

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Salem Generating Station - Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 7 2	PAGE 75 1 OF 04
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TITLE (4)  
Reactor Trip From 100% caused by partial closure of 11BF19

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		
0	1	3	1	8	6	8	6	0	0 5 0 0 0		
0	1	3	1	8	6	8	6	0	0 5 0 0 0		

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

OPERATING MODE (9) 1	20.402(b)	<input checked="" type="checkbox"/>	20.405(e)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)
	20.405(a)(1)(i)	<input type="checkbox"/>	50.38(a)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	73.71(a)
	20.405(a)(1)(ii)	<input type="checkbox"/>	50.38(a)(2)	<input type="checkbox"/>	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	<input type="checkbox"/>	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(vii)(A)	
	20.405(a)(1)(iv)	<input type="checkbox"/>	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(vii)(B)	
	20.405(a)(1)(v)	<input type="checkbox"/>	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME J. L. Rupp - Operations Licensing Engineer	TELEPHONE NUMBER	
	AREA CODE 6109	313191-4131019

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS
X	JIB	PSIV	A61019	Y					
X	JIB	FCIO	M11210	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE: )  NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

On January 31, 1986, 11BF19 (No. 11 Steam Generator Feedwater Regulating Valve) drifted partially closed and failed to respond to manual control. The water level in No. 11 Steam Generator decreased rapidly, resulting in a reactor trip on No. 11 Steam Generator steam flow/feed low mismatch, coincident with a low steam generator water level signal. A leak was discovered on the valve positioner for 11BF40 (11BF19 Bypass Valve), and the positioner was replaced. The leakage was sufficient to have caused 11BF19 to drift closed in the the eventuality of leakage through SV-1491 (a 3-way solenoid valve), and SV-1491 was replaced as a precautionary measure. During blowdown of the instrument air lines, some dirt and moisture were detected. A particle of dirt or water droplets could also have caused 11BF19 to drift closed. Subsequent investigations were unable to repeat the failure scenario and the "root" cause could not be determined. Although not related to the cause, SV-543 (a series isolation solenoid for 11BF40) was also replaced because it exhibited leakage. No. 11 Steam Generator feedwater control loop was instrumented to monitor system operation during and following the subsequent startup. Unit 1 was returned to operation on February 2, 1986, and the Steam Generator Feedwater Level Control System has continued to function satisfactorily since that time.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station Unit 1	DOCKET NUMBER 05000272	LER NUMBER 86-003-00	PAGE 2 OF 4
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PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

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

IDENTIFICATION OF OCCURRENCE:

Reactor Trip From 100% - No. 11 Steam Generator Steam Flow/Feed Flow Mismatch Coincident With Low Steam Generator Water Level

Event Date: 01/31/86

Report Date: 02/28/86

This report was initiated by Incident Report No. 86-036

CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 - Rx Power 100 % - Unit Load 1120 MWe

DESCRIPTION OF OCCURRENCE:

On January 31, 1986, during routine power operation, the water level in No. 11 Steam Generator began decreasing rapidly. The Steam Generator Water Level Control System [JB] was in automatic at the time of the occurrence, and the demand signal for 11BF19 (No. 11 Steam Generator Feedwater Regulating Valve) was observed to be 100%. However, the valve had no open or closed signal (indicating that it was not fully open or fully closed). One control room operator took manual control of 11BF19 and attempted to fully open the valve; however, it failed to respond to the full open demand signal. At the same time, another control room operator attempted to open 11BF40 (11BF19 Bypass Valve), utilizing its manual control. 11BF40 did respond by indicating approximately 50% open; however, steam generator water level continued to drop, and at 1053 hours a reactor trip occurred due to No. 11 Steam Generator steam flow/feed low mismatch, coincident with a low steam generator water level signal.

The Unit was stabilized in Mode 3 (Hot Standby), and at 1138 hours, in accordance with the requirements of the Code of Federal Regulations, 10CFR 50.72(b)(2)(ii), the Commission was notified of the automatic actuation of the Reactor Protection System [JC].

APPARENT CAUSE OF OCCURRENCE:

The cause of the feedwater transient associated with No. 11 Steam Generator was determined to be the partial closing of 11BF19. The subsequent steam generator level drop to twenty-five percent (25%), coincident with steam flow greater than feed flow, resulted in the reactor trip.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station	DOCKET NUMBER	LER NUMBER	PAGE
Unit 1	05000272	86-003-00	3 OF 4

APPARENT CAUSE OF OCCURRENCE: (cont'd)

Although the "root" cause could not be conclusively determined by the extensive tests and inspections which were performed (see the Corrective Action section of this LER), the most probable causes are as follows:

The control air lines of 11BF40 and 11BF19 are tied together through SV-1491 (a 3-way solenoid valve) in the event of either 1) 11BF40 controls being in "automatic" or 2) leakage through SV-1491. A leak was discovered on the valve positioner for 11BF40, and subsequent testing verified that this leak would be enough to cause 11BF19 to drift closed in the eventuality of leakage through SV-1491. SV-1491 was verified to operate from the control room following the trip; however, because of the possibility of an intermittent seating problem, this valve was replaced. In addition, during blowdown of the instrument air lines, some dirt and moisture were detected. A particle of dirt or water droplets could also have caused the feedwater flow perturbations which resulted in the reactor trip. These problems could have caused the trip, but subsequent investigations were unable to repeat the failure scenario. In either case, this would explain why 11BF19 drifted closed and failed to respond in the manual mode of operation.

ANALYSIS OF OCCURRENCE:

This reactor trip, on steam flow/feed flow mismatch with low steam generator water level, is an anticipatory trip. Its function is to prevent a loss of heat sink capability by sensing conditions which would eventually result in a dry steam generator. By tripping the reactor prior to reaching the low-low level setpoint in the steam generator, the required starting time and capacity requirements for the Auxiliary Feed System [BA] are reduced; thereby, minimizing the thermal transient on the steam generators and the Reactor Coolant System [AB]. The Reactor Protection System functioned as designed. This occurrence involved not 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).

CORRECTIVE ACTION:

11BF19 "open" and "close" limit switches were tested to verify proper valve position indication. 11BF19 was stroke tested and leak checked (using a hand sender). 11BF19 and 11BF40 were then stroke tested from the control room bezels. SV-541 and SV-542, which are the series isolation solenoid valves located between the 11BF19 valve positioner and valve diaphragm, were checked for leakage and proper operation.

As previously stated, SV-1491 (the 3-way solenoid valve which controls the signal to 11BF40) was replaced. Proper operation of this valve was verified from the control room by using the auto/manual push buttons.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station Unit 1	DOCKET NUMBER 05000272	LER NUMBER 86-003-00	PAGE 4 OF 4
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CORRECTIVE ACTION: (cont'd)

The line upstream of 11BF19 was radiographed to ensure proper position of the feedwater flow nozzle. All of these test and inspection results were satisfactory, with the above listed components functioning as per design.

The control air lines associated with 11BF19 and 11BF40 valve positioners and the 11BF19 I/P Transducer were blown down. A small amount of dirt and moisture were detected during this process, and the air filters on these components were replaced. SV-543 and SV-544, which are the series isolation solenoid valves located between the 11BF40 valve positioner and valve diaphragm, were tested. SV-544 test results were satisfactory; however, SV-543 was replaced because it exhibited leakage.


11BF40 valve positioner was replaced (due to a leaking bypass valve on the unit), and a calibration procedure was then performed on the new positioner. The positioners on the BF-19's and the BF-40's are inspected and tested each refueling outage. A task has been added to those Inspection Order Cards to replace the "O" rings in the positioner bypass valves at that time. Even though the bypass valve is not used in the BF-40's, the "O" rings were found to be hard and dry, which caused a leak in the input signal to the positioner.

No. 11 Steam Generator feedwater control loop was instrumented to monitor system operation during and following the subsequent startup. Unit 1 was returned to operation at 1054 hours, February 2, 1986, and the Steam Generator Feedwater Level Control System has continued to function satisfactorily since that time.

FAILURE DATA:

11BF40 Valve Positioner  
Masoneilan International, Inc.

Solenoid Valve SV-543  
202-302-1F  
ASCO Electrical Products, Inc.

  
General Manager-  
Salem Operations

JLR:tns

SORC Mtg 86-011



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

Salem Generating Station

February 28, 1986

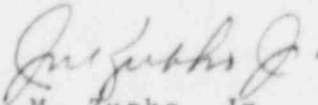
U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Dear Sir:

SALEM GENERATING STATION  
LICENSE NO. DPR-70  
DOCKET NO. 50-272  
UNIT NO. 1  
LICENSEE EVENT REPORT 86-003-00

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

JLR:ama

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