



**PSEG**

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

**Nuclear Business Unit**

**MAR 20 1998**

LR-N980129

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

**LER 272/98-006-00  
SALEM GENERATING STATION - UNIT 1  
FACILITY OPERATING LICENSE NO. DPR-70  
DOCKET NO. 50-272**

Gentlemen:

This Licensee Event Report entitled "ESF Actuation of 11 and 12 Auxiliary Feedwater Pumps" is being submitted pursuant to the requirements of the Code of Federal Regulations \*\*\*\*10CFR50.73 (a) (2) (iv)\*\*\*\*.

Sincerely,

A. C. Bakken III  
General Manager  
Salem Operations

Attachment

PJD/kjb

C      Distribution  
LER File 3.7

*IE22/1*

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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: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND 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.

FACILITY NAME (1) <b>SALEM UNIT 1</b>		DOCKET NUMBER (2) <b>05000272</b>	PAGE (3) <b>1 OF 4</b>
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TITLE (4)  
**ESF Actuation of 11 and 12 Auxiliary Feedwater Pumps**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL	REVISION	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
2	21	98	98	-- 006	-- 00	3	20	98	FACILITY NAME	DOCKET NUMBER
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9) <b>4</b>	<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)</b>			
POWER LEVEL (10) <b>0</b>	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	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)	<input checked="" type="checkbox"/> 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)**

NAME <b>Philip J. Duca, Salem Licensing Engineer</b>	TELEPHONE NUMBER (Include Area Code) <b>(609) 339-2381</b>
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**COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

**SUPPLEMENTAL REPORT EXPECTED (14)**

YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH <b>XX</b>	DAY <b>XX</b>	YEAR <b>XX</b>
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**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)**

At 1332 on February 21, 1998 with Salem Unit 1 operating in Mode 4 (Hot Shutdown), 11 and 12 Auxiliary Feedwater Pumps automatically started on Lo-Lo Steam Generator level in 14 Steam Generator.

The cause of this event was human error. The Main Steam lines were being warmed through the Main Steam Stop Bypass Valves. These valves had been opened wider during the night shift increasing the steaming rate of the steam generators. The operators did not adequately monitor steam generator water levels nor did they anticipate the increased steaming rate. Contributing causes were ineffective shift turnover and poor team communication.

The operators promptly established feedwater to all steam generators and restored water levels. Other corrective actions included discussion of the event and lessons learned by the personnel involved with all operating crews, and a reemphasis of responsibilities and the importance of safe operations by the shift superintendents. Additionally, personnel involved have been held accountable in accordance with PSE&G procedures and policies.

A 4 hour telephone notification was made to the NRC at 1500 on February 21, 1998 in accordance with 10CFR50.72(b)(2)ii; this report is being submitted in accordance with 10CFR50.73(a)(2)(iv); both required for "any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF).....".

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

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SALEM UNIT 1	05000272	98	-- 006	-- 00	2 OF 4

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

**PLANT AND SYSTEM IDENTIFICATION**

Westinghouse - Pressurized Water Reactor

Auxiliary/Emergency Feedwater System {BA/-}\*

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

**CONDITIONS PRIOR TO OCCURRENCE**

At the time of the occurrence Salem Unit 1 was in Mode 4 at 0 % Power with the Residual Heat Removal System in service providing core cooling.

**DESCRIPTION OF OCCURRENCE**

On February 19, the night shift (1900-0700) commenced warming up the Main Steam lines in accordance with procedures being utilized to take the plant from Cold Shutdown to Hot Standby. Warming up the Main Steam lines requires opening of the Main Steam Stop Bypass Valves (11-14MS18 valves). In Mode 4 feedwater is manually supplied to the steam generators on a periodic basis. This was being accomplished by starting and stopping of the Auxiliary Feedwater pumps. Establishing flow through the MS18 valves increased the steaming rate of the steam generators, thereby increasing the required frequency of providing feedwater to the steam generators to maintain water levels. The MS18 valves were opened approximately 1 to 2% of valve open position. The increased steaming rate required the starting of Auxiliary Feedwater pumps approximately once per 12 hour shift in order to maintain steam generator levels. On February 20, the night shift further opened all MS18 valves to approximately 4% valve open position. The steam generators were filled to greater than 33% narrow range level at 0451 on the morning of February 21. The additional steam demand, which caused water levels to fall at an increased rate, was not anticipated by the on-coming day shift (0700-1900). 14 Steam Generator Narrow Range Level dropped from 36% to 9% in approximately 8.5 hours.

Prior to the event steam generator water level narrow range chart recorders and steam generator water level program deviation console alarms on Control Console 2 were inoperable due to Advanced Digital Feedwater Control System testing which was in progress.

**LICENSEE EVENT REPORT (LER)**

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**DESCRIPTION OF OCCURRENCE (continued)**

The Unit 1 Reactor Operator (Nuclear Control Operator) logged 14 Steam Generator Narrow Range Level at 32% at 0730. At 1330, while performing shift logs, the Reactor Operator noticed 14 Steam Generator Level to be 12%. The Reactor Operator was about to start the Auxiliary Feedwater pumps and refill the steam generators just as the automatic action occurred. At 1332, 11 and 12 Auxiliary Feedwater pumps automatically started on Lo-Lo steam generator level when 14 Steam Generator water level reached 9% narrow range level. Operators promptly established feedwater to all steam generators to restore water levels. At the time of the event, 11 Steam Generator water level was 21%, 12 Steam Generator level was 31%, and 13 Steam Generator level was 32%.

Following the event, all steam generator water level narrow range chart recorders and program water level deviation alarms were returned to service. All steam generator levels were restored to greater than 33% as indicated on the narrow range level instruments.

**CAUSE OF OCCURRENCE**

The cause of this event was human error. The Unit 1 Reactor Operator, Plant Operator (the other control room Nuclear Control Operator), and Control Room Supervisor did not adequately monitor steam generator water levels nor did they anticipate the increased feedwater requirements. The Reactor Operator did not determine the rate at which steam generator water levels were decreasing. Steam generator narrow range water levels are logged every 6 hours. The Unit 1 Reactor Operator logged 14 Steam Generator Narrow Range Level at 32% at 0730. At 1330, while performing his logs, he noted 14 level to be 12% based on one of three narrow range level instruments. The other two narrow range level instruments were at 9%. When level reached 9%, the autostart of the auxiliary feedwater pumps occurred as designed.

A contributing cause of this event was ineffective shift turnover and poor team communication. Although the additional steam demand on the steam generators was discussed during the individual watch turnovers, the subject was never discussed at the Pre-watch Shift Brief nor did the Unit 1 Control Room Crew discuss any increased monitoring of steam generator water levels. The operating crew also did not discuss what steam generator water level should be maintained. The Operations Superintendent was not informed that the MS18 valves were opened an additional 2%.

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**PRIOR SIMILAR OCCURRENCES**

A review of LERs issued in the past two years did not identify any similar occurrences regarding the autostart of the auxiliary feedwater pumps

**SAFETY CONSEQUENCES AND IMPLICATIONS**

The Auxiliary Feedwater pump automatic start on Lo-Lo steam generator level functioned as designed. While steam generator level was dropping, the rate of decrease was relatively slow. The operators had ample time to react to the event prior to level in the steam generator reaching the extent (reaching hot and dry conditions) where damage could occur. Level in the other three steam generator levels remained above the autostart initiation level. At the time of the event core cooling was being provided by 11 Residual Heat Removal Loop. The steam generators were not being relied on for decay heat removal. Therefore, the health and safety of the public were not affected.

**CORRECTIVE ACTIONS**

1. The operators promptly established feedwater to all steam generators and restored proper water levels.
2. All steam generator water level narrow range chart recorders and program water level deviation console alarms were returned to operable status on February 21, 1998.
3. The Reactor Operator and Plant Operator at the time of the event have discussed this event and lessons learned with all operating crews.
4. All on shift Operations Superintendents have discussed this event and have led a discussion with their respective crews regarding their responsibilities and the importance of safe operations.
5. All personnel involved have been held accountable in accordance with PSE&G's procedures and policies.