

**PSEG NUCLEAR L.L.C.  
SALEM/OPERATIONS**

**S1.OP-AB.FUEL-0001(Q) - REV. 4**

**FUEL HANDLING INCIDENT**

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- ◆ Biennial Review Performed: Yes \_\_\_ No ✓
  - ◆ Change Package(s) and Affected Document Number(s) incorporated into this revision: None
  - ◆ The following OTSC(s) were incorporated into this revision: None
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**REVISION SUMMARY:**

The following changes were incorporated into this revision:

- ◆ Revised Steps 3.6.D and CAS Step 2.0.D, and incorporated Completion and Review Step 4.1 to provide additional clarification regarding logging charcoal filter hours OP-SA-470-1001, Cyclic Data Monitoring Program. This change was incorporated to provide additional clarification regarding the logging of charcoal filter hours, is in response to Operator Feedback, and is considered to be editorial in nature. **[70075982-0010] [70083883-0010]**
- ◆ Revised procedure to reflect current procedure format requirements.

**IMPLEMENTATION REQUIREMENTS**

Effective Date: 10 | 01 | 2008

None

FUEL HANDLING INCIDENT

1.0 ENTRY CONDITIONS

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

1.1 Any incident involving nuclear fuel that indicates damage to fuel assembly or a radiological release.

2.0 IMMEDIATE ACTIONS

2.1 None

3.0 SUBSEQUENT ACTIONS

\_\_\_ 3.1 **INITIATE** Attachment 1, Continuous Action Summary.

\_\_\_ 3.2 **NOTIFY** personnel at the scene of the incident to:

\_\_\_ A. **STOP** all fuel transfers in progress.

\_\_\_ B. **EVACUATE** all non-essential personnel from the scene.

3.3 Has the incident occurred in the Fuel Handling Building?

\_\_\_ YES    \_\_\_ NO ———>    **GO TO** Step 3.8



\_\_\_\_\_  
Time

**NOTE**

Emergency actions are dependent upon the location of the fuel assembly. The quickest path should be taken to place the fuel assembly in a safe condition.

\_\_\_ 3.4 **NOTIFY** personnel in the Fuel Handling Building to place any fuel assembly being handled into the emergency rack X-3, or designated location, whichever takes less time.

\_\_\_ 3.5 **PRESS** FUEL HANDLING BUILDING VENTILATION, EXH FLTR TRAINS, 12 HEPA PLUS CHAR pushbutton.

- \_\_\_ 3.6 **ENSURE** the following:
  - \_\_\_ A. All available Fuel Handling Building Exhaust Fans are running.
  - \_\_\_ B. HEPA 12 PLUS CHAR and SEQUENCE COMPLETE lights illuminate.
  - \_\_\_ C. HEPA 11 ONLY light extinguishes.
  - \_\_\_ D. **RECORD** Fuel Handling Building Charcoal Filter inservice time IAW OP-SA-470-1001, Cyclic Data Monitoring Program.
  - \_\_\_ E. FHB Truck Bay Roll Up Door is CLOSED.
  - \_\_\_ F. FHB Watertight Door remains CLOSED (with the exception of normal passage).

\_\_\_ 3.7 **GO TO** Step 3.14

3.8 Has the incident occurred in Containment?

Time

\_\_\_ NO      \_\_\_ YES ———>      **GO TO** Step 3.10

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V

Time

\_\_\_ 3.9 **RETURN** to Step 3.1 for symptom rediagnosis or as directed by the CRS.

**NOTE**

Emergency actions are dependent upon the location of the fuel assembly. The quickest path should be taken to place the fuel assembly in a safe condition.

- \_\_\_ 3.10 **NOTIFY** personnel at the scene of the incident to perform one of the following:
  - \_\_\_ A. IF the mast tube is indexed over the upender, THEN INSERT the fuel assembly in the upender AND LOWER the upender to the horizontal position.
  - \_\_\_ B. IF the mast tube is NOT indexed over the upender, THEN PLACE the fuel assembly into the core in its designated location, OR the emergency location P-10 whichever takes less time.
  - \_\_\_ C. IF the P-10 is NOT available (i.e. refueling is at the core peripheral area), THEN PLACE the fuel assembly in the upender and lower the upender to the horizontal position.

3.11 Is the Containment Equipment Hatch open?

\_\_\_ NO      \_\_\_ YES ———>      **GO TO** Step 3.13

|

V

Time

\_\_\_ 3.12 **ISOLATE** Containment as follows:

\_\_\_ A.      **INITIATE** S1.OP-AB.CONT-0001(Q), Containment Closure.

\_\_\_ B.      **GO TO** Step 3.14.

\_\_\_ 3.13 **ISOLATE** Containment as follows:

**NOTE**

Either the Containment Purge system or the Auxiliary Building Ventilation System, with suction from the containment atmosphere, with the associated radiation monitoring will be available whenever movement of irradiated fuel is in progress in the Containment and the Containment Equipment Hatch is open. This is to ensure airflow is into the Containment and that rad monitoring remains available.

\_\_\_ A.      **ENSURE** one of the following:

\_\_\_ 1.      A Containment Purge is in progress IAW S1.OP-SO.WG-0006(Q), Containment Purge to the Plant Vent.

OR

\_\_\_ 2.      ABV is in service IAW S1.OP-SO.ABV-0001(Q), Auxiliary Building Ventilation System Operation, with at least one personnel airlock open between Containment and the Auxiliary Building.

**NOTE**

◆ Either the Containment Purge shall remain inservice OR at least one personnel airlock shall remain open, with ABV inservice, to ensure airflow into the Containment and radiation monitoring remains available while the equipment hatch is open.

◆ Containment Closure shall be accomplished within 1 hour IAW S1.OP-AB.CONT-0001(Q).

\_\_\_ B.      **INITIATE** S1.OP-AB.CONT-0001(Q), Containment Closure.

- \_\_\_ 3.14 **NOTIFY** Radiation Protection of the following:
- ◆ Location of incident
  - ◆ Details of incident
  - ◆ Affected personnel, if any
  - ◆ **SURVEY** the area to determine radiological conditions
  - ◆ **SAMPLE** the area for airborne activity and contamination
- \_\_\_ 3.15 **IF** the fuel transfer cart is in the Fuel Handling Building or Fuel Transfer Canal, **THEN RETURN** fuel transfer cart to the Containment.
- \_\_\_ 3.16 **IF** the fuel transfer canal gate valve is **OPEN**, **THEN CLOSE** the valve to isolate Spent Fuel Pool from Containment.
- \_\_\_ 3.17 **NOTIFY** all personnel at the scene of the incident to perform the following:
- ◆ Evacuate the affected area.
  - ◆ Close all doors upon exiting.
  - ◆ Report to Control Point.
- \_\_\_ 3.18 **NOTIFY** Reactor Engineering of the incident and request assistance.
- \_\_\_ 3.19 **NOTIFY** the SM/CRS to refer to the Event Classification Guide and Technical Specifications.
- \_\_\_ 3.20 When the cause of the incident is corrected and Radiation Protection concurs:
- ◆ **RETURN** Fuel Handling Building ventilation to normal IAW S1.OP-SO.FHV-0001(Q), Fuel Handling Building Ventilation.
  - ◆ **RETURN** Containment Ventilation Systems to normal IAW S1.OP-SO.CBV-0001(Q), Containment Ventilation Operation.
  - ◆ **RESTORE** access to Containment.

4.0 **COMPLETION AND REVIEW**

\_\_\_ 4.1 **IF** either of the following charcoal filters were placed inservice,  
**THEN ENSURE** Charcoal Filter Hours are logged IAW OP-SA-470-1001,  
Cyclic Data Monitoring Program:

- ◆ Containment Iodine Removal Unit Charcoal Filter, or
- ◆ Fuel Handling Building Charcoal Filter.

\_\_\_ 4.2 **CIRCLE** Entry Condition number in Section 1.0,  
**OR EXPLAIN** Entry Condition in Comments Section of Attachment 2.

\_\_\_ 4.3 **COMPLETE** Attachment 2, Sections 1.0 and 2.0,  
**AND FORWARD** this procedure to SM/CRS for review and approval.

4.4 SM/CRS **PERFORM** the following:

- \_\_\_ A. **REVIEW** this procedure with Attachments 1 and 2  
for completeness and accuracy.
- \_\_\_ B. **COMPLETE** Attachment 2, Section 3.0.
- \_\_\_ C. **FORWARD** completed procedure to Operations Staff.

**END OF PROCEDURE**

ATTACHMENT 1  
(Page 1 of 1)

## CONTINUOUS ACTION SUMMARY

- \_\_\_ 1.0 IF AT ANY TIME radiation levels in the Fuel Handling Building or Containment reach or exceed 1 R/hr,  
THEN EVACUATE ALL personnel from the affected area.
- \_\_\_ 2.0 IF AT ANY TIME Radiation Protection airborne sample results indicate Iodine activity in Containment,  
THEN OPERATE Iodine Removal Units as follows:

**NOTE**

IRUs should be run only if iodine is present in Containment or when requested by Radiation Protection.

- \_\_\_ A. **PRESS** Iodine Removal Unit 11 or 12 START bezel.
- \_\_\_ B. **ENSURE SEQUENCE COMPLETE** bezel illuminated for Unit(s) started.
- \_\_\_ C. **ENSURE AIR FLOW LO** bezel alarms NOT illuminated.
- \_\_\_ D. **RECORD** Containment Iodine Removal Unit Charcoal Filter in service time IAW OP-SA-470-1001, Cyclic Data Monitoring Program.





ATTACHMENT 2  
(Page 2 of 2)

COMPLETION SIGN-OFF SHEET

2.0 COMMENTS: (continued)

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2.0 SIGNATURES:

Print	Initials	Signature	Date
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_____	_____	_____	_____
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3.0 SM/CRS FINAL REVIEW AND APPROVAL:

This procedure with Attachments 1 and 2 are reviewed for completeness and accuracy. Entry conditions and all deficiencies, including corrective actions, are clearly recorded in the COMMENTS Section of this attachment.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
SM/CRS

**FUEL HANDLING INCIDENT  
TECHNICAL BASES DOCUMENT**

**1.0 REFERENCES**

**1.1 Technical Documents**

- A. Salem Generating Station Updated Final Safety Analysis Report:
  - 1. Section 9.1, Fuel Storage and Handling
  - 2. Section 11, Radioactive Waste Management
  - 3. Section 15.4, Condition IV Faults, Fuel Handling Accident
- B. Salem Generating Station Technical Specifications Unit 1:
  - 1. Table 3.3-6, Radiation Monitoring Instrumentation
  - 2. Table 3.6-1, Containment Isolation Valves
  - 3. 3.6.3.1, Containment Isolation Valves
  - 4. 3.7.7.1, Auxiliary Building Exhaust Air Filtration System
  - 5. 3.9.9, Containment Purge and Pressure-Vacuum Relief Isolation System
  - 6. 3.9.12, Fuel Handling Area Ventilation System
- C. Configuration Baseline Documentation:
  - 1. DE-CB.FHV-0021(Q), Fuel Handling Area Ventilation System, Section 7, Accident Analysis
- D. Technical/Engineering Letters:
  - 1. S-1-N300-MSE-0012, Accident Analysis, Fuel Handling Accident No. 1 Unit, Salem Nuclear Generating Station

**1.2 Procedures**

- A. S1.OP-SO.CBV-0001(Q), Containment Ventilation Operation
- B. S1.OP-SO.ABV-0001(Q), Auxiliary Building Ventilation Operation
- C. S1.OP-SO.FHV-0001(Q), Fuel Handling Building Ventilation
- D. S1.OP-ST.CAN-0006(Q), Refueling Operations - Containment Isolation
- E. S1.OP-ST.FHV-0001(Q), Refueling Operations - Fuel Handling Building Ventilation
- F. S1.OP-AB.RAD-0001(Q), Abnormal Radiation
- G. S1.OP-AB.CONT-0001(Q), Containment Closure
- H. OP-SA-470-1001, Cyclic Data Monitoring Program
- I. SC.RE-FR.ZZ-0010(Q), Unanticipated Water Level Decrease Procedure

**1.3 Drawings**

- A. 205238, Unit No. 1 Containment Ventilation
- B. 205321, Unit No. 1 Diesel Area and Fuel Handling Building

**1.4 Industry Concerns**

- A. INPO SER 82-43, Fractured Fuel Assembly Guide Tubes
- B. INPO SER 86-21, Dropped Fuel Assembly at a PWR
- C. NRC INFO 83-29, Fuel Binding Caused By Fuel Rack Deformation
- D. NRC INFO 85-12, Recent Fuel Handling Events
- E. NRC INFO 86-58, Dropped Fuel Assembly at Haddam Neck Plant

**1.5 Other**

- A. DCP 80004814, Deletion of RMS Channels 1R24A&B, 1R25, 1R27, 1R28, 1R29, 1R30 and 1R33
- B. Tech Spec Amendment 263, Refueling Operations - Relaxation of Requirements Applicable During Movement of Irradiated Fuel

**2.0 DISCUSSION**

This procedure provides the instructions to follow during a Fuel Handling Incident. It is the intent of this discussion to provide the reasoning behind the logic and flowpath of the procedure. It is not intended to provide additional direction to the procedure.

2.1 Entry Conditions - Entry conditions are based upon Refueling personnel recognizing a Fuel Handling Incident and reporting same to the Control Room. The symptoms available to personnel involved are as follows:

- ◆ Actual observation of a Fuel Handling Incident
- ◆ Gas bubbles or discoloration of water in the vicinity of a fuel assembly
- ◆ Increasing activity or alarm on Radiation Monitors:
  - ◆ 1R11A, Containment Sampling Particulate
  - ◆ 1R12A, Containment Sampling Noble Gas
  - ◆ 1R12B, Containment Sampling Iodine
  - ◆ 1R2, Containment - 130' elevation
  - ◆ 1R5, Fuel Handling Building
  - ◆ 1R9, Fuel Storage Area
  - ◆ 1R32A, Fuel Handling Crane
  - ◆ 1R44B, Stairway to Reactor Sump - 96' elevation

2.2 Immediate Actions - None

- 2.3 Subsequent Actions - When it is determined that a Fuel Handling Incident has occurred, all fuel transfers in progress are stopped. It is then determined where the incident has occurred and fuel in transit is placed in the nearest available safe location.

In the event the incident occurs in the Fuel Handling Building, any assembly in transit is placed in the emergency rack X-3, or designated location, whichever takes less time. Additionally the Fuel Handling Ventilation Charcoal Filter is ensured in service and the FHB Truck Bay Roll Up Door and FHB Watertight Door are ensured closed to provide additional defense-in-depth to prevent a release to the environment.

If the incident occurs in the Containment, the refueling team is given the option of placing any fuel assembly in transit: in the upender when the mast tube is indexed over it, in the core in its designated location, or P-10 the emergency location whichever takes less time. When the assembly is placed in the Upender, the frame is lowered to the horizontal position.

Containment Closure is established, if applicable, and the affected area ventilation system is aligned to provide protection of personnel and the general public from possible airborne activity. Containment Closure is dependent upon the status of the Containment Equipment Hatch. If the hatch is open, isolation of Containment Purge or closing of personnel airlocks is delayed until the hatch is closed by Maintenance to ensure a flow path exists (either via the Containment Purge or Aux Building Ventilation) which draws air into the Containment rather than out the open equipment hatch. This ensures that air in the Containment is being monitored by rad monitors prior to its release out the Plant Vent. Radiation Protection is notified to determine the Radiological conditions resulting from the incident.

Steps 3.15 and 3.16 then direct isolation of the Spent Fuel Pool from the Containment by first clearing the Fuel Transfer Tube of the Fuel Transfer Cart, and then closing the Fuel Transfer Tube Gate Valve.

Once all required fuel local protective actions are completed, the affected area is evacuated in Step 3.17. Reactor Engineering is contacted for assistance in determining further actions to be taken for any actual fuel damage. The Event Classification Guide is referenced to ensure compliance with the Emergency Plan and to satisfy any reporting requirements. Applicable Technical Specifications are referenced to ensure License compliance.

High Iodine activity levels in the Containment are reduced using the installed Iodine Removal Units. Once the cause of the incident is determined and required restoration actions performed, the procedure is exited and normal operations resumed.

**END OF DOCUMENT**