



OCT 02 2015

LR-N15-0205

10 CFR 50.73

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

LER 311/2015-002-00  
Salem Nuclear Generating Station Unit 2  
Renewed Facility Operating License No. DPR-75  
NRC Docket No. 50-311

SUBJECT: Licensee Event Report 311/2015-002-00

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv), PSEG Nuclear LLC is submitting the enclosed Licensee Event Report (LER) Number 2015-002-00, "Reactor Trip Due to Loss of 4kV Non-Vital Group Bus."

There are no regulatory commitments contained in this letter.

If you have any questions or require additional information, please contact Mr. David Lafleur of Salem Regulatory Assurance at 856-339-1754.

Sincerely,

A handwritten signature in black ink that reads "John F. Perry". The signature is written in a cursive style with a large, sweeping "P" and "y".

John F. Perry  
Site Vice President – Salem

Attachment

cc Mr. D. Dorman, Administrator – Region 1, NRC  
Mr. T. Wengert, Licensing Project Manager (acting) – 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  
Mr. D. Lafleur, Salem Regulatory Assurance

<b>NRC FORM 366</b> (01-2014)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>  <b>LICENSEE EVENT REPORT (LER)</b> (See Page 2 for required number of digits/characters for each block)	<b>APPROVED BY OMB: NO. 3150-0104</b>  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>EXPIRES: 01/31/2017</b>
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<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** Reactor Trip Due to Loss of 4 kV Non-Vital Group Bus

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
08	05	2015	2015	-002	-000	10	02	2015	FACILITY NAME	DOCKET NUMBER
										<b>05000</b>
										<b>05000</b>

<b>9. OPERATING MODE</b>	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)			
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
10. POWER LEVEL  100%	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME David Lafleur, Senior Compliance Engineer, Salem Regulatory Assurance	TELEPHONE NUMBER (Include Area Code) 856-339-1754
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**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
B	EB	50	G080	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO			

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

On 8/05/15, at 1539, Salem Unit 2 experienced an automatic reactor trip. The cause of the reactor trip was due to a trip of the 21 Reactor Coolant Pump (RCP) causing a 21 Reactor Coolant Loop low flow condition. The 21 RCP breaker tripped as designed when the 2B Auxiliary Power Transformer (APT) infeed breaker to the 2H 4 kilovolt (kV) Non-Vital Bus opened. The root cause evaluation did not identify a definitive cause. However the most probable cause of the 2H 4 kV Non-Vital Bus trip was due to a ground fault on the 21 Heater Drain Pump (HDP) motor that was not isolated by its associated neutral overcurrent relay. An automatic start of the Auxiliary Feedwater (AFW) system occurred as expected following the reactor trip due to low steam generator water levels.

Corrective actions include replacement of the 21 HDP motor and its neutral overcurrent relay.

This event is reportable under 10 CFR 50.73 (a)(2)(iv)(A) as an event that resulted in an automatic actuation of the reactor protection system and actuation of the AFW system.



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

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.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Salem Generating Station – Unit 2	05000311	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2015	- 002	- 000	

**NARRATIVE**

**PLANT AND SYSTEM IDENTIFICATION**

Westinghouse - Pressurized Water Reactor {PWR/4}

Medium Voltage Power System, Overcurrent Relay {EB/50}

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

**IDENTIFICATION OF OCCURRENCE**

Event Date: August 5, 2015

Discovery Date: August 5, 2015

**CONDITIONS PRIOR TO OCCURRENCE**

Salem Unit 2 was in operational Mode 1, operating at approximately 100 percent power. No additional structures, systems or components were inoperable at the time of discovery that contributed to this event.

**DESCRIPTION OF OCCURRENCE**

On 08/05/15 at 1539, Salem Unit 2 experienced an automatic reactor trip due to low reactor coolant flow in the 21 Reactor Coolant System (RCS) loop while operating above the P-8 (36 percent power) permissive. The cause of the low reactor coolant loop flow trip was due to a trip of the 21 Reactor Coolant Pump (RCP). The 21 RCP breaker tripped as designed when the 2H 4 kV Non-Vital Group Bus neutral overcurrent relay actuated resulting in the loss of the bus.

As expected, the 21, 22 and 23 Auxiliary Feedwater (AFW) pumps started on low steam generator levels following the reactor trip. Unit 2 was stabilized in Mode 3 at normal operating temperature and pressure with the 22, 23, and 24 RCPs in service.

A four-hour Event Notification System (ENS) notification was required by 10 CFR 50.72(b)(2)(iv)(B) for actuation of the Reactor Protection System (RPS) when the reactor was critical. An eight-hour ENS notification was required by 10 CFR 50.72(b)(3)(iv)(A) for actuation of the AFW system. These notifications (EN #51290) were completed on 08/05/15 at 1851.

This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(iv)(A).

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

**CAUSE OF EVENT**

The root cause of the reactor trip could not be determined. The root cause evaluation determined that the most probable cause of the loss of the 2H 4 kV Non-Vital Group Bus was due to intermittent operation of the 21 Heater Drain Pump (HDP) motor neutral overcurrent relay {EB/50} due to aging. A ground fault occurred on the 21 HDP motor that was not isolated by its neutral overcurrent relay. The ground fault was subsequently isolated by the actuation of the 2H 4 kV Non-Vital Group Bus neutral overcurrent relay resulting in the loss of the 2H bus, including the 21 RCP, and causing the subsequent reactor trip. Post-event testing of the 21 HDP neutral overcurrent relay both onsite and at an offsite testing facility could not replicate the failure of the relay to actuate.

**SAFETY CONSEQUENCES AND IMPLICATIONS**

There were no safety consequences associated with this event. Operators appropriately responded to the automatic reactor trip and plant response was as expected. All safety systems operated as required. The loss of forced reactor coolant flow in one loop is bounded by the accident analysis.

A loss of forced reactor coolant flow is a Condition II event analyzed in Section 15.2.5 of the Updated Final Safety Analysis Review (UFSAR). By definition, a Condition II event will not propagate to cause a more serious event or fault. Condition II events are not expected to result in fuel rod failures or reactor coolant system over-pressurization. Because of the high reliability of the Solid State Protection System, a reactor trip is always assumed when evaluating the consequences of a Condition II event.

The UFSAR analysis states that for a trip and coast down of two RCPs, the departure from nucleate boiling ratio (DNBR) will not decrease below the limiting value at any time during the transient and therefore no core safety limit is violated. UFSAR analysis assumes a reactor trip on low RCS loop flow within 1.6 seconds of reduction in RCS loop flow with control rods beginning to drop in 2.6 seconds. Based on review of post trip data, the response times were within the analyzed values; therefore, there were no safety consequences as a result of the reactor trip.

**SAFETY SYSTEM FUNCTIONAL FAILURE**

A review of this event determined that a Safety System Functional Failure (SSFF) as defined in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, did not occur. This event did not prevent the ability of a system to fulfill its safety function to either shutdown the reactor, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident.

**PREVIOUS OCCURRENCES**

A review of Salem Unit 1 and 2 Licensee Event Reports for the previous three years identified no similar events.

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

**CORRECTIVE ACTIONS**

The 21 HDP motor and its associated neutral overcurrent relay were replaced.

**COMMITMENTS**

This LER contains no regulatory commitments.