

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Salem Generating Station - Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 2 7 2										PAGE 31 1 OF 0 4																													
TITLE (4) Reactor Trip From 100% - High High Level No. 14 Steam Generator																																																	
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 NAMES										DOCKET NUMBER(S)												
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OPERATING MODE (9)										THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11)																																							
POWER LEVEL (10) 1 0 0										20.402(b)										20.406(e)										<input checked="" type="checkbox"/> 80.73(a)(2)(iv)										73.71(b)									
										20.406(a)(1)(i)										80.38(a)(1)										80.73(a)(2)(v)										73.71(e)									
										20.406(a)(1)(ii)										80.38(a)(2)										80.73(a)(2)(vi)										OTHER (Specify in Abstract below and in Text: NRC Form 365A)									
										20.406(a)(1)(iii)										80.73(a)(2)(i)										80.73(a)(2)(vii)(A)																			
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LICENSEE CONTACT FOR THIS LER (12)																																																	
NAME Jerry L. Rupp																				TELEPHONE NUMBER AREA CODE 6 0 9 3 3 9 - 4 3 0 9																													
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																	
CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NPDOS				CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NPDOS																													
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SUPPLEMENTAL REPORT EXPECTED (14)																				EXPECTED SUBMISSION DATE (15)										MONTH DAY YEAR																			
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)																				<input checked="" type="checkbox"/> NO																													

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On January 7, 1984, a turbine trip occurred due to high-high level in No. 14 Steam Generator; this resulted in a reactor trip. The initiating event was a high level spike in 15C Feedwater Heater, which caused the heater string inlet valve (13CN27) to close. The Low Pressure Feedwater Heater Bypass Valve (1CN47) failed to open automatically. This caused No. 11 Steam Generator Feed Pump to trip on low suction pressure; load was ramped down to compensate for the feed pump loss. A blown fuse on the signal summator module for No. 14 Steam Generator Feedwater Level Control System caused the high-high level, which tripped the turbine and the reactor. The cause was not known, so the entire module was replaced. 1CN47 differential pressure transmitter setpoint was found to be high, and the transmitter was recalibrated. 1CN47 was thoroughly tested, and its operation was found to be satisfactory. During the transient, 14MS167 drifted off of its open seat due to a differential pressure created across its operating piston; this was caused by a combination of the power reduction and leakage from its steam assist valves. The reactor protection system functioned as designed. There was no undue risk to the health or safety of the public due to this event.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station Unit 1	DOCKET NUMBER C5000272	LER NUMBER 84-002-00	PAGE 2 OF 4
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PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

IDENTIFICATION OF OCCURRENCE:

Reactor Protection System [JC] - Reactor Trip From 100% - High High Level #14 Steam Generator - Turbine Trip - (Rx Trip #84-02)

Event Date: 01/07/84

Report Date: 02/06/84

This report was initiated by Incident Report No. 84-010

CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 - Rx Power 100 % - Unit Load 1130 MWe

DESCRIPTION OF OCCURRENCE:

At 2338 hours, January 7, 1984, during normal power operation, 13CN27 (inlet valve to 13C, 14C and 15C Low Pressure Feedwater Heater string) closed due to a spurious high level in 15C heater. The bypass around the heaters (1CN47) failed to open automatically. An attempt was made to open 1CN47 using remote-manual control from the control room; but the valve failed to respond. No. 11 Steam Generator Feed Pump (SGFP) [SJ] tripped on low suction pressure. A load reduction to fifty percent (50%) was initiated, to compensate for the loss of feed water flow. All steam generators appeared to be recovering from the transient, when No. 14 Steam Generator water level started increasing. In addition, No. 14 Steam Generator Main Steam Isolation Valve (14MS167) [SB] was observed to be lacking open indication. An attempt was made to open the valve; but, at 2342 hours, a turbine trip and reactor trip occurred, due to high-high level No. 14 Steam Generator.

APPARENT CAUSE OF OCCURRENCE:

13CN27 was determined to have shut, as designed, upon high level in the feed water heaters. No. 11 SGFP tripped on low suction pressure because the heater bypass (1CN47) failed to open. 1CN47 is supposed to open (automatically) upon a 115 psi differential pressure across the heaters or, upon 265 psig suction pressure on the feed pumps. The differential pressure setpoint was found to be high. The suction pressure setpoint was found to be satisfactory, and valve stroke indicated smooth operation. The valve was tested in all possible modes of operation. Remote manual and automatic operation of the valve was satisfactory. Subsequently, on January 21, 1984, 1CN47

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station Unit 1	DOCKET NUMBER 05000272	LER NUMBER 84-002-C0	PAGE 3 OF 4
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APPARENT CAUSE OF OCCURRENCE: (cont'd)

again failed to respond to automatic and manual control signals. The valve was then determined to be experiencing an intermittent binding problem, when fully closed, which explains why it failed to respond to automatic and manual control signals. The events associated with that occurrence are documented in LER 84-004-00.

14MS167 drifted off of its open seat because of the differential pressure across its operating piston. This differential pressure was created by the combination of the rapid power reduction and seat leakage from the 14MS167 Steam Assist Valves (14MS169 and 14MS171).

The high level in No. 14 Steam Generator was caused by a malfunction of No. 14 Steam Generator Feedwater Level Control System [JB] due to a blown fuse. This high level caused the turbine trip which, in turn, caused the reactor trip.

ANALYSIS OF OCCURRENCE:

The turbine trip, on high-high steam generator water level, is an anticipatory trip. Its function is to prevent moisture carry-over from the steam generator and resultant damage to the turbine, due to the high velocity impingement of this moisture on the turbine blades.

The primary function of this reactor trip is to prevent steam generator safety valve actuation, due to the steam generator pressure increase, in the event that a turbine trip occurs during power operation. A turbine trip is sensed by two (2) out of three (3) signals from low autostop oil pressure or all turbine steam stop valves closed signals. A turbine trip causes a direct reactor trip above approximately ten percent (10%) reactor power (P-7 interlock circuitry), and results in a controlled short term release of steam to the turbine condenser. This steam release removes sensible heat from the RCS, and thereby avoids steam generator safety valve actuation.

This reactor trip is anticipatory, and included as part of good engineering practice and prudent design. No credit is taken in any of the safety analyses for this trip. Reactor protection during power operation is provided by the Power Range Detectors for rapid transients, and by the Overtemperature Delta T and the Overpower Delta T for slower developing transients. The turbine trip and the reactor trip occurred as required, to respectively prevent turbine damage and to minimize the primary plant transient. The Reactor Protection System [JC] functioned as designed. This occurrence involved no undue risk to the health or safety of the public. Because of the automatic actuation of the Reactor Protection System, the event is reportable in accordance with the Code of Federal Regulations, 10CFR 50.73(a)(2)(iv).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station Unit 1	DOCKET NUMBER 05000272	LER NUMBER 84-002-00	PAGE 4 OF 4
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CORRECTIVE ACTION:

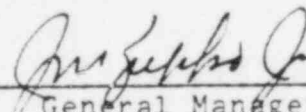
13CN27 heater high level setpoint was checked; the setpoint was correct. The valve was stroked, and it operated satisfactorily. 1CN47 differential setpoint was lowered to the required 115 psid. The suction pressure trip was found to be correct. As previously stated, the valve was stroked, and it operated smoothly. The valve was tested in all possible modes of operation. Remote-manual and automatic operation of the valve was satisfactory. Both of these valves were observed during the following reactor startup, and they operated satisfactorily.

The Main Steam Isolation Valve Steam Assist Valves (14MS169 and 14MS171) were stroked, and verified to be properly seated. Operation of these valves was also satisfactory, although some minor seat leakage was noted. Due to a history of leakage problems associated with all of the MS168, MS169, and MS171 valves, an engineering investigation is in progress, as to the feasibility of providing modifications to these valves or replacing the valves with ones of a different design.

A fuse was found to be blown on the signal summator module for No. 14 Steam Generator Feedwater Level Control System. The cause was not known, so the entire module was replaced. A functional check was then performed, with the control system operating properly.

14MS167 and its Main Steam Assist Valves operated properly during the following reactor startup and power escalation; although, some leakage was noted from the Main Steam Assist Valves.

Prepared By J. L. Rupp



General Manager -
Salem Operations

SORC Meeting 84-015



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

Salem Generating Station

February 6, 1984

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

Dear Sir:

SALEM GENERATING STATION
LICENSE NO. DPR-70
DOCKET NO. 50-272
UNIT NO. 1
LICENSEE EVENT REPORT 84-002-00

This Licensee Event Report is being submitted pursuant to the requirements of 10CFR 50.73(a)(2)(iv). This report is required within thirty (30) days of discovery.

Sincerely yours,

J. M. Zupko, Jr.
General Manager -
Salem Operations

JR:kl1

CC: Distribution

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