

PSEG Nuclear LLC  
P.O. Box 236, Hancocks Bridge, NJ 08038-0236



March 9, 2016  
LR-N16-0059

10 CFR 50.73

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Salem Nuclear Generating Station Unit 2  
Renewed Facility Operating License No. DPR-75  
NRC Docket No. 50-311

Subject: Licensee Event Report 311/2015-003-002, "Both Trains of High Head Safety Injection Inoperable Due to a Relief Valve Failure"

Reference: PSEG Letter LR-N16-0046, dated February 19, 2016  
Licensee Event Report 311/2015-003-001

In accordance with the requirements of 10 CFR 50.73(a)(2)(v)(D), PSEG Nuclear LLC is submitting the enclosed Licensee Event Report (LER) 2015-003-002, "Both Trains of High Head Safety Injection Inoperable Due to a Relief Valve Failure." The referenced LER stated that Salem Nuclear Generating Station would submit a supplement to the LER with the results of the safety consequence review and the safety system functional failure determination. These results are being communicated in the LER supplement attached to this letter.

If you have any questions or require additional information, please contact Mr. Thomas Cachaza at 856-339-5038.

There are no regulatory commitments contained in this letter.

Sincerely,

A handwritten signature in black ink, appearing to read "Eric Carr", with a long horizontal flourish extending to the right.

Eric Carr  
Plant Manager  
Salem Generating Station

tjc  
Attachment: Licensee Event Report 311/2015-003-002

cc Mr. D. Dorman, Administrator – Region 1, NRC  
Mr. T. Wengert, Licensing Project Manager – Salem, NRC  
Mr. P. Finney, USNRC Senior Resident Inspector, Salem (X24)  
Mr. P. Mulligan, Manager IV, NJBNE  
Mr. R. Braun, President and Chief Nuclear Officer – Nuclear  
Mr. T. Cachaza, Salem Commitment Tracking Coordinator  
Mr. L. Marabella, Corporate Commitment Tracking Coordinator



**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

<b>1. FACILITY NAME</b> Salem Generating Station – Unit 2	<b>2. DOCKET NUMBER</b> 05000311	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Both Trains of High Head Safety Injection Inoperable Due to a Relief Valve Failure

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	23	2015	2015	003	002	03	09	2016		05000
									FACILITY NAME	DOCKET NUMBER
									FACILITY NAME	DOCKET NUMBER
										05000

<b>9. OPERATING MODE</b>	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>			
3	20.2201(b)	20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(A)
	20.2201(d)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(viii)(B)
	20.2203(a)(1)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(ix)(A)
	20.2203(a)(2)(i)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	50.73(a)(2)(x)
<b>10. POWER LEVEL</b>  0%	20.2203(a)(2)(ii)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(4)
	20.2203(a)(2)(iii)	50.36(c)(2)	50.73(a)(2)(v)(B)	73.71(a)(5)
	20.2203(a)(2)(iv)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	73.77(a)(1)
	20.2203(a)(2)(v)	50.73(a)(2)(i)(A)	X 50.73(a)(2)(v)(D)	73.77(a)(2)(i)
	20.2203(a)(2)(vi)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	73.77(a)(2)(ii)
		50.73(a)(2)(i)(C)	OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER		TELEPHONE NUMBER (Include Area Code)
LICENSEE CONTACT Thomas J. Cachaza, Senior Regulatory Compliance Engineer		856 - 339 - 5038

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT										
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	
X	BQ	RV	C710	Y						

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
YES (If yes, complete 15. EXPECTED SUBMISSION DATE) X NO				

**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)**

At 2136 on November 23, 2015, the Boron Injection Tank (BIT) relief valve 2SJ10 exhibited increased seat leakage during the performance of troubleshooting to determine the cause of low BIT pressure. The increased seat leakage from 2SJ10 initiated a Reactor Coolant System (RCS) leak greater than 10 gallons per minute (gpm). Technical Specification (TS) 3.4.7.2.b action b was entered for RCS unidentified leakage greater than 1 gpm.

The BIT was isolated at 2137 and the leakage was stopped. Isolation of the BIT resulted in loss of the high head safety injection flow path for both trains of high head safety injection, requiring entry into TS 3.0.3.

This event was caused by ineffective use of internal operating experience in the decision making process to reuse the 2CV141, which had been installed on the discharge of the 23 positive displacement charging pump, as a suitable replacement for the 2SJ10 during 2R21.

This report is being made in accordance with 10CFR50.73 (a)(2)(v)(D) "Any event or condition that could have prevented the fulfillment of the safety functions of structures or systems that are needed to mitigate the consequences of an accident."



**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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**NARRATIVE**

**PLANT AND SYSTEM IDENTIFICATION**

Westinghouse - Pressurized Water Reactor {PWR/4}

Emergency Core Cooling System / Relief Valve {BQ/RV}

\*Energy Industry Identification System (EIS) codes and component function identifier codes appear as {SS/CCC}.

**IDENTIFICATION OF OCCURRENCE**

Event Date: November 23, 2015

Discovery Date: November 23, 2015

**CONDITIONS PRIOR TO OCCURRENCE**

Salem Unit 2 was in operational Mode 3, the RCS was at normal operating temperature and pressure. No additional structures, systems or components were inoperable at the time of the event that contributed to this event.

**DESCRIPTION OF OCCURRENCE**

At 2136 on November 23, 2015, the Boron Injection Tank (BIT) relief valve 2SJ10 exhibited increased seat leakage during the performance of troubleshooting to determine the cause of low BIT pressure. The increased seat leakage from 2SJ10 initiated a Reactor Coolant System (RCS) leak greater than 10 gallons per minute (gpm). Technical Specification (TS) 3.4.7.2.b action b was entered for RCS unidentified leakage greater than 1 gpm.

The BIT was isolated at 2137 and the leakage was stopped. Isolation of the BIT resulted in loss of the high head safety injection flow path for both trains of high head safety injection, requiring entry into TS 3.0.3.

On November 24, 2015 At 0252 Salem Unit 2 entered Mode 4, and at 0920 Salem Unit 2 achieved Mode 5, Cold Shutdown.

An eight-hour NRC Event Notification was required by 10 CFR 50.72(b)(3)(v)(D) for an event that could have prevented the fulfillment of a safety function of structures or systems that are needed to mitigate the consequences of an accident. EN 51563 was completed on November 23, 2015, at 0446. This LER is being made pursuant to the reporting requirements of 10 CFR 50.73(a)(2)(v)(D).



**LICENSEE EVENT REPORT (LER)  
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**NARRATIVE**

**CAUSE OF EVENT**

This event was caused by ineffective use of internal operating experience in the decision making process to reuse the 2CV141, which had been installed on the discharge of the 23 positive displacement charging pump, as a suitable replacement for the 2SJ10 during 2R21.

**SAFETY CONSEQUENCES AND IMPLICATIONS**

The Emergency Core Cooling System (ECCS) consists of several subsystems to ensure reactor coolant is delivered to the reactor vessel under accident conditions. The major equipment relied upon for the implementation of the injection phase functions are:

1. Two centrifugal charging pumps
2. Two safety injection (SI) pumps
3. Two residual heat removal (RHR) pumps
4. Four accumulators (one for each loop)
5. One boron injection tank (BIT)
6. Refueling water storage tank (RWST)

The BIT only functions as part of the pressure boundary within the ECCS injection flow path. Upon receipt of a safety injection (SI) signal, flow from the centrifugal (high head) charging pumps is routed through the emergency flow path (i.e., the BIT) into the reactor coolant system (RCS).

A review of the Chapter 15 accidents revealed that high head safety injection is only relied upon for the small break LOCA (SBLOCA) and the steam generator tube rupture (SGTR). With the BIT isolated and high head injection unavailable, the operators would continue through the Emergency Operating Procedures (EOPs) to cooldown and reduce pressure to slow the loss of RCS inventory and allow intermediate head injection. It is unlikely that this would result in any core damage as operators would continue to follow the EOP strategy of cooldown and depressurization after a SBLOCA or SGTR.

There were no actual consequences due to the isolation of the BIT. Unit 2 was in MODE 3 following a refueling outage. Prior to the event, both BIT outlet isolation valves (2SJ12 and 2SJ13) were closed with a charging pump in service. BIT pressure was approximately 2400 psig when leakage through the BIT relief valve (2SJ10) increased. BIT inlet isolation valve 2SJ4 was closed in approximately 80 seconds to terminate the leak. The high head charging flow path was no longer OPERABLE and no RCS make up would be available until RCS pressure decreased below SI Pump shutoff head. The leak was well within the capacity of the operating charging pump and was rapidly terminated by operator action when lowering pressurizer level was recognized. The event did result in the entry into TS 3.0.3 due to the inoperability of the ECCS high head charging flow path.

**SAFETY SYSTEM FUNCTIONAL FAILURE**

A review of this event determined that a Safety System Functional Failure (SSFF) as defined in NEI 99-02, Regulatory Assessment Performance Indicator Guidelines, did not occur.



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**NARRATIVE**

**PREVIOUS OCCURRENCES**

A review of Salem Unit 1 and 2 Licensee Event Reports for the previous three years identified a similar event requiring entry into TS 3.0.3 when both trains of intermediate head ECCS were rendered inoperable. That event was reported in LER 272/2014-005 "Technical Specification 3.0.3 Entry; Two ECCS Subsystems Inoperable," dated August 27, 2014.

**CORRECTIVE ACTIONS**

- 1) The 2SJ10 relief valve was replaced and retested with no identified leakage.
- 2) Revise procedure MA-AA-734-458, "Pressure Relief Device Removal and Installation" to include a step that requires relief valve disassembly and inspection whenever predetermined criteria are met.
- 3) Other corrective actions are being tracked in the licensee's Corrective Action Program.

**COMMITMENTS**

There are no regulatory commitments contained in this LER.