



Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038-0236

Nuclear Business Unit

SEP 28 1998

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U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

LER 311/98-012-01  
SALEM GENERATING STATION - UNIT 2  
FACILITY OPERATING LICENSE NO. DPR-70  
DOCKET NO. 50-311

Gentlemen:

This Supplemental Licensee Event Report entitled "22 Auxiliary Feedwater Pump Inoperability Caused By The Failure To Restore The Pump Runout Protection Pressure Transmitter To Service Following Calibration" is being submitted pursuant to the requirements of the Code of Federal Regulations \*\*\*\*10CFR50.73(a)(2)(I)(B) \*\*\*\*

Sincerely,

A. C. Bakken III  
General Manager  
Salem Operations

Attachment

/rbk

C Distribution  
LER File 3.7

9810060338 980928  
PDR ADDCK 05000311  
S PDR

IE22/1

The power is in your hands.

**LICENSEE EVENT REPORT (LER)**

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

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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.

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TITLE (4) **22 Auxiliary Feedwater Pump Inoperability Caused By The Failure To Restore The Pump Runout Protection Pressure Transmitter To Service Following Calibration**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
07	25	98	98	012	01	09	28	98		
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		100	20.2201(b)			20.2203(a)(2)(v)	X		50.73(a)(2)(i)	50.73(a)(2)(viii)
			20.2203(a)(1)			20.2203(a)(3)(i)			50.73(a)(2)(ii)	50.73(a)(2)(x)
			20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(iii)	73.71
			20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv)	OTHER
			20.2203(a)(2)(iii)			50.36(c)(1)			50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)	

**LICENSEE CONTACT FOR THIS LER (12)**

Robert B. Knieriem, Licensing Engineer (609) 339-1782

**COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

**SUPPLEMENTAL REPORT EXPECTED (14)**

YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)**

This supplemental LER documents additional corrective action to be taken to address operation of Salem Unit 2 in a condition prohibited by Technical Specifications (TS). Contrary to TS 3.7.1.2, Auxiliary Feedwater System, Salem Unit 2 was operated with less than the required number of operable Auxiliary Feedwater (AFW) pumps.

This event is reportable under 10CFR50.73(a)(2)(i)(B), any operation or condition prohibited by the plant's TS. TS 3.7.1.2 requires that for operation in Modes 1, 2, and 3, all three AFW pumps must be operable. During the period from July 7, 1998, until July 25, 1998, and without the knowledge of the operators, Salem Unit 2 was operated in Mode 1 and Mode 2 with the 22 AFW pump inoperable. Following a calibration performed on July 7, 1998, technicians failed to restore the 22 AFW pump runout protection pressure device to service. With the runout protection pressure device isolated, the Steam Generator Flow Control valves would not open in response to an AFW pump discharge pressure signal. This condition would have prevented the 22 AFW pump from providing feedwater to the 21 and 22 Steam Generators when required.

The cause of this event was the failure of maintenance personnel to properly implement the procedure used to perform instrument calibrations. Specifically maintenance personnel failed to restore the 22 AFW pump runout protection pressure device to service following calibration and failed to independently verify that the instrument had been returned to service.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Plant And System Identification

Westinghouse - Pressurized Water Reactor  
 Auxiliary Feedwater Pump {BA/P}  
 Auxiliary Feedwater Pump Runout Protection Pressure Transmitter {BA/PIC}  
 Auxiliary Feedwater Steam Generator Flow Control Valves {BA/FCV}  
 Steam Generator Feed Pump {SJ/P}

Energy Industry Identification System (EIIS) system/component identifiers appear in {} following the first reference to the system component.

Conditions Prior To Occurrence

Mode 1, 100% power

Description Of Occurrence

On July 25, 1998, Salem Operations personnel were performing a plant shutdown in preparation for a planned maintenance outage. During the transition from the Steam Generator Feed pumps (SGFP) {SJ/P} to the Auxiliary Feedwater (AFW) pumps {BA/P}, operators noted that the Steam Generator Flow Control valves (21AF21 and 22AF21) {BA/FCV} did not respond as expected following the start of the 22 AFW pump. The operators took manual control of the Steam Generator Flow Control valves and restored feedwater flow. At that time the 22 AFW pump was declared inoperable.

The 21AF21 and 22AF21 valves are used to regulate AFW flow to the 21 and 22 Steam Generators respectively. Additionally, these valves operate in response to a signal from the 22 AFW Pump Runout Pressure Transmitter (2PA3449) {BA/PIC}. This pressure transmitter senses pressure at the AFW pump discharge to provide runout protection for the AFW pumps. In response to 2PA3449, when AFW pump discharge pressure drops below 1200 psig, 21AF21 and 22AF21 begin to close. These valves are fully closed at an AFW pump discharge pressure of 1000 psig.

Upon further investigation, station personnel determined that the instrument valve for 2PA3449 was shut, isolating the instrument from the 22 AFW discharge. This prevented the 21AF21 and 22AF21 valves from operating in response to AFW pump discharge pressure. Upon discovery of this condition the instrument valve for 2PA3449 was opened and AFW pump runout protection was restored. This action returned the 22 AFW pump to an operable condition and the Technical Specification action statement was exited.

Technical Specification 3.7.1.2, Auxiliary Feedwater System, requires that in Modes 1, 2, and 3, both motor-driven Auxiliary Feedwater pumps and the steam-driven Auxiliary Feedwater pump must be operable. With one AFW pump inoperable, Action a., of Technical Specification 3.7.1.2 requires that the inoperable pump must be restored to an operable status within seventy-two hours or the plant must be in at least Hot Standby within the next six hours and in Hot Shutdown within the following six hours.

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Based upon a review of station operating and maintenance records, the 22 AFW Pump Runout Pressure Transmitter instrument valve was last operated during the performance of an instrument calibration performed on July 7, 1998. Following completion of that calibration, instrument technicians failed to properly restore the pressure transmitter to service. The instrument valve remained closed from July 7, 1998 until the discovery of this condition on July 25, 1998. During that period Salem Unit 2 operated in Mode 1 and Mode 2.

Apparent Cause Of Occurrence

The apparent cause of this occurrence was the failure of maintenance personnel to properly implement the requirements of the Salem General Instrument Calibration Procedure For Field Devices (SC.IC-GP.ZZ-0003 (Q)), regarding equipment restoration.

Following the completion of the instrument calibration on July 7, 1998, maintenance personnel did not restore the 22 AFW Pump Runout Protection Pressure Transmitter to service as required by SC.IC-GP.ZZ-0003 (Q). Specifically, maintenance personnel failed to follow the requirements of this procedure for restoring a pressure device to service following calibration and the requirement to independently verify that the instrument had been returned to service.

Prior Similar Occurrences

A review of events during the past two years at Salem and Hope Creek Generating Stations identified one previous similar event. Hope Creek LER 354/97-009-00 reported an event in which the High Pressure Coolant Injection (HPCI) system was rendered inoperable after maintenance technicians failed to restore the HPCI Minimum Flow transmitter to service following calibration. The cause of that event was attributed to personnel performance, specifically verbatim procedure compliance and failure to properly conduct a hands-on second verification of the transmitter valves.

Safety Consequences

The AFW pumps serve to supply feedwater to the secondary side of the Steam Generators at times when the Main Feedwater system is not available. The AFW system is relied upon to prevent Reactor Coolant System over-pressurization in the event of accidents such as a loss of coolant accident, a loss of feedwater flow, a major feedwater line rupture, or a secondary system pipe rupture. In addition to accident and transient response, the AFW system is used to provide a means for plant cooldown.

Each Salem unit is equipped with one turbine-driven and two motor driven Auxiliary Feedwater pumps. Each motor-driven pump discharges to two of the four steam generators with a normally isolated cross-connect line joining the motor-driven pump discharge headers. The turbine-driven pump feeds all four steam generators. Feedwater flow is controlled from the Control Room by remotely operated flow control valves (AF21 valves for the motor-driven pumps and the AF11 valves for the turbine driven pump).

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The AFW system is designed with adequate redundancy to provide reactor cooldown capability when required. Each pump has sufficient capacity to remove heat from the steam generators at a rate sufficient to prevent over-pressurization of the Reactor Coolant system and to maintain steam generator levels to prevent thermal cycling. With the 22 AFW pump inoperable, the other two AFW pumps remained available, each capable of carrying out the design function of the system for the accidents analyzed.

In addition to the redundancy of the AFW pumps, the AFW pump runout protection device can be overridden in the control room. If an event had occurred in which a demand was placed upon the 22 AFW pump, the AF21 valves for the 22 AFW pump could have been overridden and flow restored to the 21 and 22 Steam Generators. This action is taken in accordance with appropriate procedural guidance.

Based upon the above, the inoperability of the 22 AFW pump Runout Pressure Transmitter did not place Salem Unit 2 in a condition that would impact the health and safety of the public.

Corrective Actions

1. The 22 AFW pump runout protection pressure transmitter was returned to service on July 25, 1998.
2. A valve lineup procedure was performed for instrument valves for the AFW system and the Residual Heat Removal system for Salem Units 1 and 2. No valve position deficiencies were identified.
3. All personnel involved have been held accountable in accordance with PSE&G's procedures and policies.
4. The details of this event were presented to Maintenance Department personnel as a written discussion of operating experience feedback. This discussion reinforced the importance of procedural compliance and independent verification in ensuring that components are restored the proper configuration following maintenance activities.
5. A review of Nuclear Business Unit programs and processes related to the control of safety system status will be performed to identify programmatic and organizational weaknesses that could compromise the ability of safety systems to carry out their design function. As a part of this review, the recommendations of INPO SOER 98-1 will be addressed. (PIR 980826176)

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