceded by F-Area Maintenance’s air-gapping of alarm circuits from Building 292-2F’s ECR Room to the Building 235-F SOB. FEDNET provided new communication cables to Building 292-2F. As part of that effort, they relocated the communications cable that previously ran to the northwest corner of Building 235-F from Pole FF55. See GEN-ERH-04 and GEN-ERH-05.
- **Exterior Conduits** – F-Area Maintenance air-gapped the security and communications conduits running up the west and south exterior walls of Building 235-F. See GEN-ERH-04 and GEN-ERH-05.
- **Piping Connections to 292-2F** – F-Area Maintenance air-gapped three overhead pipes (steam, breathing air, and instrument air) between Buildings 235-F and 292-2F. See 3A-ERH-01, -02 and -03.

Building 235-F has four entrances: one on each side of the building (see drawing A-A2-F-2979 [Reference 9.40] for building layout). Each of the entrances is locked to protect/secure property and nuclear material. Normal entry is through the south door to Room 135; however, all doors are available for entry. Three of the doors (north, east, and south) are fitted with interior crash bars for ready egress from the building. In contrast, the west door is fitted with a padlock, which is only accessible from outside the building. In support of building entry, this padlock is removed and a worker is stationed at the door until the entry is completed and the padlock is re-installed (Reference 9.41). Key control is via the F-Area Complex Control Room in Building 772-F.

At the conclusion of deactivation, the 235-F structure was in good condition. Except for periodic roof inspections, there is no maintenance associated with the structure and no ongoing or planned repairs of the structure. For compliance with the 235-F Safety Basis (see Section 5.7.2.8 of Reference 9.13), F-Area

implements a Structural Integrity Program. The last structural integrity inspection was conducted in 2021 during the deactivation project (Reference 9.42). This inspection identified no Priority I, II or III conditions and thus no corrective maintenance. The next structural inspection is currently scheduled for 2027 (5-year frequency). The roof was replaced in 2012 and last inspected in 2018. The next roof inspection is scheduled for early 2023 (5-year frequency).

As mentioned previously in this section, F-Area shutdown all *active* SSCs within Building 235-F during the deactivation project. This shutdown included the Fire Detection and Alarm System (FDAS) consisting of detectors throughout the building's process areas and a control panel in Room 135. There is currently no active fire alarm and/or fire suppression in Building 235-F. See End Point 1A-ERH-01 for additional background on impairment and shutdown of the FDAS.

## 6.02 Radiological or Hazardous Material Status

Radiological contamination remains in many areas of Building 235-F, primarily in those areas containing a shutdown radiological process (i.e., ABL, PEF, PuFF Facility, and OML). Within these areas, the radiological contamination is generally confined to shutdown process enclosures (i.e., cells and gloveboxes) and associated support equipment (e.g., exhaust ducts and inert gas lines). At the end of deactivation, very little radiological contamination existed outside the process enclosures and the associated support equipment.

The remaining radiological contamination is a direct result of Building 235-F's missions to manufacture (1) neptunium-237 billets for eventual irradiation in SRS's reactors and (2) plutonium-238 spheres and pellets as a power source in deep space probes. In support of these missions, Building 235-F received nuclear material (powdered oxides) from H-Canyon. In the conduct of the manufacturing and testing, these oxides (1) contacted process equipment and left residues in/on that equipment and (2) were volatilized, aerosolized, or spilled, which left residues in/on confinements (i.e., cells and gloveboxes) and exhaust system components. These two mechanisms account for the vast majority of radiological contamination in Building 235-F. In some areas (e.g., East Maintenance of the PuFF Facility), radiological contamination—in/on the previously-mentioned equipment/components—then migrated to surrounding surfaces (floors, walls, trenches, exterior of piping and ductwork, etc.) during process upsets, transfers of materials in/out of confinements, and/or during maintenance/modifications to components of the exhaust and confinement systems. Deteriorating neoprene seals associated with the process enclosures have also contributed to radiological contamination on the surrounding surfaces. The remaining radiological contamination is primarily neptunium-237 and plutonium-238 (in oxide form) with lesser concentrations of other actinides such as plutonium-239 (Reference 9.43).

The survey in Appendix C and figures in Appendix D show the radiological conditions at the time F-Area completed interior end points (i.e., end points for all zones except for Zones 1G and 3A) in September 2022 (Reference 9.3). As shown in the survey and on the figures, radiological contamination was present or potentially present in the process areas of Building 235-F. Within the process areas, the highest levels of contamination were within the (1) cells of the PuFF Facility, (2) gloveboxes of the ABL, PEF, PuFF Facility, and OML, and (3) the exhaust ducts from these cells/gloveboxes to the HEPA filter banks in Room 2000.<sup>6</sup> CA/RAs generally surrounded all process enclosures, the primary exception being Room 1002, which was a HCA/ARA/HRA. Additionally, Room 2010 was an HCA/ARA due to past leakage from exhaust ducts and/or components of the inert gas purification system.

After completion of interior end points, the entire building was posted as an inactive HCA/ARA as a minimum because RP is no longer performing routines and retrospective air sampling and because there is some risk that radiological conditions will change during Safe Storage. The HCA/ARA posting ensures workers entering Building 235-F for S&M are protected from radiological contamination that migrated to previously “clean” areas and/or RBAs of the building.

During deactivation, the Project Team completed several end points to fix or remove radiological contamination. Those end points are summarized as follows (see Appendix A for additional details):

- Rolled back West Maintenance (Room 1004) to the extent practical (1B-ERC-01)
- Decontaminated Airlock 158 to the extent practical and reposted the airlock as an RBA (1B-ERC-02)
- Decontaminated/cleaned up the Hot Press vacuum pump containment in East Maintenance (Room 1002) (1B-ERC-03)
- Applied fixative to the Entry Hood in East Maintenance (Room 1002) (1B-ERC-04)
- Removed/fixed/encapsulated contamination associated with the Cell 1’s northernmost manipulator (1B-ERC-05)
- Within the SOB (Room 1003), improved seals for other PuFF Facility manipulators (1B-ERC-06)
- Repaired Building 235-F’s north door (1B-ERC-07)
- Decontaminated, applied fixative, and sealed the leaky ABL ductwork in Room 2007 (2B-ERC-01)
- Applied fixative and sealant to leaky ductwork in East Service (Room 2008) (2C-ERC-02)

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<sup>6</sup> See Reference 9.44 for the radiological inventory associated with contaminated SSCs (e.g., PuFF Facility Cell 1) of Building 235-F.

### 6.03 Custodial Requirements

When this completion report is issued, the following custodial information is applicable to Building 235-F:

- Facility Manager = Verne Mooneyhan (704-59E, (803) 646-8893)
- Operations Manager = Janice Cook (707-F, 2-4247, (803) 507-1758)
- Administrator/Custodian = Donnie Parkman (707-F, 2-4334, (803) 646-6218)

See the 235-F S&M Plan (Reference 9.11) for up-to-date custodial information for the building. Also, see the S&M Plan for a complete list of custodial activities applicable to Building 235-F. There are no additional custodial activities that need to be captured in this completion report.

### 6.04 Licenses/Permits/Regulatory Status

#### 6.04.01 *Resource Conservation and Recovery Act / Comprehensive Environmental Response and Recovery Act*

With one exception, there are no RCRA treatment, storage or disposal facilities or Comprehensive Environmental Recovery, Compensation, and Liability Act (CERCLA) sites at or near Building 235-F. There is a Site Evaluation Area, OU563, directly outside the north wall of Building 235-F and to the southwest of Building 235-F. This Site Evaluation Area is associated with the abandoned process sewer system. Two deactivation activities potentially impacted the Site Evaluation Area: (1) excavation in support of domestic and service water isolations (End Point No. GEN-ERH-07), and (2) excavation for direct burial of new communications cables to Building 292-2F (supported End Point No. GEN-ERH-05). The Project Team prepared and implemented an Operation and Maintenance Activity Plan (References 9.45 and 9.46) for each of these excavations. The plans included soil sampling by RP. That sampling detected no radiological contamination in the excavated soil.

During deactivation, the Project Team completed several end points to remove hazardous materials that become RCRA hazardous waste when disposed. Those end points are summarized as follows (see Appendix A for additional details):

- Remove fluorescent light bulbs containing mercury (GEN-ERH-10)
- Remove batteries from emergency lights (GEN-ERH-12)
- Remove lead-acid batteries for the diesel generator (1G-ERH-04)
- Remove fire extinguishers (GEN-ERH-12)
- Remove compressed gas cylinders (1A-RVA-02)
- Remove used oils (1B-ERH-01, 1B-ERC-03, 1F-ERH-01, 1G-ERH-01, 2A-ERH-02, and 2C-ERH-01)

- Remove lead counterweights from manipulators (1B-ERH-08)

The Project Team managed the first three materials listed above as Universal Waste in accordance with Manual 3Q, Procedure 6.28 “Universal Waste Batteries, Lamps, Mercury-Containing Equipment, and Aerosol Can Management” (Reference 9.47). The next two materials listed above, fire extinguishers and compressed gas cylinders, were not disposed. Instead, they were transferred to other SRS facilities for reuse. With respect to used oils and lead counterweights, the Project Team managed these materials in accordance with Manual 3Q, Procedure 6.4 “Used Oil Management” (Reference 9.48) and Manual 3Q, Procedure 6.20 “Metallic Lead Management” (Reference 9.49), respectively. See Section 4.0 of this completion report for additional details regarding generation and management of wastes.

Prior to deactivation, Building 235-F contained an SAA for paint chips (SAA-235-F-02). During deactivation, this SAA was moved to 211-9F and is now used for the collection of paint chips from throughout F-Area. An SAA (SAA-235-F-03) and a Central Accumulation Area (CAA-235-F-04) were established during deactivation for wastewaters containing metals. Subsequently, the wastewaters were discharged to the sanitary sewer and the SAA and Central Accumulation Area were closed. One other SAA (SAA-235-F-01) was established prior to deactivation for equipment containing cadmium, chromium and/or lead. This SAA was also closed during the deactivation project (waste container was transferred to a Central Accumulation Area at Building 292-F). See End Point No. 1A-RDW-01 in Appendix A for additional details regarding the SAAs and Central Accumulation Area in Room 116.

Although not regulated by RCRA, it is worth noting that the Project Team removed lighting ballasts containing PCBs (see End Point No. GEN-ERH-11 in Appendix A). The Project Team managed the removed ballasts in accordance with Manual 3Q1, Volume 1, Procedure 9101 “Polychlorinated Biphenyl (PCB) Management Manual” (Reference 9.50).

#### 6.04.02 *Clean Air Act*

The deactivation project did not require any new air permits. Also, the deactivation project did not modify or cancel existing permits. Neither the 235-F stack nor the 235-F diesel generator are specifically mentioned in the latest revision of the SRS Title V air permit [Reference 9.51]; however, they are subject to certain conditions within the permit (e.g., Conditions E.3 and E.4).

During deactivation, the 235-F diesel generator was shutdown, disconnected from starter batteries, drained of fluids, and permanently isolated from the 235-F electrical grid (see End Point Nos. GEN-ERH-04, 1G-ERH-01, 1G-ERH-02, 1G-ERH-03, and 1G-ERH-04 in Appendix A). The diesel generator can no longer operate as a stationary internal combustion engine and is no longer tracked on the

SRS listing of insignificant activities (Reference 9.52).

Also during deactivation, the Project Team shutdown the 235-F supply/exhaust fans and modified the supply/exhaust ductwork within Building 235-F (see End Point Nos. GEN-ERH-16 and GEN-EE-03 in Appendix A). Collectively, these actions reduced the volume of air emitted from the 235-F stack.<sup>7</sup> Prior to the shutdown and modifications, the Project Team evaluated Building 235-F's potential to emit radionuclides in the new ventilation configuration. This National Emission Standards for Hazardous Air Pollutants (NESHAP) evaluation determined that the Building 235-F stack would remain a Potential Impact Category 3 (PIC 3) emission point after the shutdown/modifications (Reference 9.53). SCDHEC subsequently concurred with the evaluation and its conclusion (Reference 9.54). Because there was no change to the PIC, the deactivation resulted in no change to the overall strategy for monitoring radionuclide emissions from the 235-F stack.<sup>8</sup>

The 235-F stack remains an active air emissions point subject to 40 Code of Federal Regulations (CFR) 61, Subpart H and Manual 3Q, Procedure 4.15, "Radionuclide NESHAP Program" (Reference 9.55). At deactivation project completion, F-Area Operations continued to own the 235-F stack and continued to be responsible for its emissions, monitoring, reporting, and input to the SRS Air Emissions Inventory (Reference 9.56).

#### *6.04.03 Clean Water Act/Safe Drinking Water Act*

The deactivation had a positive impact on stormwater discharges from in/around Building 235-F to Outfalls F-05 and F-08 for two reasons. First, Building 235-F is no longer discharging cooling water and steam condensate to the sanitary sewer, a "redirect" which prevented these discharges to Outfall F-05 (Reference 9.57).<sup>9</sup> Second, the electrical isolation of Building 235-F also isolated the 285-11F Cooling Tower. Hence, the Cooling Tower will no longer discharge to Outfall F-08. The Deactivation Project Team made no efforts to modify or cancel the combined industrial wastewater and stormwater permit for Outfalls F-05 and F-08 (Reference 9.58). However, the two changes noted earlier in this paragraph will be incorporated into the next permit revision for Outfalls F-05 and F-08.

Domestic water and sanitary wastewater services were provided to Building 235-F through non-permitted line connections. These line connections were air-gapped or blocked during deactivation as part of the Building 235-F isolation (see End Points Nos. GEN-ERH-07 and GEN-ERH-08 in Appendix A). Because they

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<sup>7</sup> The 235-F stack is attached to the 292-2F Fanhouse. Air flow is from Building 235-F, through the 292-4F Sandfilter, through the fans in the 292-2F Fanhouse, and then out the stack attached to Fanhouse. Air is drawn from Building 235-F by the E5 exhaust fans in the 292-2F Fanhouse.

<sup>8</sup> F-Area continues to operate continuous samplers in Building 292-2F in accordance with Manual 5Q1.5, Procedure 319 (Reference 9.56). This procedure was revised so that the setpoint for the continuous samplers was appropriate for the reduced volume of air emitted from the 235-F stack.

<sup>9</sup> Note that 235-F roof drains remain active after deactivation and continue to discharge to Outfall F-05.

were non-permitted line connections, there was no requirement to update or modify a permit prior to their air-gapping/blocking.

## 6.05 Safety Category/Hazards Baseline Documentation

Building 235-F remains a Category 2, non-reactor “nuclear” facility, subject to a Safety Basis. The deactivation project team made no effort to downgrade the facility category. The deactivation project included no efforts to remove radiological material in support of a downgrade because Building 235-F is slated for in-situ decommissioning where the radiological inventory is fixed in place rather than removed.

The Safety Basis documents applicable to Building 235-F are as follows (Reference 9.59):

- U-BIO-F-00003, “Basis for Interim Operation for Building 235-F, Deactivation,” Revision 5, April 2021 (Reference 9.12)
- U-TSR-F-00005, “Technical Safety Requirements, Savannah River Site, Building 235-F, Deactivation,” Revision 5, April 2021 (Reference 9.13)
- NMED-21-0011, “Approval of Transmittal of Building 235-F Basis for Interim Operation (BIO) and Technical Safety Requirements (TSR) Revision 5,” 6/21/21 (Reference 9.15)

Per SafetyNet, the following “safety support documents” are applicable to Building 235-F:

- S-CHA-F-00016, “Consolidated Hazards Analysis for 235-F Deactivation,” Revision 8, February 2021 (Reference 9.60)
- S-EHA-F-00004, “Emergency Planning Hazards Assessment for Building 235-F,” Revision 9, May 2021 (Reference 9.61)
- N-NCS-F-00153, “Nuclear Criticality Safety Assessment: Fissionable Material Inventory Adjustment for 235-F,” July 2020 (Reference 9.62)
- N-NCS-F-00129, “Nuclear Criticality Safety Evaluation: Criticality Potential During Decontamination and Decommissioning of F-Area Material Storage (FAMS),” Revision 2, October 2012 (Reference 9.63)
- OSSES-21-037, DOE Approval of Building 235-F EPHA Revision 9, 10/21/21 (Reference 9.64)
- SRNS-TR-2009-00214, “Technical Safety Requirements, Minimum Shift Crew Compositions for F-Canyon Complex, 235-F and F/H Lab,” Revision 15, September 2021 (Reference 9.65)

Although not listed as a “safety support document,” a transitional fire hazards analysis (TFHA) has been developed and implemented for Building 235-F (Reference 9.39). This document established fire protection and life safety controls, which ensured 235-F fire-related accidents are within Department of Energy risk guidelines.

## 6.06 Configuration Management

During deactivation, the Project Team managed the configuration of impacted SSCs in accordance with the Configuration Management Implementation Plans applicable to Building 235-F (References 9.66 and 9.67) and as required by the 235-F Safety Basis (e.g., see Section 5.7.2.5 of Reference 9.13, which requires a “Configuration Management Program”). In general, the Project Team maintained the full suite of documentation (e.g., drawings, procedures, specifications, calculations, Master Equipment List, etc.) for (1) operating SSCs and (2) those SSCs credited in the Safety Basis (e.g., E5 Exhaust Ventilation System). For shutdown SSCs, the Project Team generally made no effort to maintain documentation. For SSCs that transitioned from operating-to-shutdown during the deactivation project, the Project Team maintained documentation up to the time of shutdown, but not during and/or after the shutdown. For SSCs undergoing shutdown, the Project Team developed and implemented W/Os per Manual 1Y, Procedure 8.20 (Reference 9.68) to control and document the shutdown. To ensure compliance with the 235-F Safety Basis, these W/Os were reviewed by F-Area Engineering and subjected to the USQ process of Manual 11Q, Procedure 1.05 (Reference 9.36).

Significant configuration management activities completed by the Project Team during the deactivation project are as follows:

- Prepared the following MTs per Manual E7, Procedure 2.05 (Ref. 9.69):
  - MT-V35-2019-00001 for new instrument air system and heaters in Building 292-2F (Reference 9.18)
  - MT-V35-2019-00002 for isolation of 235-F utilities (Ref. 9.19)
  - MT-V35-2020-00001 for ventilation modifications (Ref. 9.22)
  - MT-V35-2021-00001 for surveillance lighting installation (Reference 9.23)
- Generated the following design output per Manual E7:
  - M-DCP-F-19006 for new instrument air system and heaters in Building 292-2F (Reference 9.20)
  - M-DCP-F-19007 for isolation of 235-F utilities (Reference 9.21)
  - G-SOW-F-00122, M-ESR-F-00303, and M-ESR-F-00306 for modeling in support of ventilation modifications (Ref. 9.70-9.72)
  - A-A2-F-2979-RL-2021-00001, A-A2-F-2980-RL-2021-00001, M-DCF-F-05012, M-ESR-F-00305 and M-ESR-F-00346 for ventilation modifications (References 9.24-9.26, 9.73 and 9.74)
  - M-ESR-F-00342 and M-ESR-F-00343 for component level functional classification in support of ventilation modifications (References 9.75 and 9.76)
  - E-DCP-F-21004 for installation of surveillance lighting (Ref. 9.27)
  - G-SOW-F-00296 for demolition of Buildings 235-11F and 245-6F (Reference 9.77)

- C-SOW-F-00039 for 281-28F equipment removal and grouting (Reference 9.78)
- E-DCF-F-03591 for electrical isolation of Trailers 235-11F/245-6F (Reference 9.79)
- Obtained the following Site Clearance (SC) Permits per Manual 1D, Procedure 3.02 (Reference 9.80)
  - SC-8268 for mechanical isolations (domestic water)
  - SC-8273 for mechanical isolations (steam)
  - SC-8274 for mechanical isolations (cooling water)
  - SC-8319 for demolition of Trailers 235-11F/245-6F
  - SC-8328 for 281-28F equipment removal and grouting

With a few exceptions, the Project Team cancelled procedures for shutdown SSCs within Building 235-F. The few remaining procedures needing cancellation will be handled by the 235-F S&M Program after deactivation project completion. Also to be handled by the 235-F S&M Program (after deactivation project completion) are the following configuration management activities:

- Review “support” and “essential” drawings in Document Control and downgrade to “general” or “non-technical baseline” as appropriate for shutdown SSCs.
- Close MT for electrical/mechanical isolations (M-DCP-F-19007 [Reference 9.21] is not yet fully complete due to the need to pressure test the active end of the air-gapped service water line).
- Update the Master Equipment List for shutdown SSCs.
- Continue efforts to cancel preventive maintenance as they drop in Asset Suites.

## 7.0 Lessons Learned and Recommendations

The durations for several project activities were longer than expected due to emergent or unforeseen obstacles. Specific issues are discussed in the following two paragraphs.

The Project Team coordinated/completed the issuance of M-DCP-F-19006 (Reference 9.20 for new services to Building 292-2F in support of ventilation modification) and M-DCP-F-19007 (Reference 9.21 for electrical/mechanical isolations) well in advance of the 9/30/22 PBI for shutdown of the 235-F supply/exhaust fans and for the 235-F electrical/mechanical isolations. Even so, implementation of the designs took much longer than expected leaving little schedule float. The longer durations for implementation were primarily due to (1) rework of the design (several amendments) and (2) a conflict regarding applicable codes and standards. The lesson learned relative to the first item is to ensure a thorough review during the design process, i.e., prior to design change package (DCP) issuance. A thorough review may have negated the need for amendments and prevented the associated schedule slippage. With respect to the second item, the lesson learned is that the SRS guidance for use of superseded codes/standards was lacking, thus leading to a difficult-to-resolve conflict between Construction and the

Design Authority. This conflict has since been resolved via the issuance of Revision 13 of Manual 1Q, Procedure 6-1 (Reference 9.81), which clarified that previous revisions of SRS Engineering standards and guides may be stamped “Working Copy” and used to perform work.

The Project Team initiated the preparation of E-DCP-F-21004 (Reference 9.27 for installation of surveillance lighting) in early FY22, well in advance of the PBI mentioned in the previous paragraph. Due to limited resources, a subcontractor prepared the DCP rather than Design Engineering. The subcontractor took longer than expected to prepare the DCP for several reasons. First, the subcontractor did not have access to SmartPlant Foundation, which complicated the review and approval process. Second, the subcontractor had limited knowledge of SRS engineering standards and guides, which slowed their efforts to prepare the DCP. Third, the subcontractor exceeded the approved funding for the effort, necessitating a revision to their task order. The subcontractor did provide an acceptable product and the Project Team did achieve the PBI. However, float associated with the surveillance lighting installation was less than desirable. The lesson learned is that—for time-critical designs—the preferable design agency is Design Engineering.

The Project Team had two successes that are worth mentioning. Those successes are described in the following two paragraphs.

The shutdown of the 235-F ventilation, a complicated process involving 26 steps, was accomplished in short order and without mishap. This is attributable to extensive modeling and pre-planning prior to field execution. The Project Team used the CONTAM software (see References 9.70 through 9.72) to model the 235-F ventilation, simulate the 26-step shutdown process, and verify system parameters would be acceptable during the actual shutdown. The Project Team also spent considerable time analyzing and preparing for each step of the shutdown, i.e., planning was thorough and detailed. Facilities, who plan to shut down ventilation, should make use of the CONTAM software and would likely benefit from a review of the 235-F ventilation shutdown documentation.

The deactivation included three end points for fixing transferrable contamination in East Maintenance (1B-ERC-04), Room 2007 (2B-ERC-01), and Room 2010 (2C-ERC-02). The Project Team used 3M™ FireDam™ Spray, an intumescent coating, to satisfy the end points and to fix transferrable contamination at all three locations. The Project Team found that the coating is easy to apply, works well as a fixative, and has the added benefit of being non-combustible (a critical characteristic for use in Building 235-F, where fixed and transient combustibles are kept to a minimum). Based on successful use in the three areas, the Project Team greatly expanded its use to include most vertical surfaces in East Maintenance (Room 1002) of Building 235-F. The Project Team recommends that facilities with transferrable contamination should consider using FireDam™ as a fixative.

## **8.0 Supporting Documents**

This section describes and makes reference to additional deliverable documents that contain detailed discussions that are relevant but not appropriate for inclusion in this report.

### **8.01 Facility Condition Documentation Package**

Concurrent with the preparation/issuance of this completion report, F-Area prepared an FCDP for Building 235-F (Reference 9.10). Therefore, the FCDP is accurate and up-to-date at the time of deactivation completion. The FCDP describes the condition of the facility at the completion of deactivation and entry into Safe Storage. Note that deactivation End Point No. GEN-DL-01 required F-Area to update the FCDP.

### **8.02 Deactivation Project Plan**

The DPP (Reference 9.1) was the top-tier document defining the deactivation project. In addition, it was the document that guided the project team from project inception to project completion. The project plan is a good source of information relative to the scope, cost and schedule for the project. Additionally, the project plan is the source of end points addressed by Appendix A of this completion report.

### **8.03 Surveillance and Maintenance Plan**

Concurrent with the preparation/issuance of this completion report and the updated FCDP, F-Area prepared an S&M Plan for Building 235-F (Reference 9.11). The initial issue of the S&M Plan is accurate and up-to-date at the time of deactivation completion. The S&M Plan describes the activities to be implemented by the facility owner to keep the facility in a safe and stable condition that is protective of workers, the environment, and the Public. Note that End Point No. GEN-DL-02 required F-Area to prepare/issue an S&M Plan.

### **8.04 Structural Inspection Report**

For compliance with the 235-F Safety Basis (see Section 5.7.2.8 of Reference 9.13), F-Area implements a Structural Integrity Program in accordance with a “program description document” (Reference 9.82). The program’s purpose is to ensure the Building 235-F structure can perform its intended safety function. Additionally, the program provides assurance that structural or functional degradation is detected early, i.e., before it compromises the SSC’s intended safety function and to provide ample time for corrective action. The last structural integrity inspection was conducted in 2021 during the deactivation project and documented in a report (Reference 9.42). This report identified no Priority I, II or III conditions and thus no corrective maintenance.

## 9.0 References

- 9.1 V-PMP-F-00247, "Deactivation Project Plan, Preparation for Decommissioning, Building 235-F, Metallurgical Building," Revision 1, 9/4/20.
- 9.2 Facility Disposition Manual 1C, "Glossary," latest revision.
- 9.3 SRNS-E1400-2022-00026, "Preliminary End Points Completion Report for Building 235-F Deactivation," 9/5/22.
- 9.4 Facility Disposition Manual 1C, Procedure 303, "Preparing a Deactivation Project Final Report," latest revision.
- 9.5 Conduct of Project Management and Control Manual E11, latest revision.
- 9.6 DOE Order 413.3B, "Program and Project Management for the Acquisition of Capital Assets," 11/29/10.
- 9.7 Program Management Manual 6B, latest revision.
- 9.8 NMPD-19-0024, "Savannah River Management and Operating Contract DE-AC09-08SR22470, Direction Regarding Building 235-F Activity," 7/10/19.
- 9.9 SRNS-RP-2021-00001, "Removal Site Evaluation Report / Engineering Evaluation/Cost Analysis for the F-Area Material Storage Building (235-F)," Revision 1, February 2022.
- 9.10 G-ESR-F-00088, "Facility Condition Documentation Package, Building 235-F, Metallurgical Building," Revision 1, February 27, 2023.
- 9.11 G-SMPL-F-00008, "Surveillance and Maintenance Plan, 235-F, Metallurgical Building," February 7, 2023.
- 9.12 U-BIO-F-00003, "Basis for Interim Operation for Building 235-F, Deactivation," Revision 5, April 2021.
- 9.13 U-TSR-F-00005, "Technical Safety Requirements, Savannah River Site, Building 235-F, Deactivation," Revision 5, April 2021.
- 9.14 N-SBIP-F-00039, "Safety Basis Implementation Plan for 235-F, BIO/TSR Revision 4," Revision 3, July 2020.
- 9.15 NMED-21-0011, "Approval of Transmittal of Building 235-F Basis for Interim (BIO) and Technical Safety Requirements (TSR) Revision 5," 6/21/21.
- 9.16 N-SBIP-F-00041, "Safety Basis Implementation Plan for 235-F, BIO/TSR Revision 5," Revision 2, September 2021.
- 9.17 N-SBIP-F-00045, "Safety Basis Implementation Plan for 235-F, Transition Surveillance and Maintenance," Revision 2, August 2022.
- 9.18 MT-V35-2019-00001, "Install New Instrument Air Systems and Heaters in 292-2F Facility," Design Agency Acceptance in July 2019.
- 9.19 MT-V35-2019-00002, "Isolation of Electrical/Utility Feeds to Building 235-F, 235-1F, 235-2F, 607-3F and Cooling Tower 285-11F," Design Agency Acceptance in August 2019.
- 9.20 M-DCP-F-19006, "Installation of New Instrument Air System and Heaters in 292-2F Facility, January 2020.
- 9.21 M-DCP-F-19007, "Isolation of Electrical/Mechanical to Building 235-F, 235-1F, 235-2F, 607-3F and Cooling Tower 285-11F," April 2020.
- 9.22 MT-V35-2020-00001, "235-F Ventilation End State (VES) Modifications for Facility Deactivation," Design Agency Acceptance in June 2020.

- 9.23 MT-V35-2021-00001, "Install Temporary Lighting in Support of 235-F Post Deactivation Activities," Design Agency Acceptance in May 2021.
- 9.24 Redline A-A2-F-2979-RL-2021-00001, "Door Modifications for 235-F Deactivation," 7/15/21.
- 9.25 Redline A-A2-F-2980-RL-2021-00001, "Door Modifications for 235-F Deactivation," 7/15/21.
- 9.26 M-DCF-F-05012, "235-F Deactivation Ventilation End State Modifications," 9/16/21.
- 9.27 E-DCP-F-21004, "235-F Surveillance Lighting Installation Supporting Post Deactivation Activities," Revision 1, May 2022.
- 9.28 Log No. 19-10-01, M&O Site Estimating, Estimate Summary Sign-Off Report, "235-F Deactivation," January 2020.
- 9.29 Manual 6B, Procedure 1.7, "Cost Estimates," latest revision.
- 9.30 Email, Brian Vining to John Musall, "Volume of Waste from 235-F," 2/15/23.
- 9.31 Manual 3Q, Procedure 2.18, "Treatment of Non-Routinely Generated (Scavenger) Wastewater," latest revision.
- 9.32 Procedure 221-F-55025 "Handling 'Green-Is-Clean,' Solid Low Level Waste (LLW) and Hazardous/Mixed Waste in F-Area Operations Facilities," latest revision.
- 9.33 Email, Oliver to Hasty, "RE: 235-F Shield Windows," 2/16/23.
- 9.34 Manual 1-01, Policy 1.22, "Integrated Safety Management System," latest revision.
- 9.35 Manual 8Q, Procedure 122, "Hazard Analysis Process," latest revision.
- 9.36 Manual 11Q, Procedure 1.05, "Nuclear Facility Unreviewed Safety Questions," latest revision.
- 9.37 Manual 2S, Procedure 2.1, "Task Preparation and Post-Job Review," latest revision.
- 9.38 Engineering Standard 07270, "Criteria for the Design, Installation, and Inspection of Firestop Systems, Cementitious Seals, Duct Wraps, and Conduit Seals," Revision 11, 4/4/22.
- 9.39 F-TFHA-F-00007, "Transitional Fire Hazards Analysis for Building 235-F and Support Buildings," Revision 1, 10/24/22.
- 9.40 A-A2-F-2979, "Building 235-F, 1st Floor Room Plan," latest revision.
- 9.41 235-F-3354, "Building 235-F Entry Control," latest revision.
- 9.42 T-ESR-F-00036, "235-F Facility 2021 SIP Report," February 2022.
- 9.43 S-CLC-F-00717, "Decayed 235-F PEC per Gram Values for Pu-238 and Np-237," 11/7/19.
- 9.44 U-CLC-F-00061, "235-F Inputs and Assumptions," Revision 3, January 2021.
- 9.45 22-0111. "Minor Operation and Maintenance Activity Plan, Isolation of Water Utilities to 235-F, 282-11F Cooling Tower, and 292-2F – Site Index 563," 8/17/22.
- 9.46 23-013. "Operation and Maintenance Activity Plan, Isolation of Communication Cables from 235-F," 1/26/23.
- 9.47 Manual 3Q, Procedure 6.28, "Universal Waste Batteries, Lamps, Mercury-Containing Equipment, and Aerosol Can Management," latest revision.
- 9.48 Manual 3Q, Procedure 6.4 "Used Oil Management," latest revision.
- 9.49 Manual 3Q, Procedure 6.20 "Metallic Lead Management," latest revision.
- 9.50 Manual 3Q1, Volume1, Procedure 9101 "Polychlorinated Biphenyl (PCB) Management Manual," latest revision.


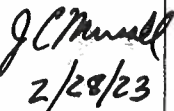
- 9.51 Permit No. TV-0080-0041, "Bureau of Air Quality Title V Operating Permit," issued by the South Carolina Department of Health and Environmental Control to the United States Department of Energy – Savannah River Site [and] Savannah River Nuclear Solutions LLC," Effective Date of 4/1/21.
- 9.52 SRNS-J2200-2022-00187, "Supporting Documentation for Removal of Emergency Diesel Generator and Fuel Tank from the Insignificant Activities List for Title V Operating Permit 0080-0041," 9/14/22.
- 9.53 SRNS-J2200-2022-00056, "Building 235-F Ventilation Transition Sequence (VTS) and Ventilation End State (VES)," 3/31/22.
- 9.54 SRNS-OS-2022-00145, "Re: Building 235-F Ventilation Transition Sequence (VTS) and Ventilation End State (VES)," 4/22/22.
- 9.55 Manual 3Q, Procedure 4.15, "Radionuclide NESHAP Program," latest revision.
- 9.56 Manual 5Q1.5, Procedure 319, "Operation of the Building 235-F Exhaust Isokinetic Air Sampling System and Sand Filter Inlet Sample," latest revision.
- 9.57 SRNS-J2600-2022-00440, "Notice of Permanent Closure of F-05 Redirect Line to CSWTF, 11/22/22.
- 9.58 Permit No. SC0000175, "National Pollutant Discharge Elimination System Permit for Discharge to Surface Waters - USDOE/Savannah River Site," Modification Issued 11/30/08.
- 9.59 S-SBL-F-00001, "Savannah River Nuclear Solutions, Building 235-F, Safety Basis List," Revision 38, 2/2/23.
- 9.60 S-CHA-F-00016, "Consolidated Hazards Analysis for 235-F Deactivation," Revision 8, February 2021.
- 9.61 S-EHA-F-00004, "Emergency Planning Hazards Assessment for Building 235-F," Revision 9, May 2021.
- 9.62 N-NCS-F-00153, "Nuclear Criticality Safety Assessment: Fissionable Material Inventory Adjustment for 235-F," July 2020.
- 9.63 N-NCS-F-00129, "Nuclear Criticality Safety Evaluation: Criticality Potential During Decontamination and Decommissioning of F-Area Material Storage (FAMS)," Revision 2, October 2012.
- 9.64 OSSES-21-037, "Approval Request for the 235-F Emergency Planning Hazards Assessment (EPHA) S-EHA-F-00004, Revision 9 (Letter, Shifer to Bartholomew, August 3, 2021)," 10/21/21.
- 9.65 SRNS-TR-2009-00214, "Technical Safety Requirements, Minimum Shift Crew Compositions for F-Canyon Complex, 235-F and F/H Lab," Revision 15, September 2021.
- 9.66 WSRC-RP-94-644, "F/H Laboratory, F-Canyon and 235-F, Configuration Management Implementation Plan," Revision 14, 3/10/22.
- 9.67 ESR-FCA-2016-00002, "F-Canyon & 235-F, Configuration Management Implementation Plan," Revision 3, 5/3/21.
- 9.68 Manual 1Y, Procedure 8.20, "Work Control Procedure," latest revision.
- 9.69 Manual E7, Procedure 2.05, "Modification Traveler," latest revision.
- 9.70 G-SOW-F-00122, "CONTAM Computer Modelling and Ventilation Analysis for Building 235-F," Revision 2, 3/31/20.
- 9.71 M-ESR-F-00303, "Savannah River Site – 235-F CONTAM Model Design and Validation," 5/14/20.

- 9.72 M-ESR-F-00306, "Building 235-F Deactivation, Ventilation Transition Sequence, CONTAM Model Simulations," 8/26/20.
- 9.73 M-ESR-F-00305, "Ventilation Transition Sequence, Planned Modifications and Ventilation End State for Building 235-F Deactivation," 12/17/20.
- 9.74 M-ESR-F-00346, "235-F Glove Box Exhaust Hose Connection Blank," 5/27/21.
- 9.75 M-ESR-F-00342, "235-F PuFF Cell 9 Seal Pot Functional Classification Evaluation," 4/12/21.
- 9.76 M-ESR-F-00343, "235-F Liquid Waste Handling Glove Box Functional Classification Evaluation," 10/6/21.
- 9.77 G-SOW-F-00296, "Dismantlement and Removal of Buildings 235-11F and 245-6F," 12/6/22.
- 9.78 C-SOW-F-00039, "Removal of Equipment and End State Configuration of Met Lab Waste Containment Area," 1/5/23.
- 9.79 E-DCF-F-03591, "Disconnect Power Cables from 245-6F, 235-11F and 235-17F," 11/30/22.
- 9.80 Manual 1D, Procedure 3.02, "Site Real Property Configuration Control," latest revision.
- 9.81 Manual 1Q, Procedure 6-1, "Document Control," Revision 13, 7/2/22.
- 9.82 T-TRT-F-00036, "F-Area Complex Structural Integrity Program," Revision 9, 7/28/21.
- 9.83 G-SDD-F-00007, "Final Acceptance Inspection" (Form OSR 20-22), for 235-F Deactivation, Inspection Date of 8/16/22.
- 9.84 G-SDD-F-00009, "Final Acceptance Inspection" (Form OSR 20-22), for Demolition of 235-11F and 245-6F and Surrounding Area, Inspection Date of 2/21/23.
- 9.85 G-SDD-F-00010, "Final Acceptance Inspection" (Form OSR 20-22), for Removal of MET Lab Waste Tank and Associated Equipment, Inspection Date of 2/21/23.
- 9.86 SRNS-J2600-2022-00015, "Notice of Permanent Closure of 235-F Diesel Generator and Diesel Fuel Tank," 2/21/23.
- 9.87 A-A2-F-2980, "Building 235-F, 2nd Floor Room Plan," latest revision.

## Appendices

- A. Listing of End Points and/or End Point Activities Along with Completion Verification**
- B. Photos**
- C. Final Facility Survey Reports**
- D. Radiological Maps for Building 235-F**

Appendix A - Listing of End Points and/or End Point Activities Along with Completion Verification

End Point	Activity Description	End Point	Discussion	Verification Signature
APPLICABLE TO ALL ZONES				
GEN-ERH-01	Per Manual 3Q, Procedure 4.14, perform inspection(s) of affected SSCs for ACM and issue the required report.	Inspection has been completed and required report issued.	<p><b>Activity is complete and end point has been achieved.</b> EC&amp;ACP completed a baseline inspection of Building 235-F in 2020 (see Q-APG-F-00033). This inspection did not identify any ACM in need of abatement but did identify ACM in mastic removed during subsequent chilled water line draining/air-gapping (see W/O No. 01978974). EC&amp;ACP also completed other inspections of Building 235-F in support of deactivation and with the potential to disturb ACM. Example inspections were SDD-APG-2018-02200 (ceiling tiles, various locations), SDD-APG-2019-02359 (ceiling tiles, Corridor 1000), Q-APG-F-00158 (insulation on air dryer), Q-APG-F-00208 (Room 152 concrete), Q-APG-F-00288 (breathing air gaskets), and Q-APG-F-00361 (cable insulation). All of these recent example reports were “negative” for ACM. One recent inspection did identify ACM in instrument air gaskets (see Q-APG-F-00300). Subsequently, these gaskets were removed during the air-gapping of instrument air lines exterior Building 235-F (see W/O No. 01952572).</p> <p>EC&amp;ACP also completed baseline inspections of the demolished trailers, 235-11F and 245-6F (see Q-APG-F-00322 and Q-APG-F-00323). No ACM was identified in 245-6F; however, ACM was identified in the window putty of 235-11F. This ACM was remediated during the subsequent demolition of the two trailers (see End Point 3A-RVA-02). In support of the trailers’ demolition, EC&amp;ACP completed an inspection of duct mastic (see Q-APG-F-00355), which was determined to be “negative” for ACM.</p> <p>EC&amp;ACP also completed baseline inspections of the remediated containment, 281-28F (see Q-APG-F-00332). The inspection identified no ACM at 281-28F.</p> <p>EC&amp;ACP also completed an inspection of the steam line within the 235-F yard (see SDD-APG-2014-00986), which identified potential ACM in gaskets. Subsequently, some gaskets were impacted/removed during the air-gapping of the steam line (see W/O No. 01931043).</p>	 2/28/23
GEN-ERH-02	Prepare and submit notice of asbestos disturbance for deactivation scope, if applicable.	Notice of asbestos disturbance has been prepared and issued, if applicable.	<p><b>Activity is complete and end point has been achieved.</b> In general, deactivation activities have not impacted asbestos. The primary exceptions were (1) the installation of surveillance lighting, which included the drilling of holes in asbestos cement board walls, (2) the demolition of Trailer 235-11F (ACM in window sealant), (3) the draining of water lines on the west face of 235-F (included the removal of insulation/mastic prior to draining), (4) the air-gapping of a steam line (potential ACM in gaskets) and (5) the air-gapping of instrument air lines (ACM in gaskets). The notices associated with these activities are contained in W/O Nos. 01911006, 01931043, 01952572, 01995668, and 01978974.</p>	 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
GEN-ERH-03	Complete asbestos abatement actions, if applicable.	Asbestos abatement actions have been completed, if applicable.	<b>Activity is complete and end point has been achieved.</b> As discussed in GEN-ERH-02, there were five activities that generated ACM. As evidenced by the finished or complete work orders and walkdowns, the activities are physically complete. Also see FAIs (References 9.83 through 9.85).	<i>J.C. Munnell</i> 2-28-23
GEN-ERH-04	Isolate Building 235-F from electrical sources.	Electrical feeds to the building (both currently active and abandoned) have been air-gapped (includes the following currently active feeds: (1) to Substation in Room 156, (2) from Substation 252-20F, (3) to exterior lights from 720-F, and (4) to alarm circuits in Room 1003 from 292-2F). No overhead lines remain connected to the building and conduits have been air-gapped at ground level.	<b>Activity is complete and end point has been achieved.</b> The two primary electrical feeds to Building 235-F (via the Transformer Room [Room 156] and Substation 252-20F) have been air-gapped along with overhead cabling to the northeast corner of Building 235-F. See W/O Nos. 01931043, 01952230, 1952574 & 01958293 and Photos B1 & B3. The electrical feed to the 235-F roof-top mini power center (from 720-F and for exterior lights) has also been air-gapped (see W/O No. 01929806) along with the electrical feed from the 235-F diesel generator (see W/O No. 01961326 and Photo B2). Also, all overhead lines were dropped and conduits on the west side and southwest corner of Building 235-F were air-gapped (see W/O Nos. 01982072, 01969345 & 01996981 and Photos B4 & B5)	<i>Jeff Hrostky</i> 2/28/23
GEN-ERH-05	Isolate Building 235-F from communications.	Communications to Room 156 have been air-gapped. No overhead lines remain connected to the building and conduits have been air-gapped at ground level.	<b>Activity is complete and end point has been achieved.</b> Communication cables to Building 235-F have been air-gapped (see Photo B5) by F-Area Maintenance with FEDNET approval (see Work Order No. 01996981). The air-gaps are located along the southern wall of Building 235-F near the southwest corner of the building.	<i>Jeff Hrostky</i> 2/28/23
GEN-ERH-06	Isolate Building 235-F from steam sources.	The steam line to Building 235-F has been air-gapped.	<b>Activity is complete and end point has been achieved.</b> The steam line to Building 235-F has been air-gapped (see W/O No. 01931043 and Photo B6). Note that new electric heaters were installed in Building 292-2F in support of the steam isolation (see W/O No. 01863061). Also note that pressure safety valves for the steam system were removed (see W/O No. 01953321).	<i>Jeff Hrostky</i> 2/28/23
GEN-ERH-07	Isolate Building 235-F from water sources.	The domestic water, chilled water and service water lines to Building 235-F have been air-gapped.	<b>Activity is complete and end point has been achieved.</b> Domestic water has been air-gapped (see W/O No. 01931043 and Photo B7). Chilled water lines from 285-F/285-5F, shutdown facilities and not a source of hazardous energy, have been air-gapped on the building exterior (see W/O No. 01978974 and Photo B8). Chilled water lines from Buildings 235-1F and 235-2F have been drained (see W/O No. 01946760). These lines are not a source of hazardous energy because these buildings were fed from Building 235-F, which has been electrically isolated (see End Point GEN-ERH-04). Service water has been air-gapped (see W/O No. 01931043); however, this utility actually went to structures (e.g., 285-11F) outside the deactivation scope and is not a source of hazardous energy to Building 235-F. Note that domestic water lines within Building 235-F were drained (see W/O Nos. 01935708 and 01946755).	<i>Jeff Hrostky</i> 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
GEN-ERH-08	Isolate Building 235-F from sanitary sewer.	The sanitary sewer manhole at the SW corner of Building 235-F has been grouted.	<b>Activity is complete and end point has been achieved.</b> Building 235-F has been isolated from the sanitary sewer via capping/plugging of connections within Building 235-F (see W/O No. 01922503, SRNS-E1400-2022-00025 and Photo B9). Note that most remaining storm sewer connections were also plugged/capped (see W/O No. 01942576 and one item in W/O No. 01922503).	<i>JM Hasty 2/28/23</i>
GEN-ERH-09	Isolate Building 235-F from OOS plant air.	The plant air piping to Building 235-F has been air-gapped.	<b>Activity is complete and end point has been achieved.</b> Building 235-F has been isolated from OOS plant air (see W/O Nos. 01952572 & 01977481 and Photo B6). Note that W/O No. 01952572 also air-gapped/capped the instrument air line outside 235-F to prevent connection to a portable air compressor.	<i>JM Hasty 2/28/23</i>
GEN-ERH-10	Remove fluorescent lights bulbs containing mercury.	Lighting fixtures have been inspected for non-green cap fluorescent light bulbs and all non-green cap bulbs have been removed from the fixtures. Mercury containing bulbs in process enclosures remain in place.	<b>Activity is complete and end point has been achieved.</b> Removal is complete. See W/O Nos. 01917058, 01942570, 01942572, 01942573, 01949315, and 01949317. Also see Facility Acceptance Inspection (FAI) (Reference 9.83).	<i>JM Hasty 2/28/23</i>
GEN-ERH-11	Remove PCB ballasts from lighting fixtures and circuits.	Lighting fixtures have been inspected for PCB ballasts. Lighting fixtures and circuits are free of PCB ballasts.	<b>Activity is complete and end point has been achieved.</b> Removal is complete. See W/O Nos. 01857849, 01917058, 01942570, 01942572, 01942573, 01949315, and 01949317. Also see FAI (Ref. 9.83).	<i>JM Hasty 2/28/23</i>
GEN-ERH-12	Remove batteries from emergency lights.	Building 235-F is free of batteries.	<b>Activity is complete and end point has been achieved.</b> Removal is complete. See W/O Nos. 01917059 and 01955415. Also see FAI (Reference 9.83).	<i>JM Hasty 2/28/23</i>
GEN-ERH-13	Remove transient combustibles from Building 235-F.	Building 235-F is free of transient combustibles and there are no posted transient combustible storage areas within Building 235-F.	<b>Activity is complete and end point has been achieved.</b> Transient combustibles have been removed along with posted storage areas. See W/O Nos. 01754952, 01753939, & 01915592 and Photo B10 for ceiling tile removal. Also see FAI (Reference 9.83). Note that except for ceiling tile removal, there was no single W/O dedicated to the removal of transient combustibles. Rather, controls were built into W/O's, when applicable, for the introduction, control, and removal of transient combustibles in accordance with F-Area procedures 221-F-51105, 235-F-SF-020 (posting), and 235-F-SF-021 (permit). Additionally, to supplement the controls in W/O's, F-Area conducted bi-weekly inspections for transient combustibles in accordance with 235-F-SF-018.	<i>JM Hasty 2/28/23</i>
GEN-ERH-14	Remove fire extinguishers from Building 235-F.	Building 235-F is free of fire extinguishers.	<b>Activity is complete and end point has been achieved.</b> Removal is complete. See W/O No. 01961143 and FAI (Reference 9.83).	<i>JM Hasty 2/28/23</i>
GEN-ERH-15	Remove tritium exit signs from Building 235-F.	Building 235-F is free of tritium exit signs.	<b>Activity is complete and end point has been achieved.</b> Removal is complete. See W/O No. 01955410 and FAI (Reference 9.83).	<i>JM Hasty 2/28/23</i>

End Point	Activity Description	End Point	Discussion	Verification Signature
GEN-ERH-16	Reconfigure ventilation (e.g., supply ductwork/fans, and exhaust ductwork/fans) so that process enclosures are no longer acted upon by an E1 exhaust fan, yet the building and process enclosures remain under negative pressure.	All supply fans are shutdown, and exhaust fans E1 through E4 are shutdown. Process enclosures remain more negative as compared to the enclosure rooms. Enclosure rooms continue to be exhausted by the E5 fans in Building 292-2F.	<b>Activity is complete and end point has been achieved.</b> The VTS is complete except for those steps affecting the E5 controller in Building 292-2F (i.e., Steps 22 and 23 per U-ESR-F-00305). These two steps, which are external to 235-F and outside the deactivation scope, will be completed in FY23 as part of the S&M of Building 292-2F. Closure of the LVAM outlet slide gate (originally part of VTS Step 14) was completed just prior to issuance of this document. Closure was confirmed via interview of the operator (McCaskill) who turned off the LVAM blower and closed the slide gate (also see 01967329). For other VTS steps and other support activities, see W/O Nos. 01805140, 01842315, 01860843, 01861469, 01863285, 01882274, 01886867, 01886868, 01887152, 01888015, 01891540, 01896136, 01903788, 01903795, 01905755, 01905842, 01915536, 01917257, 01921900, 01931281, 01940646, and 01960011. See Photos B11 and B12 for typical modifications to supply ductwork.	J.M. Hursty 2/28/23
GEN-RDW-01	Prepare & submit request for screening of real property for disposition.	Department of Energy has approved excessing of assets.	<b>Activity is complete and end point has been achieved.</b> Excessing is complete. See SDD-2009-00228 and SDD-2009-00242.	J.C. Muirall 2/29/23
GEN-DL-01	Update and reissue the FCDP.	The FCDP has been revised to capture the condition/configuration of Building 235-F at the completion of deactivation.	<b>Activity is complete and end point has been achieved.</b> See G-ESR-F-00088, Revision 1.	J.C. Muirall 2/29/23
GEN-DL-02	Prepare and issue an S&M Plan for Building 235-F.	The S&M Plan is issued and posted to EPFM.	<b>Activity is complete and end point has been achieved.</b> See G-SMPL-F-00008, Revision 0.	J.C. Muirall 2-28-23
GEN-DL-03	Prepare and issue a Deactivation Project Completion Report in accordance with Manual 1C, Procedure 303.	The completion report is issued and posted to EPFM.	<b>Activity is complete and end point has been achieved.</b> This document (V-PCOR-F-00093, Revision 0) satisfies the end point.	J.C. Muirall 2/28/23
GEN-EE-01	Revise & submit an EEC for approval in accordance with Manual 3Q, Procedure 5.1.	NONA is issued. EEC is approved.	<b>Activity is complete and end point has been achieved.</b> Environmental Evaluation Checklists (EECs) are approved and Notices of NEPA Approval (NONAs) were issued (NEPA = National Environmental Policy Act). See CBU-F-2019-0030, Revision 5, CBU-F-2022-01001, Revision 2, SRNS-J2600-2022-00109, and CBU-F-2022-01001, Revision 2.	J.M. Hursty 2/28/23
GEN-EE-02	Revise and implement Safety Basis in support of the deactivation activities.	Department of Energy has signed the authorization agreement and the Safety Basis Implementation Plan is complete.	<b>Activity is complete and end point has been achieved.</b> Safety basis was revised to include deactivation activities. See N-AA-F-00002, Revision 5, N-SBIP-F-00041, Revision 2, U-BIO-F-00003, Revision 5 and U-TSR-F-00005, Revision 5.	J.M. Hursty 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
GEN-EE-03	Conduct engineering study and modeling to identify exhaust ventilation modifications, which allow shutdown of the supply fans and exhaust fans E1 through E4.	Study/modeling is complete and issued. Study/ modeling identifies a ventilation configuration where Building 235-F remains under negative pressure after shutdown of the supply fans and exhaust fans E1 through E4. MT for modifications, based on the study/modeling, is accepted by Design Engineering.	<b>Activity is complete and end point has been achieved.</b> Engineering studies and modeling are complete. See M-ESR-F-00302, M-ESR-F-00303, M-ESR-F-00305, and M-ESR-F-00306. These studies and modeling were input to MT-V35-2020-00001, which was accepted by Design Engineering on 6/25/20. The MT in turn was input for the design output (e.g., M-DCF-F-05012, various field sketches [e.g., 235-F-DEACT-VENT-001], and two redlines [A-A2-F-2979-RL-2021-00001 and A-A2-F-2980-RL-2021-00001]), which was prepared by F-Area Engineering.	<i>J. Hasty</i> 2/28/23
GEN-EE-04	Conduct a Final Acceptance Inspection (FAI) in accordance with Manual 8Q, Procedure 51, when deactivation scope is completed.	FAI-51 Inspection has been completed and all punch-list items have also been completed.	<b>Activity is complete and end point has been achieved.</b> An initial FAI, which covered the building interior, was conducted on 8/16/22 (Reference 9.83). Two additional FAIs, which covered the trailer demolition and the 281-28F remediation, were conducted on 2/21/23 (References 9.84 and 9.85).	<i>J.C. McCall</i> 2/28/23
<b>ZONE 1A</b>				
1A-ERH-01	Impair or shutdown the FDAS panel in Room 135 so that smoke detectors in process areas can be placed OOS in support of ceiling tile removal.	OOS smoke detectors do not alarm at the FDAS panel.	<b>Activity is complete and end point has been achieved.</b> The FDAS was impaired in 2019. See impairment No. 2019-705. Also see NMED-20-0002 for DOE's approval to impair the system, and SRNS-N0000-2020-00011 for SRNS's commitment to keep the system operational until electrical isolation of Building 235-F. Subsequently, the FDAS was de-energized (see End Point GEN-ERH-04) and laid up (see Work Order No. 01965771).	<i>J. Hasty</i> 2/28/23
1A-ERH-02	Remove used oil from transformer in Room 156.	Transformer is free of bulk used oil.	<b>Activity is complete and end point has been achieved.</b> No oil was removed because the transformer was found to be a "dry" transformer. See W2022954 and BPF201118.	<i>J. Hasty</i> 2/28/23
1A-RVA-01	Remove temporary monitoring equipment (computer, screens, radio) from Room 131.	Monitoring equipment has been removed from Building 235-F and disposed or excessed.	<b>Activity is complete and end point has been achieved.</b> Temporary monitoring equipment has been removed from Room 131 (HP Office) based on 8/16/22 walkdown by Musall and Hasty. Also, see FAI (Reference 9.83).	<i>J. Hasty</i> 2/28/23
1A-RVA-02	Remove Argos equipment from Rooms 116 and 157 along with oxygen monitors, CRMs and compressed gas cylinders. Also remove CRM from Room 140.	Equipment/cylinders has been removed from Building 235-F and disposed or excessed.	<b>Activity is complete and end point has been achieved.</b> Argos equipment has been removed from Room 116 and Airlock 157. See W/O Nos. 01941452 and 01953487. Oxygen monitors and compressed gas cylinders have also been removed based on 8/24/22 walkdown by Musall. CRMs have been removed based on 9/5/22 interview of the Deactivation Project Manager (Hasty). Also, see W/O No. 01961145 for removal of constant air monitors.	<i>J. Hasty</i> 2/28/23
1A-RDW-01	Close SAA in Room 116 in accordance with Manual 3Q, Procedure 6.9.	Waste has been removed and transferred to Solid Waste for custodianship, and SAA is removed.	<b>Activity is complete and end point has been achieved.</b> SAA-235-F-02 was moved to 211-9F in October '20 (Ref. SRNS-J2600-2019-00202 revision log). An additional SAA (SAA-235-F-03) was established in Room 116 in October '21. This SAA was closed in June '22 based on interview of F-Area ECA and email documentation (Price to Kuhn, "Satellite Accumulation Area (SAA-235-F-03) – Closure," dated 6/20/22). Waste in SAA-235-F-03 was hazardous wastewater, which was disposed to the sanitary sewer prior to SAA closure.	<i>J. Hasty</i> 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
<b>ZONE 1B</b>				
1B-ERH-01	Remove used oil (in vacuum pump for Hot Press, and in cylinders/small lines associated with the Hot and Cold Presses) from East Maintenance.	East Maintenance is free of bulk used oil.	<b>Activity is complete and end point has been achieved.</b> Oils have been removed from the PuFF Facility vacuum pumps, Hot Press and Cold Press. See W/O No. 01875108. Note that oils were also drained from the ABL cold press in Zone 1C. See W/O Nos. 01850745 and 01886138.	<i>J. Musall</i> <i>H. Hasty</i> 2/28/23
1B-ERH-02	Drain/verify empty the Chilled Water Collector Tank.	Chilled Water Collector Tank has been drained and verified empty.	<b>Activity is complete and end point has been achieved.</b> Tank was inspected on 4/15/21 by Musall and found to be empty. See email, Musall to Hasty, "Results of 4/15/21 Walkdown of the Chilled Water Tank in East Maintenance of Building 235-F," 4/19/21.	<i>J. Musall</i> <i>H. Hasty</i> 2/28/23
1B-ERH-03	Drain water from shield doors and from annulus spaces of gloveboxes.	Shield doors and gloveboxes are free of shield water. Bottom drain legs are left open.	<b>Activity is complete and end point has been achieved.</b> Shield doors and glovebox annuluses were drained and collected water was discharged to the sanitary sewer. There were no drain legs associated with small inner shield doors. These doors were emptied via removal of a top plug, and then use of a wand/pump. The plug was reinstalled after draining. The large shield doors were drained via a self-closing disconnects at the base of the doors. This disconnect was not modified or removed during the draining. Because the shield doors were resealed after draining, then for consistency, the drain legs on the gloveboxes were closed after draining. See W/O Nos. 01864309 and 01880587. Also, see Photo B13.	<i>J. Musall</i> <i>H. Hasty</i> 2/28/23
1B-ERH-04	Drain water from closed-loop system that circulates water to/from the PuFF Facility shield windows.	Tank in Room 2004 is empty.	<b>Activity is complete and end point has been achieved.</b> The system was drained and collected water was discharged to the sanitary sewer. See W/O No. 01880604.	<i>J. Musall</i> <i>H. Hasty</i> 2/28/23
1B-ERH-05	Drain water from closed-loop system that circulates water to/from the Cooled Storage tanks below Cells 1-9.	Tanks below cells are empty.	<b>Activity is complete and end point has been achieved.</b> The system was drained to the extent practical and collected water was discharged to the sanitary sewer. See W/O No. 01868121.	<i>J. Musall</i> <i>H. Hasty</i> 2/28/23
1B-ERH-06	Remove glove cartridges from cells/gloveboxes and replace with blank cartridges or electrical pass-thru.	Glove cartridges have been removed from cells/ gloveboxes and replaced with blank cartridge or electrical pass thru.	<b>Activity is complete and end point has been achieved.</b> Glove cartridges have been removed and replaced with blank cartridges based on 8/16/22 inspection by Musall.	<i>J. Musall</i> <i>H. Hasty</i> 2/28/23
1B-ERH-07	Remove ceiling tiles. (Removal minimizes fire severity due to low combustible loading and minimizes mold/mildew once building is "cold and dark.")	All room are free of ceiling tiles.	<b>Activity is complete and end point has been achieved.</b> PuFF Facility ceiling tiles have been removed except for Airlocks 1009 and 1010. For these two airlocks, the ceiling tiles were replaced with non-combustible ceiling tiles. Light diffusers were also removed concurrent with the removal of ceiling tiles. See W/O Nos. 01753939 and 01754952 and Photo B10.	<i>J. Musall</i> <i>H. Hasty</i> 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
1B-ERH-08	Remove lead counterweights on manipulator masters in Room 1003.	Counterweights have been removed and disposed.	<b>Activity is complete and end point has been achieved.</b> Lead counterweights have been removed to the extent practical. The entire masters—including the counterweights associated with the masters—were removed from Cells 3-5 and the two northernmost positions associated with Cell 1. Counterweights atop the masters and for the Y-motion have been removed from all remaining masters except for one master on Cell 1 and both masters on Cell 2. These three masters were not targeted for lead removal due to concerns with unplanned movement of these manipulators' interior slave arms. Lead counterweights also remain within the barrels of all remaining masters as well as in the thru tubes and on the slave arms. The preceding discussion is based on an 8/24/22 walkdown by Musall. Also, see W/O No. 01831190. Note that masters were removed from Cells 3-5 and counterweights from Cells 6-9 (in support of shield window remediation) prior to the current deactivation.	<i>Jeff Hasty 2/28/23</i>
1B-ERC-01	Decontaminate West Maintenance Area to the extent practical and roll back to an RBA.	West Maintenance Area has been decontaminated to the extent practical and rolled back to an RBA.	<b>Activity is complete and end point has been achieved.</b> West Maintenance has been rolled back to the extent practical. A small inactive CA remains adjacent to the Cells 6-8 as a precautionary measure to support opening of the shield doors and to address potential contamination within the shield doors. See RSLs-CANY-M-20220718-1 and RSLs-CANY-M-20220809-16 for example surveys of West Maintenance. Note that the entire building was posted as an HCA/ARA upon conclusion of interior deactivation.	<i>Jeff Hasty 2/28/23</i>
1B-ERC-02	Decontaminate Airlock 158 to the extent practical and roll back to an RBA.	Airlock 158 has been decontaminated to the extent practical and rolled back to an RBA.	<b>Activity is complete and end point has been achieved.</b> Based on an 8/16/22 walkdown by Musall, Airlock 158 has been rolled back to an RBA. Also, see RSLs-CANY-M-20220512-9. Note that the entire building was posted as an HCA/ARA upon conclusion of interior deactivation.	<i>Jeff Hasty 2/28/23</i>
1B-ERC-03	Decontaminate Hot Press vacuum pump containment and remove plastic sheeting and other combustible components (e.g., gloves and plastic caps) around pump.	Sheeting and combustible components have been removed.	<b>Activity is complete and end point has been achieved.</b> Per interview of the 235-F Deactivation Lead (McCall) on 7/12/22, combustible materials were removed from the containment including plastic sheeting, oils, oily residues, plastic jugs, bucket, and flashlights. Installed gloves and caps were not removed. The floor of the containment was dry wiped, and a fixative (FireDam™) was applied to the interior of the confinement to fix contamination (see W/O No. 01910457 and Photo B14). Note that refrigerant in the Hot Press cooling unit was also removed (see W/O No. 01905044).	<i>Jeff Hasty 2/28/23</i>
1B-ERC-04	Fix or remove contamination in the Entry Hood attached to the Cold Press Glovebox.	Entry Hood is free of transferrable contamination.	<b>Activity is complete and end point has been achieved.</b> A fixative (FireDam™) was applied to the interior surfaces of the Entry Hood. See W/O No. 01648596 and Photo B15. Note that a cover was installed over the Entry Hood to further isolate the contamination in the Entry Hood. See W/O No. 01860843.	<i>Jeff Hasty 2/28/23</i>
1B-ERC-05	Fix or remove contamination associated with the Cell 1 north manipulator, and better seal manipulator penetration to Cell 1.	Cell 1 manipulator is free of transferrable contamination, and manipulator penetration is sealed to prevent future migration of contamination from the cell.	<b>Activity is complete and end point has been achieved.</b> The northernmost manipulator master was removed, and a cover/sealant was installed over the remaining exposed end of the manipulator thru tube. See WOs No. 01849353 and Photo B16. Also see RSLs-CANY-M-20210421-12.	<i>Jeff Hasty 2/28/23</i>
1B-ERC-06	Better seal the manipulator penetrations to other PuFF Facility East Line cells.	Manipulator penetrations are sealed to prevent future migration of contamination from the cells.	<b>Activity is complete and end point has been achieved.</b> Sealant was applied to the penetrations for Cells 1-7 and 9. See W/Os Nos. 01849353 and 01906940. See previous end points for discussion regarding the northernmost manipulator for Cell 1. Note that penetrations for Cell 8 were sealed by the 235-F S&M Program and its Enclosure Integrity Program. See W/O No. 01748462 and Photo B16.	<i>Jeff Hasty 2/28/23</i>

End Point	Activity Description	End Point	Discussion	Verification Signature
1B-ERC-07	Better seal the north door of Building 235-F (Door 153).	The door is sealed (air- and water-tight to the extent practical) to prevent future migration of contamination from the PuFF Facility to the yard of Building 235-F. Sealing may include the installation of a shallow dike on the interior to the door.	<b>Activity is complete and end point has been achieved.</b> The north door was modified/repaired to provide a better seal. See W/O Nos. 01887152 and 01931281. The airlock adjacent to the north door was also modified/repaired to provide a better seal. See W/O Nos. 01896136 and 01886868.	<i>J. M. Hasty</i> 2/28/23
1B-RVA-01	Remove radiation monitoring equipment (e.g., CAMs).	Monitoring equipment has been removed from Building 235-F and disposed or excessed.	<b>Activity is complete and end point has been achieved.</b> Monitoring equipment was removed from Zone 1B based on 9/5/22 interview of the Deactivation Project Manager (Hasty). Also, see W/O No. 01961145.	<i>J. M. Hasty</i> 2/28/23
1B-RDW-01	Remove temporary monitoring equipment (e.g., screens, cameras and microphones).	Monitoring equipment has been removed from Building 235-F and disposed or excessed.	<b>Activity is complete and end point has been achieved.</b> Loose monitoring equipment was removed based on 8/16/22 walkdown by Musall and Hasty. Installed monitoring equipment will be abandoned-in-place.	<i>J. M. Hasty</i> 2/28/23
1B-RDW-02	Remove all TRU waste and LLW and transfer custodianship to Solid Waste.	All waste has been removed and transferred to Solid Waste for custodianship.	<b>Activity is complete and end point has been achieved.</b> All TRU waste and LLW was removed based on 8/16/22 walkdown by Musall and Hasty.	<i>J. M. Hasty</i> 2/28/23
1B-RDW-03	Remove all temporary containments.	All temporary containments have been removed.	<b>Activity is complete and end point has been achieved.</b> All containments were removed based on 8/16/22 walkdown by Musall and Hasty. Also see Work Orders Nos. 01754072 and 01773507.	<i>J. M. Hasty</i> 2/28/23
1B-RDW-04	Remove all temporary risk reduction equipment/ materials, including temporary lighting.	All temporary risk reduction equipment/material, including temporary lighting has been removed.	<b>Activity is complete and end point has been achieved.</b> All risk reduction equipment was removed based on 8/16/22 walkdown by Musall and Hasty. A lighting stand remains in the SOB. The lighting stand was abandoned in place after electrical isolation.	<i>J. M. Hasty</i> 2/28/23
1B-MCC-01	Secure shield doors in the closed position.	All shield doors are closed and protective of the cells' shield windows.	<b>Activity is complete and end point has been achieved.</b> Musall and Hasty inspected the West Maintenance doors on 8/16/22 and confirmed that they were closed. Per interview of 235-F RP (Lawton) on 8/24/22, the East Maintenance doors were confirmed to be closed. See Photo B13.	<i>J. M. Hasty</i> 2/28/23
<b>ZONE 1C</b>				
1C-ERH-01	Remove combustible materials to the extent practical.	Ceiling tiles have been removed and oils have been drained from the press in Glovebox 4.	<b>Activity is complete and end point has been achieved.</b> Ceiling tiles have been removed. See W/O No. 01753939. Also, oil has been removed from the press. See W/O Nos. 01850745 and 01886138.	<i>J. M. Hasty</i> 2/28/23
1C-RVA-01	Remove radiation monitoring equipment (e.g., CAMs).	Monitoring equipment has been removed from Building 235-F and disposed or excessed.	<b>Activity is complete and end point has been achieved.</b> Monitoring equipment was removed from Zone 1C based on 9/5/22 interview of the Deactivation Project Manager (Hasty). Also, see W/O No. 01961145.	<i>J. M. Hasty</i> 2/28/23
<b>ZONE 1D</b>				
None	None	None	N/A	<i>N/A</i> <i>J. C. Musall</i> 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
<b>ZONE 1E</b>				
1E-ERH-01	Remove combustible materials to the extent practical.	Used oils have been drained from all instrument air and breathing air compressors.	<b>Activity is complete and end point has been achieved.</b> Oils have been removed from compressors. Also, the compressors were electrically isolated in preparation for draining. See W/O Nos. 01848592, 01942576, and 01851732.	<i>Jeff Hasty</i> 2/28/23
1E-RDW-01	Remove all temporary maintenance equipment/materials.	All temporary maintenance equipment/materials have been removed.	<b>Activity is complete and end point has been achieved.</b> Zone was inspected on 8/16/22 by Musall and Hasty and found to be free of temporary maintenance equipment/materials. Also, see FAI (Reference 9.83).	<i>Jeff Hasty</i> 2/28/23
1E-RI-01	Permanently vent air receivers and air dryers.	Plugs have been removed from pressure vessels and/or nearby piping is air-gapped or open.	<b>Activity is complete and end point has been achieved.</b> Air receivers and air dryers were vented. See W/O Nos. 01863284 and 01942576. Note that 01952572 air-gapped instrument air lines outside the south wall of Building 235-F (service to Buildings 235-1F, 235-2F and 607-3F). Also note that connections for portable air compressors (for both breathing air and instrument air) were also air-gapped and/or capped (see 01885665 and 01952572). Finally note that pressure safety valves for instrument air on the second floor of Building 235-F (in Zone 2C) were removed (see W/O No. 01946712).	<i>Jeff Hasty</i> 2/28/23
<b>ZONE 1F</b>				
1F-ERH-01	Remove used oil (in EB welder, in vacuum breaker seal pots, in vacuum pump for Hot Press, and in cylinders/ lines associated with the Hot & Cold Presses) from PEF.	PEF is free of bulk used oil.	<b>Activity is complete and end point has been achieved.</b> Oils were removed from the hot and cold presses and two vacuum pumps. See W/O Nos. 01843574, 01843575 and 01841778. The EB welder was found not to contain oil (see F-TRT-F-00041). The vacuum breaker seal pots and the vacuum pump in Glovebox 13 were not drained due to the significant effort required to drain/access this equipment and/or the small volume (<1 gallon total) associated with each piece of equipment. Note that refrigerant in the Hot Press cooling unit was also removed (see W/O No. 01905043).	<i>Jeff Hasty</i> 2/28/23
1F-ERH-02	Drain water from shield walls.	Shield walls are free of shield water. Bottom drain legs are left open.	<b>Activity is complete and end point has been achieved.</b> Shield walls have been drained and collected water was disposed to the sanitary sewer. See W/O No. 01855321.	<i>Jeff Hasty</i> 2/28/23
1F-ERH-03	Remove ceiling tiles from Rooms 153A and 154. (Removal minimizes fire severity due to low combustible loading and minimizes mold/mildew once building is "cold and dark.")	All room are free of ceiling tiles.	<b>Activity is complete and end point has been achieved.</b> Ceiling tiles have been removed. See W/O No. 01753939.	<i>Jeff Hasty</i> 2/28/23
1F-RVA-01	Remove radiation monitoring equipment (e.g., CAMs).	Monitoring equipment has been removed from Building 235-F and disposed or excessed.	<b>Activity is complete and end point has been achieved.</b> Monitoring equipment was removed from Zone 1F based on 9/5/22 interview of the Deactivation Project Manager (Hasty). Also, see W/O No. 01961145.	<i>Jeff Hasty</i> 2/28/23
<b>ZONE 1G</b>				
1G-ERH-01	Remove used oil and oil filter from diesel engine.	Diesel engine is free of bulk used oil.	<b>Activity is complete and end point has been achieved.</b> Used oil and oil filter have been removed from the diesel generator (see W/O No. 01961326).	<i>Jeff Hasty</i> 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
1G-ERH-02	Drain coolant from radiator.	Radiator is free of bulk coolant.	<b>Activity is complete and end point has been achieved.</b> Coolant has been removed from the diesel generator (see W/O No. 01961326).	<i>Jeff Harty</i> 2/28/23
1G-ERH-03	Drain diesel fuel from supply lines and filter.	Diesel engine is free of diesel fuel.	<b>Activity is complete and end point has been achieved.</b> Diesel fuel has been drained from supply lines and filter (see W/O No. 01961326).	<i>Jeff Harty</i> 2/28/23
1G-ERH-04	Disconnect and remove lead acid batteries.	The diesel generator enclosure is free of lead-acid batteries.	<b>Activity is complete and end point has been achieved.</b> Batteries were disconnected and removed (see W/O No. 01961326).	<i>Jeff Harty</i> 2/28/23
1G-RBM-01	Drain diesel fuel from storage tank, and isolate/seal tank.	Storage tank is free of diesel fuel and flushed/sealed to remove residual diesel fuel and prevent reuse in accordance with Manual 3Q, Procedure 2.4.	<b>Activity is complete and end point has been achieved.</b> Diesel fuel tank has been drained and isolated (see W/O Nos. 01961326 and 01997223).	<i>Jeff Harty</i> 2/28/23
1G-RDW-01	Remove all temporary maintenance equipment/materials.	All temporary maintenance equipment/materials have been removed.	<b>Activity is complete and end point has been achieved.</b> Temporary maintenance equipment has been removed based on 1/30/23 walkdown by Musall. Also see FAI (Reference 9.83).	<i>Jeff Harty</i> 2/28/23
1G-DL-01	Re-label the storage tank for diesel fuel.	Storage tank is stenciled "EMPTY, CLOSED ON XX/XX/XX." Other labeling on tank is removed.	<b>Activity is complete and end point has been achieved.</b> Labeling has been applied to the storage tank based on 1/30/23 walkdown by Musall. See Photo B17.	<i>Jeff Harty</i> 2/28/23
1G-EE-01	Remove the storage tank for diesel fuel from the SRS SPCC Plan.	Tank has been removed from the SRS SPCC Plan in accordance with Manual 3Q, Procedure 2.4.	<b>Activity is complete and end point has been achieved.</b> Storage tank was permanently closed (see W/O No. 01961326) and letter has been issued to SRS Environmental Compliance in support of their periodic (future) revision of the SPCC (see Reference 9.86).	<i>Jeff Harty</i> 2/28/23
<b>ZONE 2A</b>				
2A-ERH-01	Drain refrigerants from chillers in Room 209.	Chiller room is free of refrigerants.	<b>Activity is complete and end point has been achieved.</b> Refrigerants were removed. See W/O No. 01905045 and Photo B18.	<i>Jeff Harty</i> 2/28/23
2A-ERH-02	Drain used oils from rotating equipment in Room 209.	Chiller room is free of bulk used oil.	<b>Activity is complete and end point has been achieved.</b> Oils were removed. See W/O No. 01899544 and Photo B18.	<i>Jeff Harty</i> 2/28/23
2A-ERH-03	Drain cooling water from piping and components of the supply ventilation.	Piping and components of the supply ventilation are free of bulk cooling water.	<b>Activity is complete and end point has been achieved.</b> Chilled water was drained and discharged to sanitary sewer (see W/O No. 01946760). Also, water was drained from cooling systems that supported the PuFF Facility and discharged to the sanitary sewer (see W/O Nos. 01880603 & 01903813 and Photo B18). Note that pressure safety valves were removed from the chilled water system (see W/O No. 01936275).	<i>Jeff Harty</i> 2/28/23
<b>ZONE 2B</b>				
2B-ERH-01	Drain cooling water from piping and components of the supply ventilation.	Piping and components of the supply ventilation are free of bulk cooling water.	<b>Activity is complete and end point has been achieved.</b> Water was drained and discharged to the sanitary sewer (see W/O No. 01946760).	<i>Jeff Harty</i> 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
2B-ERC-01	Fix or remove contamination associated with the overhead ABL exhaust duct, and better seal duct.	Exhaust duct is free of transferrable contamination, and duct is sealed to prevent future migration of contamination from the duct.	<b>Activity is complete and end point has been achieved.</b> Plastic containment was partially removed from the ABL valve and then a fixative (FireDam™) applied. A pipe wrap was then installed over the fixative. Finally, fixative was applied to the valve stem that penetrated the pipe wrap. See W/O No. 01909128 and Photo B19.	<i>JM Hursty 2/28/23</i>
<b>ZONE 2C</b>				
2C-ERH-01	Drain oils from blowers for inert gas systems in Room 2008 and from vacuum pumps in Rooms 2009 and 2010.	Blowers and vacuum pumps are free of bulk used oil.	<b>Activity is complete and end point has been achieved.</b> Oils were removed from vacuum pumps in Rooms 2008, 2009, and 2010. See W/O No. 01850718 and Photo B20. Based on company literature and the absence of fill/drain ports, the Spencer (hermetic) inert gas blowers (in Room 2008) were found not to contain bulk oil. Because they continue to support proper operation of the exhaust ventilation, oils remain in seal pots in Rooms 2008 and 2009 (see Photo B21).	<i>JM Hursty 2/28/23</i>
2C-ERH-02	Remove ceiling tiles from all rooms and corridors. (Removal minimizes fire severity due to low combustible loading and minimizes mold/mildew once building is "cold and dark.")	All rooms are free of ceiling tiles.	<b>Activity is complete and end point has been achieved.</b> Ceiling tiles have been removed except for Room 2010 (East Service). For this room, the ceiling tiles were replaced with non-combustible ceiling tiles. Lighting diffusers were removed from all rooms. See W/O Nos. 01753939 and 01754952.	<i>JM Hursty 2/28/23</i>
2C-ERH-03	Drain water from cooling systems in Rooms 2008, 2009 and 2010 and Corridor 2002.	Systems are free of bulk cooling water.	<b>Activity is complete and end point has been achieved.</b> Systems have been drained. See W/O Nos. 01880603 and 01885973. The system in Corridor 2002, which provided cooling water to the PuFF Facility Vacuum Furnace Glovebox, was not drained because it was found to be partially installed and never placed into service (inspected by Musall and McCaskill on 5/25/21).	<i>JM Hursty 2/28/23</i>
2C-ERC-01	In Rooms 2008 and 2010, remove HEPA filters associated with inert gas systems, and decontaminate filter housings to the extent practical.	HEPA filter have been removed from their housings, and the housings have been resealed.	<b>Activity and end point were not needed for a safe, stable deactivation end state.</b> The deactivation project team did not remove the HEPA filters. They are abandoned-in-place and no longer provide a filtration function. The HEPA filters were not removed because (1) the HEPA filters make only a minor contribution to the 235-F radiological inventory (which is left intact elsewhere in the building), (2) the HEPA filters are not a current or ongoing source of transferrable contamination to the surrounding spaces, and (3) their removal is unnecessary worker exposure considering Building 235-F is progressing towards "in-situ decommissioning."	<i>JM Hursty 2/28/23</i>
2C-ERC-02	Fix or remove contamination associated with the PuFF Facility exhaust ducts, and better seal ducts.	Exhaust ducts are free of transferrable contamination, and ducts are sealed to prevent future migration of contamination from the ducts.	<b>Activity is complete and end point has been achieved.</b> Fixative was applied to leaky ductwork in Room 2010 (primarily that associated with Cell 5). See W/O No. 01910457, Radcon survey CANY-M-20220105-3, and Photo B22. Transferrable contamination was greatly reduced but some was still detectable.	<i>JM Hursty 2/28/23</i>

End Point	Activity Description	End Point	Discussion	Verification Signature
2C-RVA-01	Remove radiation monitoring equipment (e.g., CAMs).	Monitoring equipment has been removed from Building 235-F and disposed or excessed.	<b>Activity is complete and end point has been achieved.</b> Monitoring equipment was removed from Zone 2C based on 9/5/22 interview of the Deactivation Project Manager (Hasty). Also, see W/O No. 01961145.	Jeff Hasty 2/28/23
2C-DL-01	Remove administrative locks from isolation valves associated with Cells 6-9 service panels.	Administrative locks have been removed.	<b>Activity is complete and end point has been achieved.</b> Administrative locks have been removed based on walkdown by Musall on 7/13/22.	Jeff Hasty 2/28/23
<b>ZONE 2D</b>				
2D-ERC-01	If needed for proper operation of exhaust ventilation after deactivation, remove HEPA filters associated with the E1 exhaust system.	HEPA filter have been removed from their housings, and the housings have been resealed.	<b>Activity and end point were not needed for a safe, stable Ventilation End State.</b> HEPA filters remain installed in Room 2000. Their removal was not required in support of the Ventilation End State. For Engineering studies and modeling, see M-ESR-F-00302, M-ESR-F-00303, M-ESR-F-00305, and M-ESR-F-00306.	Jeff Hasty 2/28/23
2D-RVA-01	Remove radiation monitoring equipment (e.g., CAMs).	Monitoring equipment has been removed from Building 235-F and disposed or excessed.	<b>Activity is complete and end point has been achieved.</b> Monitoring equipment was removed from Zone 2D based on 9/5/22 interview of the Deactivation Project Manager (Hasty). Also, see W/O No. 01961145.	Jeff Hasty 2/28/23
<b>ZONE 2E</b>				
2E-ERH-01	Drain cooling water from piping and components of the supply ventilation.	Piping and components of the supply ventilation are free of bulk cooling water.	<b>Activity is complete and end point has been achieved.</b> Water was drained and discharged to the sanitary sewer (see W/O No. 01946760).	Jeff Hasty 2/28/23
2E-RI-01	Permanently vent air receiver.	Plug has been removed from pressure vessel and/or nearby piping is air-gapped or open.	<b>Activity is complete and end point has been achieved.</b> Air receivers were vented, and pressure safety valves were removed (see W/O No. 01863284).	Jeff Hasty 2/28/23
<b>ZONE 2F</b>				
2F-ERH-01	Drain cooling water from piping and components of the PEF Hot Press Cooling System.	Piping and components are free of bulk cooling water.	<b>Activity is complete and end point has been achieved.</b> No draining was conducted because the system was found to be modified and drained prior to deactivation (see W/O No. 00677642).	Jeff Hasty 2/28/23
<b>ZONE 3A</b>				
3A-ERH-01	Air-gap steam piping between Building 235-F and Building 292-2F.	Section of piping above road north of Building 235-F has been removed.	<b>Activity is complete and end point has been achieved.</b> Steam line has been air-gapped (see W/O No. 01976251 and Photo B23).	Jeff Hasty 2/28/23
3A-ERH-02	Air-gap breathing air piping from Building 235-F to Building 292-2F.	Section of piping above road north of Building 235-F has been removed.	<b>Activity is complete and end point has been achieved.</b> Steam line has been air-gapped (see W/O No. 01976251 and Photo B23).	Jeff Hasty 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
3A-ERH-03	Air-gap instrument air piping from Building 235-F to Building 292-2F.	Section of piping above road north of Building 235-F has been removed.	<b>Activity is complete and end point has been achieved.</b> Steam line has been air-gapped (see W/O No. 01976251 and Photo B23).	<i>Jeff Hasty</i> 2/28/23
3A-ERH-04	Drain refrigerant from chiller for the PEF Hot Press Cooling System.	Chiller room is free of refrigerants.	<b>Activity is complete and end point has been achieved.</b> Refrigerant was removed from the chiller. See W/O No. 01903425.	<i>Jeff Hasty</i> 2/28/23
3A-ERH-05	Drain cooling water from the PEF Hot Press Cooling System cooling system.	Piping and components are free of bulk cooling water.	<b>Activity is complete and end point has been achieved.</b> No draining was conducted because the system was found to be modified and drained prior to deactivation. See W/O No. 00677642.	<i>Jeff Hasty</i> 2/28/23
3A-ERH-06	Isolate electricity and communications to Trailers 235-11F and 245-6F.	Trailers are free of hazardous energy.	<b>Activity is complete and end point has been achieved.</b> Trailers have been isolated in preparation for demolition (see W/O Nos. 01974408 and 01989483).	<i>Jeff Hasty</i> 2/28/23
3A-ERH-07	After removal of trailers, housekeep area formerly occupied by trailers and remaining structure (e.g., remove wooden stairways and tie-down straps).	Area is free of tripping hazards and extraneous equipment. (Note that the substation is being reused for temporary lighting to Building 235-F. See end points .)	<b>Activity is complete and end point has been achieved.</b> Housekeeping is complete based on field walkdown on 2/21/23 by Hasty and Musall. Also see FAI (Reference 9.84).	<i>Jeff Hasty</i> 2/28/23
3A-RVA-01	Remove refrigerators, computers, equipment, furniture and supplies, etc. from Trailers 235-11F and 245-6F.	Rooms within trailers are empty.	<b>Activity is complete and end point has been achieved.</b> Refrigerators, computers, miscellaneous equipment, furniture, supplies and hazardous materials (e.g., fluorescent bulbs, ballasts, batteries, and refrigerants) were removed from the trailers in preparation for demolition (see W/O Nos. 01976252, 01977477, 01980051, and 01983078).	<i>Jeff Hasty</i> 2/28/23
3A-RVA-02	Remove Trailers 235-11F and 245-6F.	Trailers have been removed from Building 235-F yard. (Fluorescent lights bulbs, ballasts, and refrigerants are not being removed from the trailers because the trailers are assumed to be excess/reused.)	<b>Activity is complete and end point has been achieved.</b> Trailer have been demolished and demolition debris was disposed to the SRS C&D Landfill (see W/O No. 01995668, Photo B24 and FAI [Reference 9.84]). Due to their deteriorated condition, the trailers were not candidates for excess or reuse. Therefore, hazardous materials (e.g., fluorescent light bulbs, ballasts, refrigerant, and ACM) were removed by SRNS or the demolition subcontractor prior to demolition (see W/O Nos. 01977477, 01980051, 01983078, and 01995668).	<i>Jeff Hasty</i> 2/28/23
3A-RDW-01	Close SAA in Room 116 in accordance with Manual 3Q, Procedure 6.9.	Waste has been removed and transferred to Solid Waste for custodianship, and SAA is removed.	<b>Activity is complete and end point has been achieved.</b> This end point is a duplicate of End Point No. 1A-RDW-01. See End Point No. 1A-RDW-01 for discussion of status.	<i>Jeff Hasty</i> 2/28/23

End Point	Activity Description	End Point	Discussion	Verification Signature
3A-RDW-02	Remove all LLW, MW and hazardous waste from the west covered area and transfer custodianship to Solid Waste.	All waste has been removed and transferred to Solid Waste for custodianship.	<b>Activity is complete and end point has been achieved.</b> All waste has been removed from the west covered area of Building 235-F (see Photo B25). Most waste was transferred to Solid Waste for disposal (e.g., all TRU waste) or discharged to the sanitary sewer (e.g., coolants from various draining activities). Some waste was transferred to F-Area's S&M Program for consolidation with other F-Area wastes (e.g., used oil and contaminated metallic lead). Also, see Section 4.02 of this report for additional discussion regarding waste management.	<i>Jell</i> <i>Hooty</i> 2/28/23
3A-RDW-03	Close SAA(s) and CAA(s) on the west covered area in accordance with Manual 3Q, Procedures 6.9 and 6.21.	SAA(s) and CAA(s) are removed.	<b>Activity is complete and end point has been achieved.</b> SAAs and CAAs are closed or relocated (see Photo B25). Also see discussion in Section 6.04.01.	<i>Jell</i> <i>Hooty</i> 2/28/23
3A-RI-01	Break 281-28F concrete containment.	Containment is configured so that it no longer contains standing water.	<b>Activity is complete and end point has been achieved.</b> Equipment (e.g., tanks and piping) has been removed from containment. Subsequently, the containment was filled and the curbing broken to ensure no standing water (see W/O No. 01995712, C-SOW-F-00039, Photo B26, and FAI [Reference 9.85]).	<i>Jell</i> <i>Hooty</i> 2/28/23
<b>ZONE 3B</b>				
3B-ERH-01	Drain refrigerant from window air conditioning unit.	Air conditioning unit is free of refrigerant.	<b>Activity is complete and end point has been achieved.</b> Refrigerant was removed from two units. The units were removed from the roof of 235-F and disposed. See W/O No. 01905046.	<i>Jell</i> <i>Hooty</i> 2/28/23

Appendix B – Photos

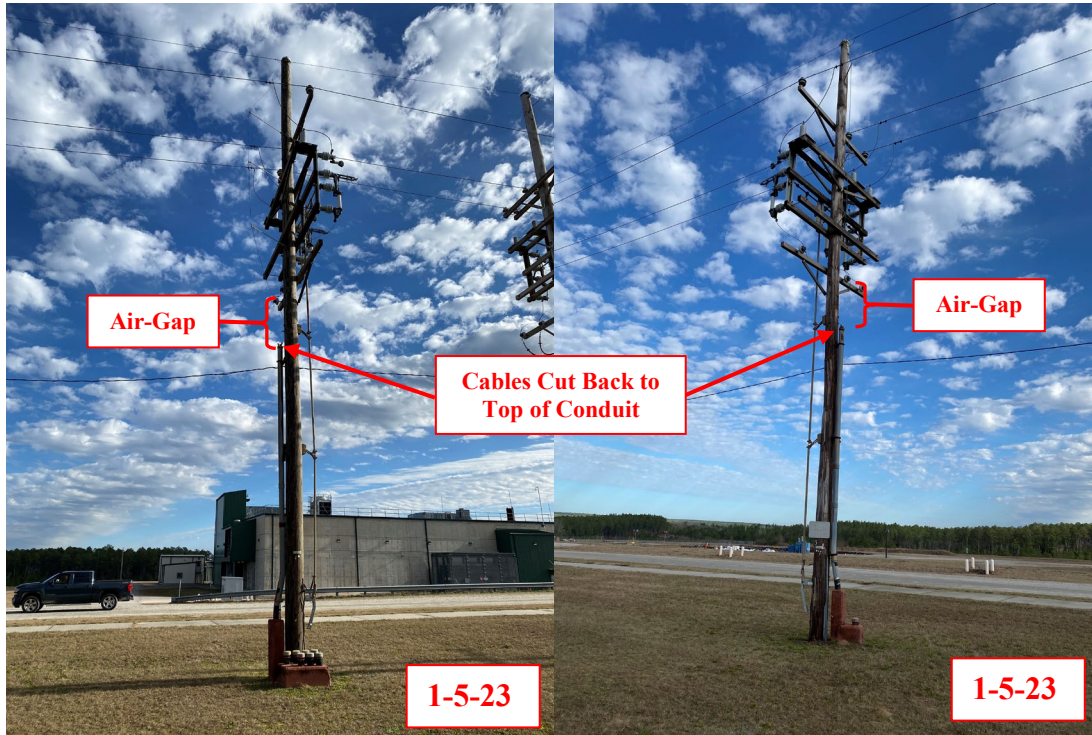


Figure B1 – Air-Gapped Electricity at Poles F3B526 and F3B367

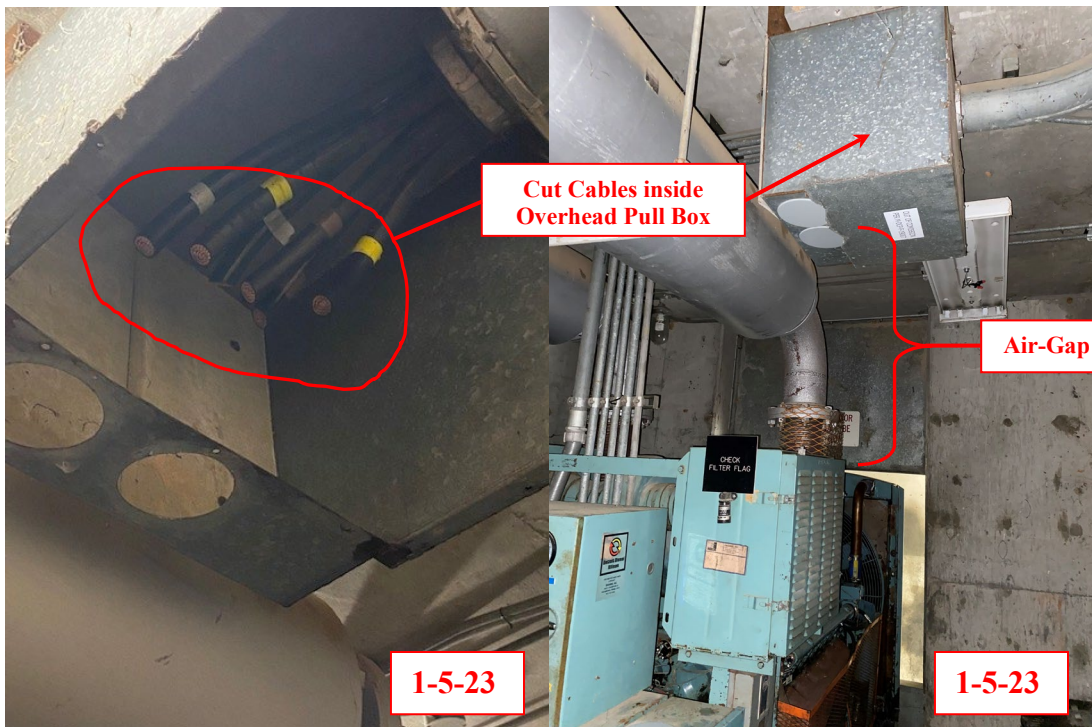


Figure B2 – Air-Gapped Diesel Generator, Southeast Corner 235-F

Photo is typical of four (4) other locations where overhead cables previously went to Building 235-F (i.e., to northwest corner, to two places on the west wall, and to the southwest corner).

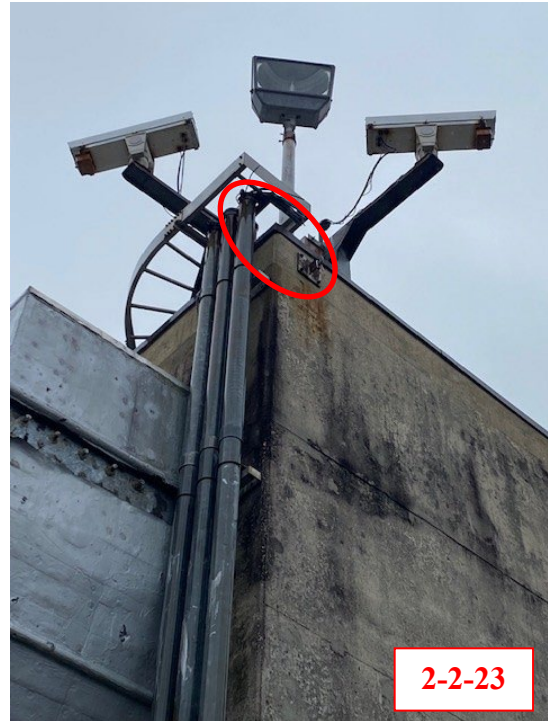


Figure B3 – Former Location of Basket and Cables to Northeast Corner of Building 235-F

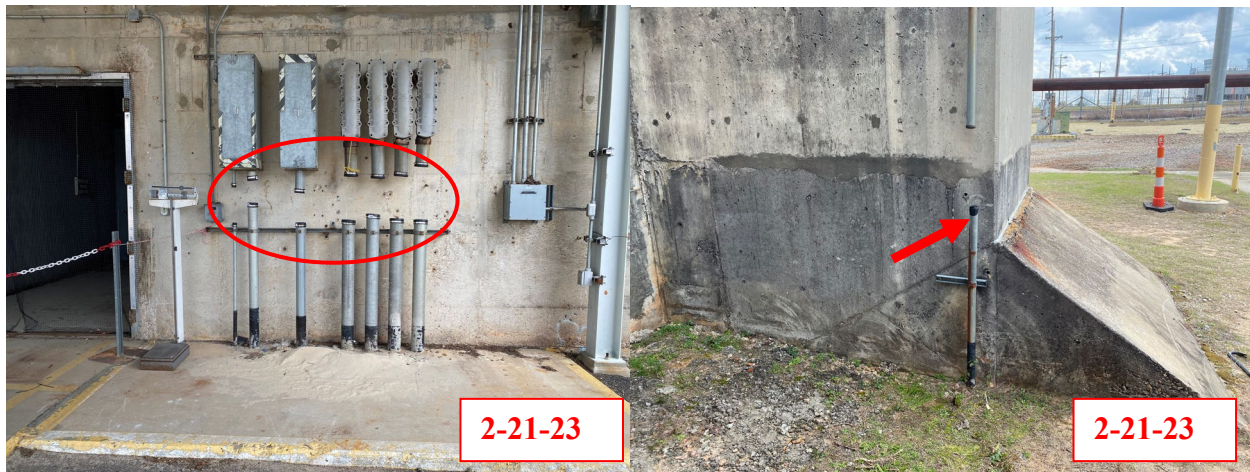


Figure B4 – Air-Gapped Security Conduits, West Wall of 235-F

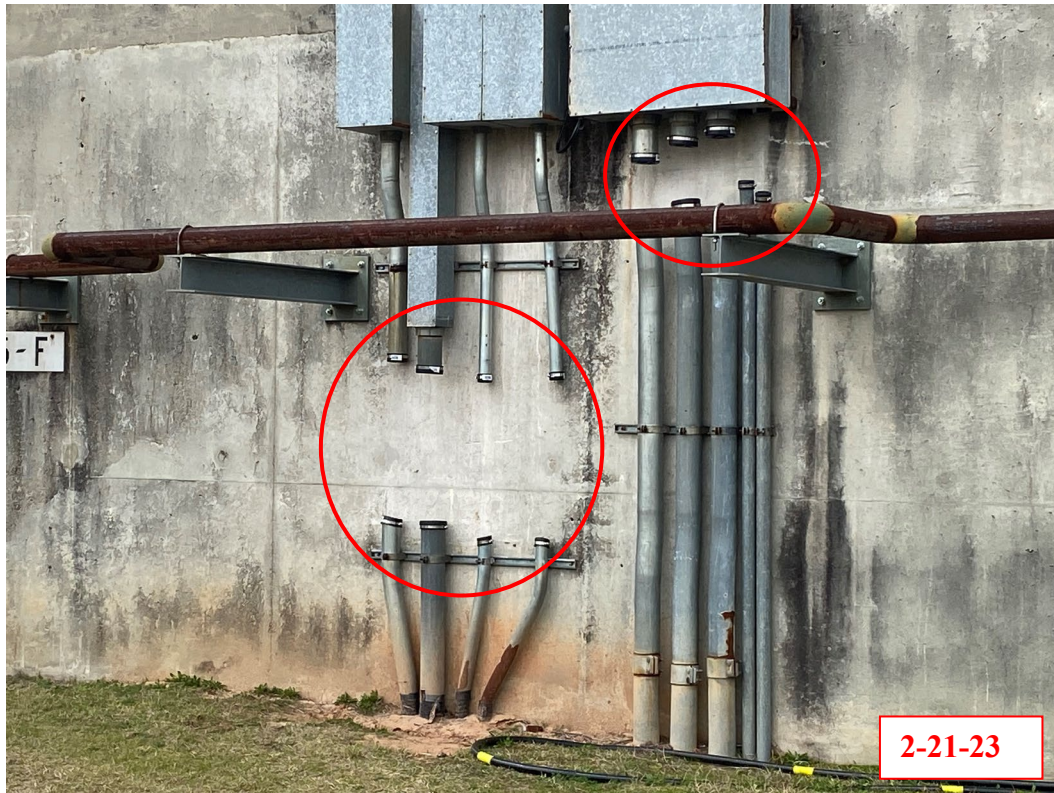


Figure B5 – Air-Gapped Security and Communications Conduits, Southwest Corner of 235-F

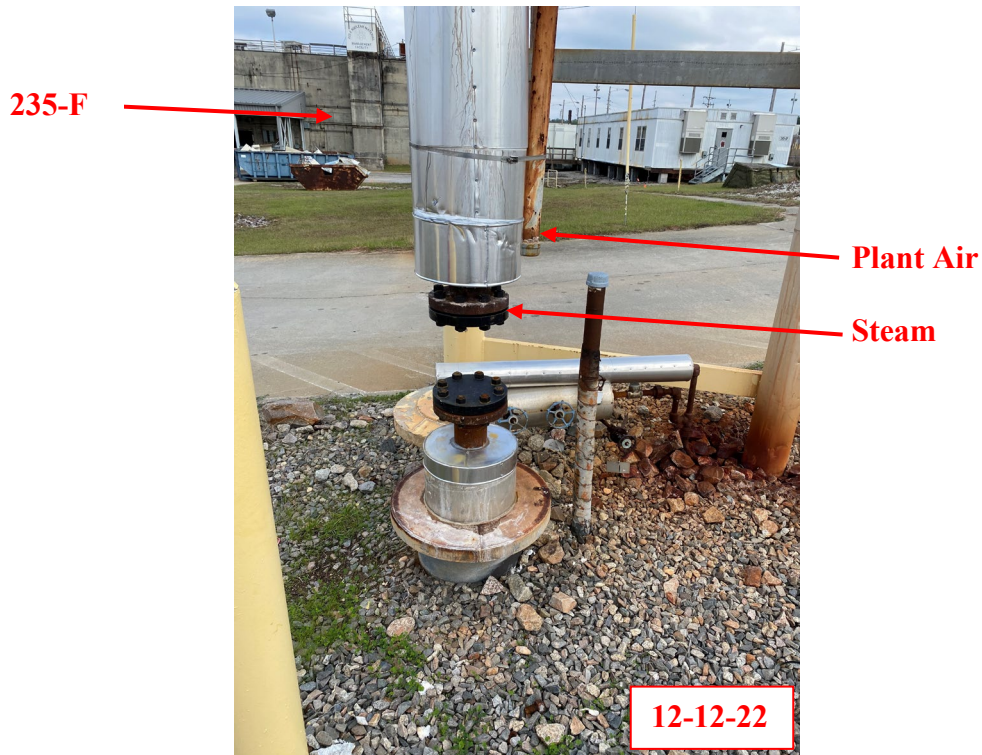


Figure B6 – Air-Gapped Steam and Plant Air to 235-F, West of Building at Base of Pipe Bridge



Figure B7 – Air-Gapped Domestic Water Line to 235-F, Adjacent to Road South of 235-F



Figure B8 – Air-Gapped (Hole Installed) Chilled Water Lines on West Exterior Wall of 235-F



Figure B9 – Sealed Sanitary Sewer Connections in 235-F (Typical)



Note - Photo is typical of ceiling tile removal in Rooms 107A, 136A, 136B, 137, 153A, 154, 158, 1000, 1001, 1002, 1003, 1004, 1005, 1007, 1008, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009, 2011, 2012, & 2013. Ceiling tiles were replaced with non-combustible tiles in the following three locations: Room 2010 and Airlocks 1009 & 1010. Ceiling tiles remain in stalled in some non-process rooms (e.g., Conference Room 129).

Figure B10 – Ceiling Tiles Removed in Airlock 1008 (Looking West toward Door 1015)



Figure B11 – Sealed Register to the E5 Exhaust System, Room 216A



Figure B12 – Covered Outlet for E4 Exhaust Fan (Roof of Building 235-F)



Figure B13 – Drained Shielding and Shut Shield Doors in Room 1002

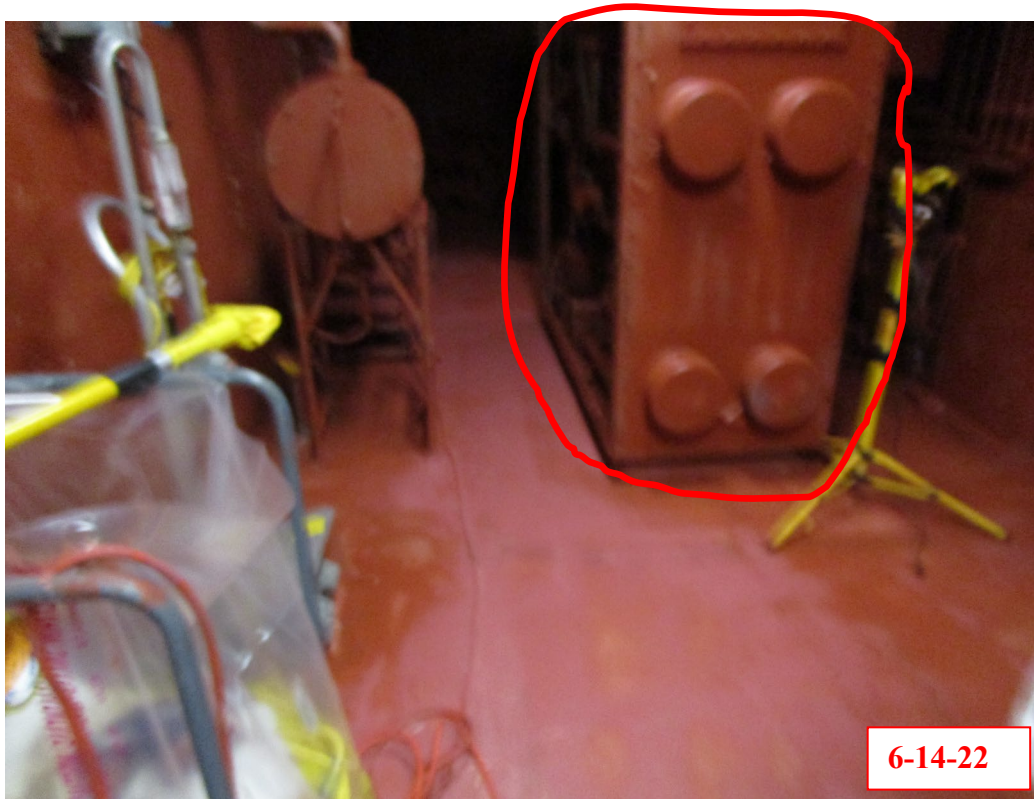


Figure B14 – Fixative Applied to Vacuum Pump Enclosure for Cell 4 Hot Press, Room 1002

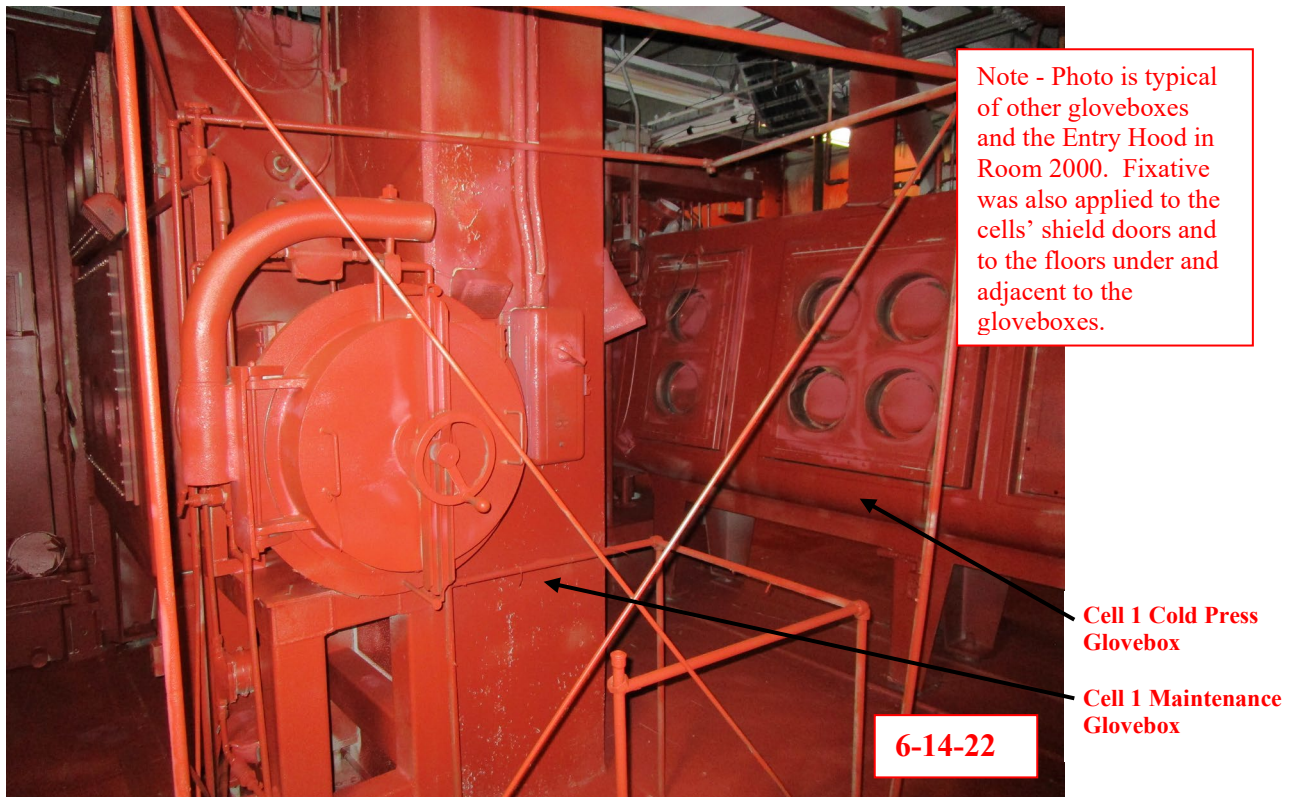


Figure B15 – Fixative Applied to PuFF Facility Gloveboxes, Room 1002

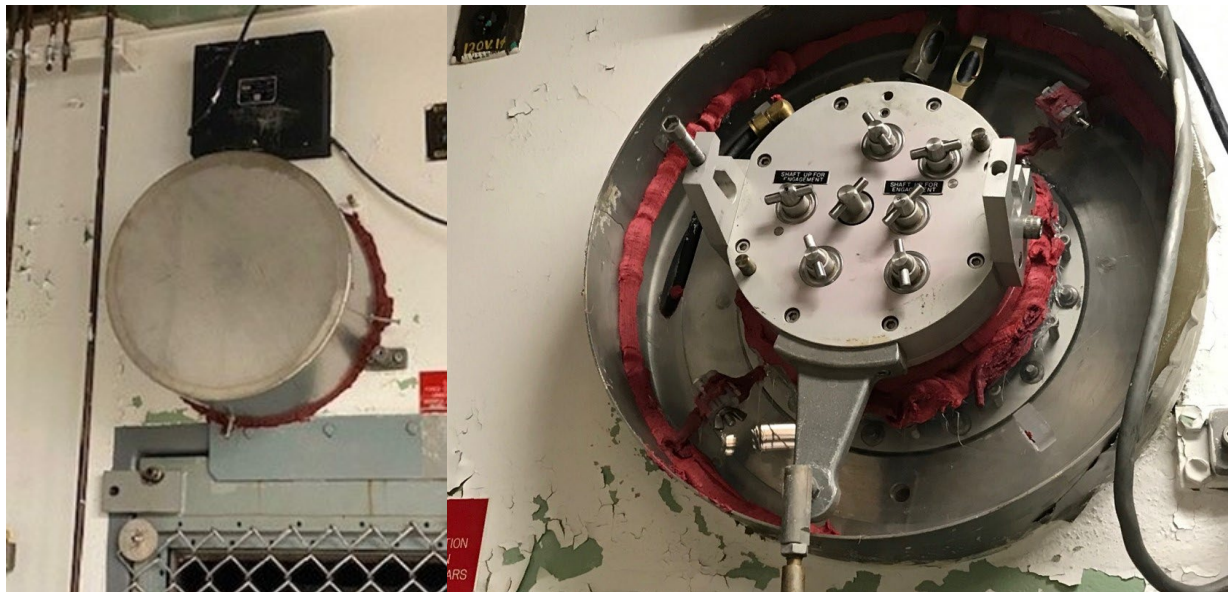


Figure B16 – Improved Seals for Manipulator Penetrations, Room 1003



Figure B17 – Drained and Isolated Storage Tank for Diesel Fuel, Southeast Corner 235-F

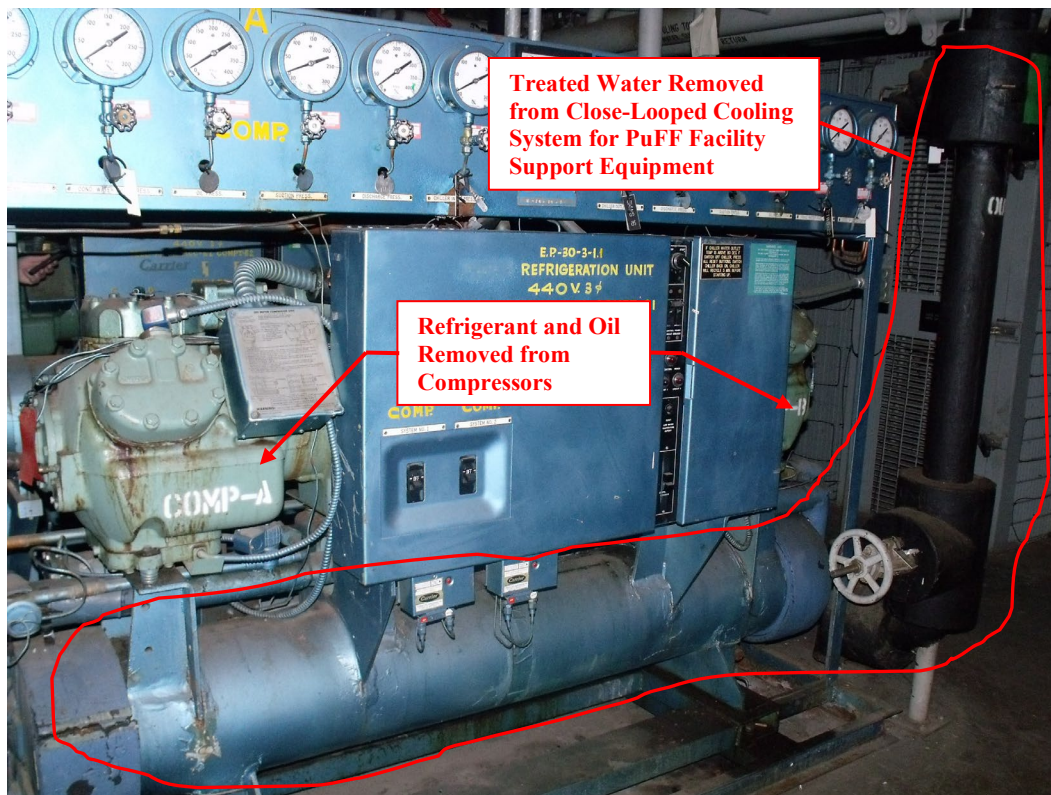


Figure B18 – Drained Chillers and Cooling System in Room 209



Figure B10 – Sealed Ductwork, ABL Exhaust, Room 2007, East Wall

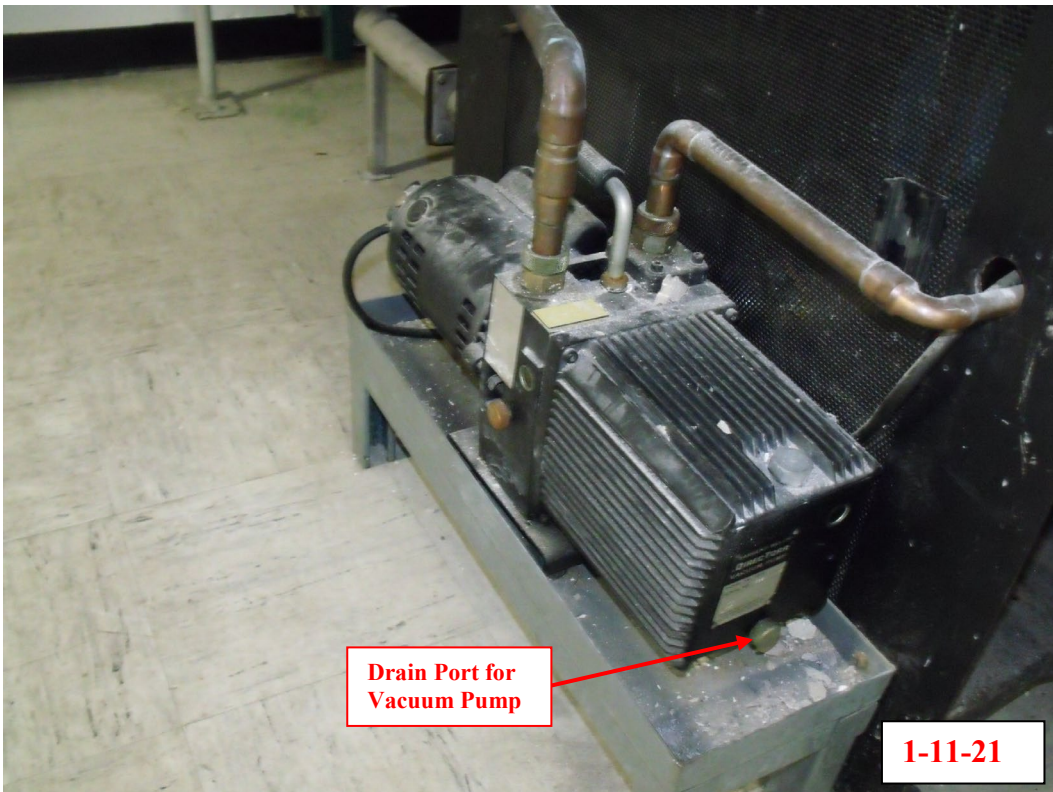


Figure B20 – Drained Vacuum Pump in Room 2008, Adjacent to Helium Purification Unit



Figure B21 – Undrained Seal Pot in Room 2009 for PuFF Facility Cell 9

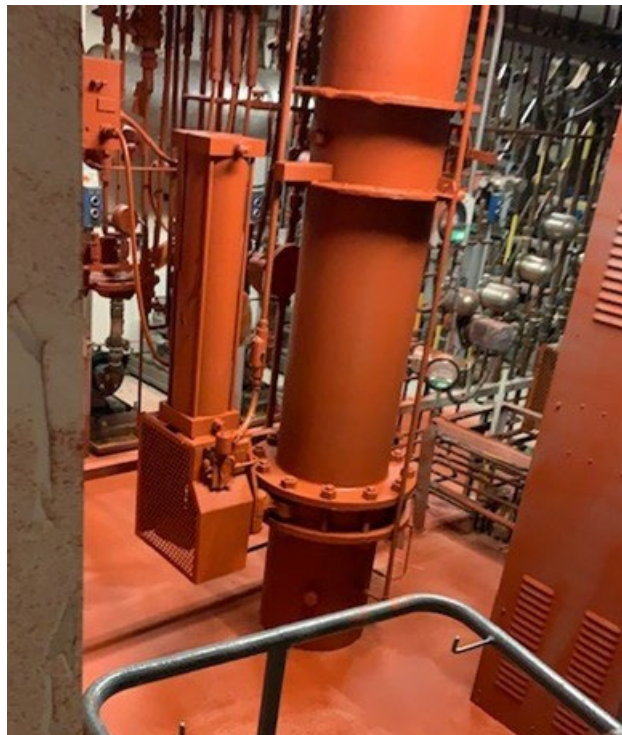


Figure B22 – Fixative Applied to PuFF Facility Cell 5 Exhaust Ductwork, Room 2010

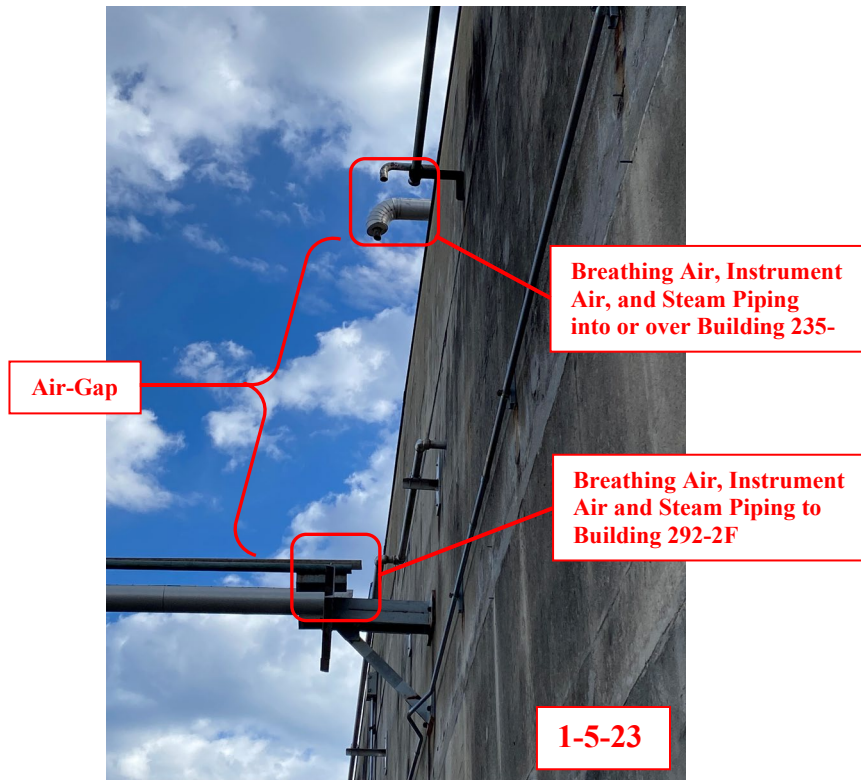


Figure B24 – Air-Gapped Utilities From Building 235-F to Building 292-2F



Figure B24 – Former Location of Trailers 235-11F and 245-6F



Figure B25 – West Covered Area of Building 235-F (Cleared, No Overhead Lines)



Figure B26 – Concrete Containment (281-28F) Northeast of Building 235-F

Appendix C - Final Facility Survey Reports

VSDS Standard Map RSLs  
 Procedure 5Q1.2-133A RSM Track # 10025

**Survey CANY-M-20220829-1**

General Information	
Title: FCA 235-F Routines, Daily (Monday)	
Survey Date/Time: 8/29/2022 04:54	Lead Inspector: SMITH, LAWTON GARY
Survey Type: Daily	Work Order/Task #: N/A
Counted By: SMITH, LAWTON GARY 8/29/2022 06:15	ID: L4634
RWP #: 22-FCA-001	
Facility: 235-F	
Status: Approved by: BROWN, STANLEY JEROME, 9/2/2022 13:16:07	ID: W7829

Additional Inspectors		
Inspector	Cmp Alt	Approve
BARTLING, BETHANY GRACE	J0320	<input checked="" type="checkbox"/>
PENNINGTON, JARED SILAS	G8818	<input checked="" type="checkbox"/>

Dose Rate (DR) Object Prefixes/Suffixes			
<u>Dose Rates with Prefixes:</u>	<u>Dose Rates with No Prefixes:</u>	<u>Default Prefixes:</u>	<u>Default Suffixes:</u>
E = Extrem		HS = Hot Spot	"n" = Neutron
GA = GA WB			"b" = Beta
S = Skin			"c" = Corrected

Postings Legend		
ARA=Airborne Radioactivity Area	HCA=High Contamination Area	IHCA=Inactive High Contamination Ar
Contact/RCO=Contact Rad Protection	HRA=High Radiation Area	RA=Radiation Area
DANGER=Danger	ICA=Inactive Contamination Area	RBA=Radiological Buffer Area

Instruments Used		
#	Instrument Model	Instrument Serial #
1	12-Alpha	CMC006313
2	12-Alpha	CMC006325
3	12-Alpha	CMC006357
4	12-Alpha	CMC006895
5	RadEye SX-AB	CMC018472
6	RO-20	CMC008072
7	RO-20	CMC008336
8	RO-20	CMC009582
9	ASP-2S1/NRD	CMC011722
10	HandECount	CMC002751
11	HandECount	CMC012973
12	HandECount	CMC013628
13	Easy Count	CMC017153
14	Easy Count	CMC018100
15	Easy Count	CMC018421

**VSDS Standard Map RSLs**

Procedure 5Q1.2-133A

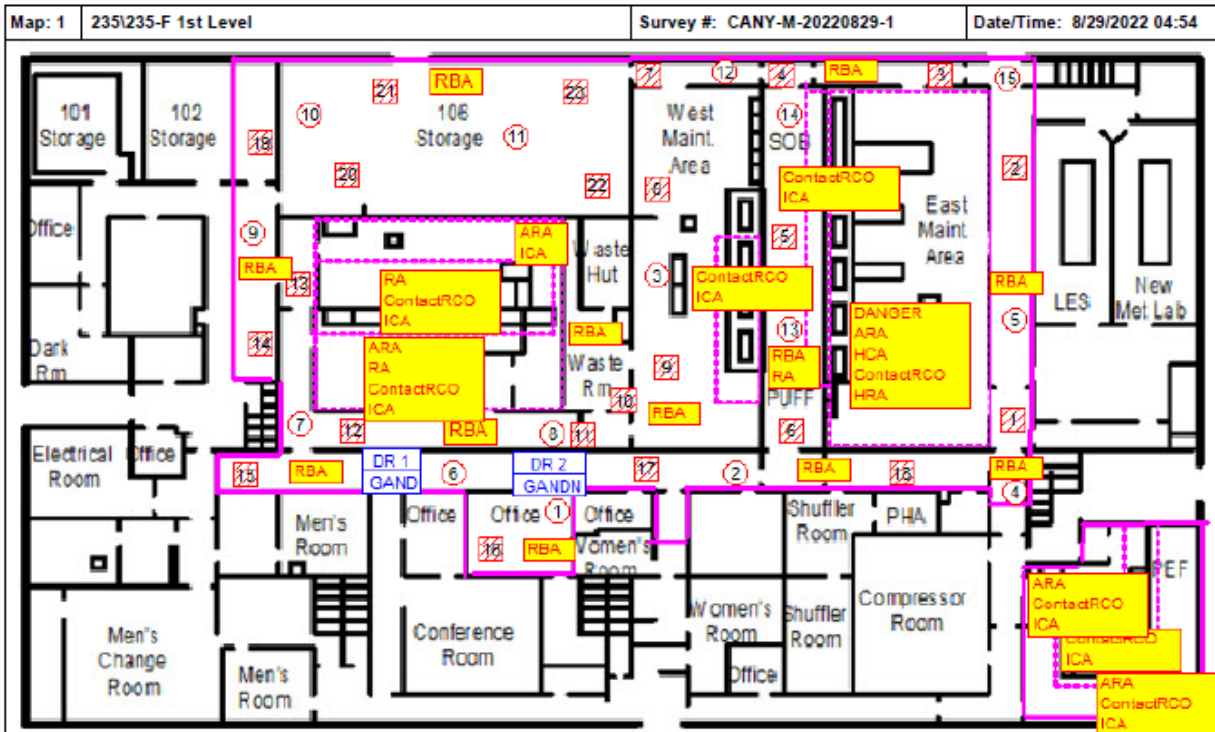
RSM Track # 10025

**Comments:**

**Performed the following Daily Routines for 235-F:**

- 1.) Inspect facilities for poor housekeeping, leaks, and unusual conditions. Verify leak collection devices are less than 3/4 full.
- 2.) Source check survey instruments at RCO office.
- 3.) Perform transferable/fixed contamination survey of laundry, waste, and respirator bags as needed. **N/A**
- 4.) Perform daily operability check of Canberra CAMs.
- 5.) Perform 6, 24, and 120 hr. counts on air samples as needed, complete air sample documentation and prepare samples for CCF drop point.
- 6.) Perform masslinn cloth survey of routinely occupied RBAs in 235-F.
- 7.) Perform daily background count and source check of HandECOUNTS.
- 8.) Changed air samples per Air Sample Plan and FARMS. Air samples bagged and tagged. All smears <20 d/m alpha/100cm<sup>2</sup> and <200 d/m Beta-Gamma/100cm<sup>2</sup>. LAS were ND alpha. Max. dose rate ND mrem/hr at 5 and 30 cms.
- 9.) Performed daily confidence test on the EPDs. **N/A**

VSDS Standard Map RSLs  
 Procedure 5Q1.2-133A RSM Track # 10025



Comments:

Summary of Highest Readings  
 (All available values may not be listed)

Smears	Air Samples & Wipes
15) <20 DPM/100 cm <sup>2</sup> α	Wipe 23) ND DPM/Wipe α
15) <200 DPM/100 cm <sup>2</sup> β/γ	

Type: Daily

Symbol Legend (for example only) RWP #: 22-FOA-001

DR 1 DOSE RATE	○ SMEAR	▨ WIPE
E15 EXTREMITY	◇ DIRECT	
S10 SKIN	△ AIR SAMPLE	
3 WHOLEBODY		

Unless otherwise noted, dose rates in mrem/hr.

Lead Inspector: SMITH, LAWTON GARY  
 Location Code: 235F000  
 Location Description: 235-F 1st Level

Status: Approved by: BROWN, STANLEY JEROME, 9/2/2022 13:16:07  
 Bldg/Area Name: 235-F

VSDS Standard Map RSLs  
 Procedure 5Q1.2-133A RSM Track # 10025

Data Point Details						
Survey #: CANY-M-20220829-1						
Map: 1 - 235/235-F 1st Level						
#	Type	Inst.	Value	Units	Position	Notes
1	DR $\gamma$	N/A	GA ND	mrem/hr	RBA's	
2	DR Neutron	N/A	GA ND $\eta$	mrem/hr	RBA's	
1	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
2	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
3	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
4	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
5	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
6	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
7	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
8	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
9	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
10	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
11	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
12	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
13	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
14	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
15	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 4 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
1	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
2	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
3	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
4	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
5	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
6	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
7	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
8	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
9	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		

VSDS Standard Map RSLs  
 Procedure 5Q1.2-133A RSM Track # 10025

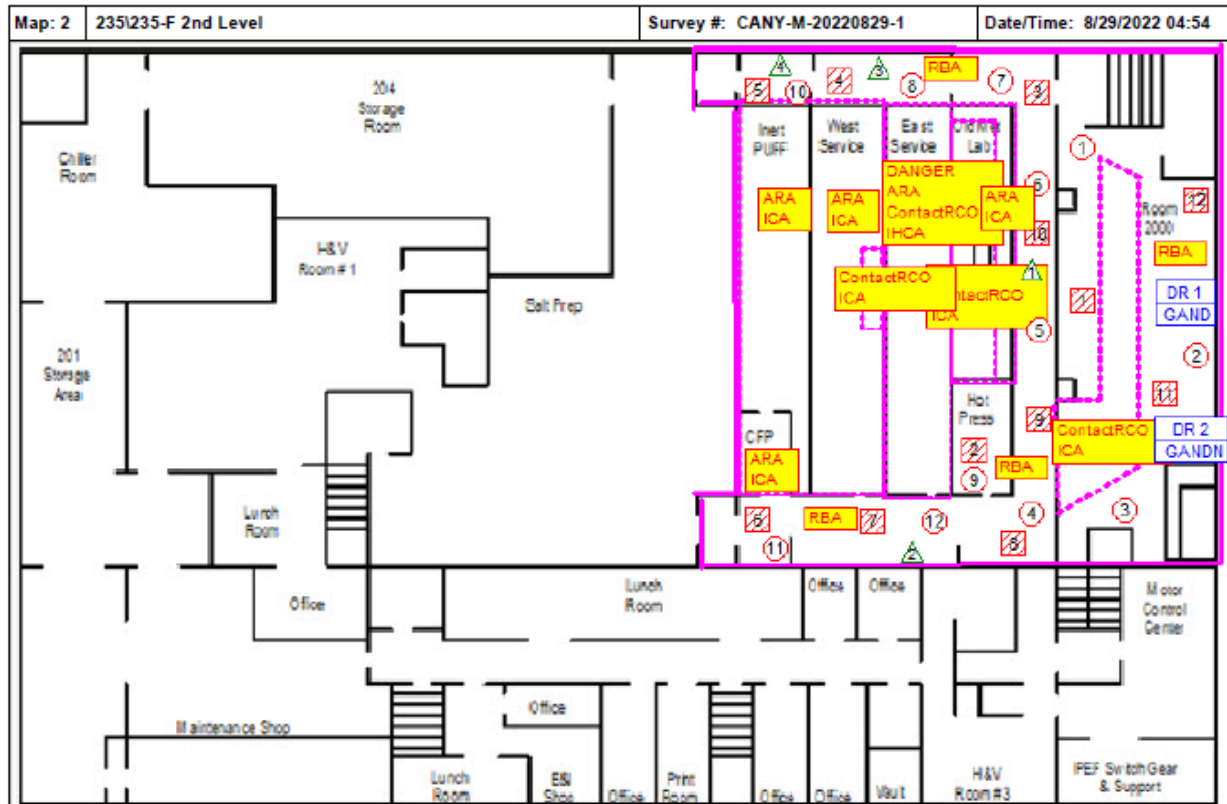
Data Point Details						
Survey #: CANY-M-20220829-1						
Map: 1 - 235\235-F 1st Level						
#	Type	Inst.	Value	Units	Position	Notes
10	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
11	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
12	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
13	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
14	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
15	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
16	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
17	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
18	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
19	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
20	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
21	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
22	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
23	Wipe	N/A N/A	α ND β/γ N/A	DPM/Wipe N/A	Floor	Reps. 2 wipes
	Posting		ARA ICA		ABL	
	Posting		RBA			
	Posting		ContactRCO ICA			
	Posting		RBA			
	Posting		RBA			
	Posting		ContactRCO ICA		PEF	
	Posting		ContactRCO ICA		SOB	
	Posting		DANGER ARA HCA ContactRCO HRA		East Maintenance	
	Posting		RA ContactRCO ICA		ABL	
	Posting		RBA			
	Posting		RBA			
	Posting		RBA		West Maintenance	

VSDS Standard Map RSLs  
 Procedure 5Q1.2-133A RSM Track # 10025

<b>Data Point Details</b> <b>Survey #: CANY-M-20220829-1</b> <b>Map: 1 - 235\235-F 1st Level</b>						
#	Type	Inst.	Value	Units	Position	Notes
	Posting		RBA RA		SOB	
	Posting		RBA		Vault 106	
	Posting		RBA		Waste Room	
	Posting		RBA		Corridor 1001	
	Posting		RBA			
	Posting		ARA RA ContactRCO ICA		ABL	
	Posting		ARA ContactRCO ICA		PEF-Maint.	
	Posting		ARA ContactRCO ICA		PEF-OP	

VSDS Standard Map RSLs

Procedure 5Q1.2-133A RSM Track # 10025



Map: 2	235/235-F 2nd Level	Survey #: CANY-M-20220829-1	Date/Time: 8/29/2022 04:54	Summary of Highest Readings (All available values may not be listed)	
				Smears	Air Samples & Wipes
Comments:				12) <20 DPM/100 cm <sup>2</sup> α	A/S 4) ND DAC-hr α
				12) <200 DPM/100 cm <sup>2</sup> β/γ	Wipe 12) ND DPM/Wipe α
Type: Daily					
Symbol Legend (for example only) RWP #: 22-FCA-001					
DR 1	DOSE RATE	○	SMEAR	▨	WIPE
E15	EXTREMITY	◇	DIRECT		
S10	SKIN	◇			
3	WHOLEBODY	△	AIR SAMPLE		
Unless otherwise noted, dose rates in mrem/hr.					
Lead Inspector: SMITH, LAWTON GARY				Status: Approved by: BROWN, STANLEY JEROME, 8/2/2022 13:16:07	
Location Code: 235F000				Bldg/Area Name: 235-F	
Location Description: 235-F 2nd Level					

VSDS Standard Map RSLs

Procedure 5Q1.2-133A

RSM Track # 10025

Data Point Details						
Survey #: CANY-M-20220829-1						
Map: 2 - 235\235-F 2nd Level						
#	Type	Inst.	Value	Units	Position	Notes
1	DR $\gamma$	N/A	GA ND	mrem/hr	RBA's	
2	DR Neutron	N/A	GA ND $n$	mrem/hr	RBA's	
1	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
2	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
3	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
4	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
5	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
6	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
7	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
8	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
9	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
10	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
11	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
12	Smear	N/A	$\alpha$ <20	DPM/100 cm <sup>2</sup>	Floor	Reps. 3 smears
		N/A	$\beta/\gamma$ <200	DPM/100 cm <sup>2</sup>		
1	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
2	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
3	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
4	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
5	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
6	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
7	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
8	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
9	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
10	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
11	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		
12	Wipe	N/A	$\alpha$ ND	DPM/Wipe	Floor	Reps. 2 wipes
		N/A	$\beta/\gamma$ N/A	N/A		

VSDS Standard Map RSLs  
 Procedure 5Q1.2-133A RSM Track # 10025

Data Point Details						
Survey #: CANY-M-20220829-1						
Map: 2 - 235\235-F 2nd Level						
#	Type	Inst.	Value	Units	Position	Notes
1	Air Sample		ND	DAC-hr α	Corridor 2002	Job Specific Sample
			N/A	DAC-hr βγ		
			N/A	DAC-hr Tritium		
2	Air Sample		ND	DAC-hr α	Corridor 2013	Job Specific Sample
			N/A	DAC-hr βγ		
			N/A	DAC-hr Tritium		
3	Air Sample		ND	DAC-hr α	Corridor 2005	Job Specific Sample
			N/A	DAC-hr βγ		
			N/A	DAC-hr Tritium		
4	Air Sample		ND	DAC-hr α	Corridor 2006	Job Specific Sample
			N/A	DAC-hr βγ		
			N/A	DAC-hr Tritium		
	Posting		Contact RCO ICA		Room 2000	
	Posting		DANGER ARA Contact RCO IHCA		East Service	
	Posting		RBA			
	Posting		RBA			
	Posting		RBA			
	Posting		RBA			
	Posting		RA Contact RCO ICA		Old Met Lab	
	Posting		Contact RCO ICA		West Service	
	Posting		ARA ICA		Inert Atmosphere	
	Posting		ARA ICA		West Service	
	Posting		ARA ICA		Old Met Lab	
	Posting		ARA ICA		Cold Feed Prep	

VSDS Standard Map RSLs  
 RSM Track # 10025

Procedure 5Q1.2-133A

Supplemental Airborne Survey Information

#	Sample Type	RME ID Number	Sample Media	Respirator Type	Start Time	End Time	Total Run Time (min)	Flow Rate		Total Vol. Volume
								Beginning	Ending	
1	MAP	LV61134	2' Barcode	None	8/29/2022 06:31	8/29/2022 06:25	5754	5 f3/min	5 f3/min	28770 f3
2	MAP	LV60309	2' Barcode	None	8/29/2022 06:55	8/29/2022 06:27	5732	4 f3/min	4 f3/min	22928 f3
3	MAP	LV60323	2' Barcode	None	8/29/2022 06:57	8/29/2022 06:29	5732	4 f3/min	4 f3/min	22928 f3
4	MAP	LV60709	2' Barcode	None	8/29/2022 06:56	8/29/2022 06:30	5734	4 f3/min	4 f3/min	22926 f3

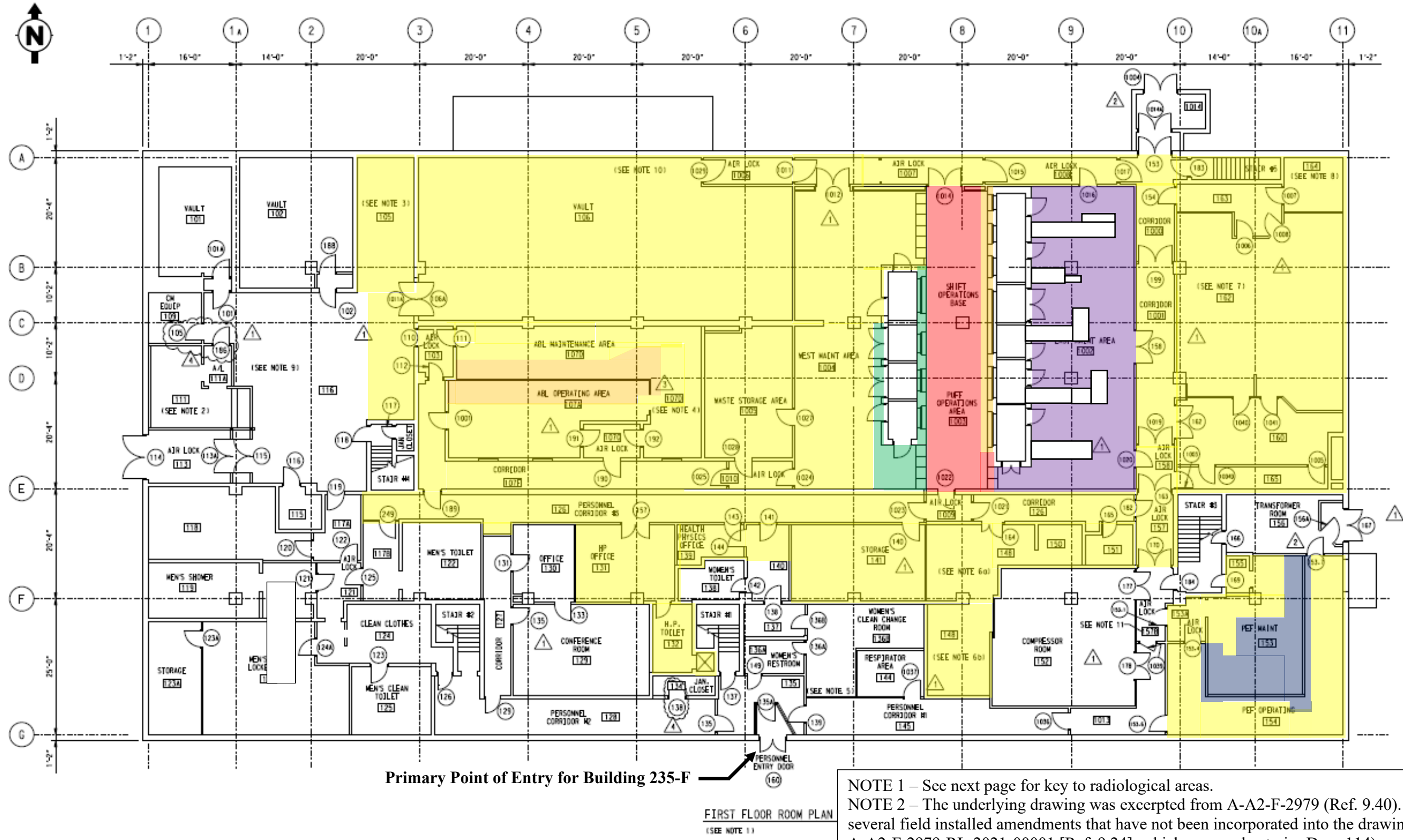
Initial/Final Probe

Air Sample No.	Reading Type	Value	Units	Date/Time
1	Initial Alpha	N/A		
	Final Alpha	800	DPM	8/29/2022 06:31
	Initial Beta/Gamma	N/A		
	Final Beta/Gamma	2000	DPM	8/29/2022 06:31
2	Initial Alpha	N/A		
	Final Alpha	800	DPM	8/29/2022 06:27
	Initial Beta/Gamma	N/A		
	Final Beta/Gamma	2000	DPM	8/29/2022 06:27
3	Initial Alpha	N/A		
	Final Alpha	800	DPM	8/29/2022 06:29
	Initial Beta/Gamma	N/A		
	Final Beta/Gamma	2000	DPM	8/29/2022 06:29
4	Initial Alpha	N/A		
	Final Alpha	800	DPM	8/29/2022 06:30
	Initial Beta/Gamma	N/A		
	Final Beta/Gamma	2000	DPM	8/29/2022 06:30

# **Appendix D**

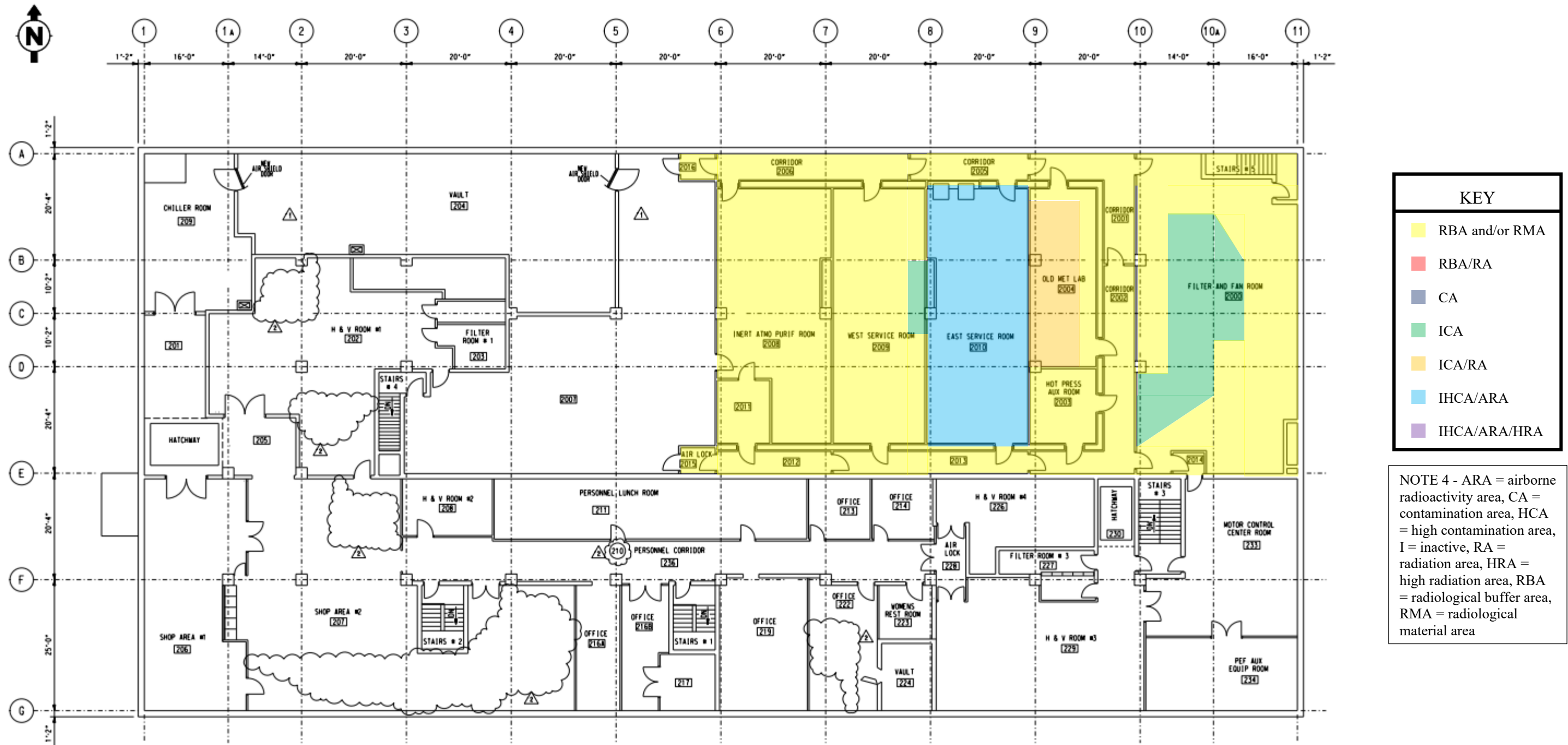
## **Radiological Maps for Building 235-F**

Figure D1 – Radiological Areas on First Floor of Building 235-F, Prior to RME Removal and Subsequent Posting of the Building as an IHCA/ARA in September 2022



NOTE 1 – See next page for key to radiological areas.  
 NOTE 2 – The underlying drawing was excerpted from A-A2-F-2979 (Ref. 9.40). There are several field installed amendments that have not been incorporated into the drawing (e.g., A-A2-F-2979-RL-2021-00001 [Ref. 9.24], which removed exterior Door 114).

Figure D2 – Radiological Postings on Second Floor of Building 235-F, Prior to RME Removal and Subsequent Posting of the Building as an IHCA/ARA in September 2022



KEY	
<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span>	RBA and/or RMA
<span style="display:inline-block; width:15px; height:15px; background-color:red; border:1px solid black;"></span>	RBA/RA
<span style="display:inline-block; width:15px; height:15px; background-color:blue; border:1px solid black;"></span>	CA
<span style="display:inline-block; width:15px; height:15px; background-color:green; border:1px solid black;"></span>	ICA
<span style="display:inline-block; width:15px; height:15px; background-color:orange; border:1px solid black;"></span>	ICA/RA
<span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span>	IHCA/ARA
<span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span>	IHCA/ARA/HRA

NOTE 4 - ARA = airborne radioactivity area, CA = contamination area, HCA = high contamination area, I = inactive, RA = radiation area, HRA = high radiation area, RBA = radiological buffer area, RMA = radiological material area

SECOND FLOOR ROOM PLAN  
 (SEE NOTE 1)

NOTE 3 – The underlying drawing was excerpted from A-A2-F-2980 (Reference 9.87). There are several field installed amendments that have not been incorporated into the drawing (e.g., A-A2-F-2980-RL-2021-00001 [Ref. 9.25], which removed the door to Filter Room #1).