PSEG

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

Salem Generating Station

July 19, 1993

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

Dear Sir:

SALEM GENERATING STATION
LICENSE NO. DPR-75
DOCKET NO. 50-311
UNIT NO. 2

LICENSEE EVENT REPORT 93-009-00

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

Sincerely yours,

C. A Vondra
General Manager -
Salem Operations

MP:pc

Distribution

260072

The power is in your hands.

IE22

NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Salem Generating Station - Unit 2	0 5 0 0 0 3 1 1	1 OF 0 6

TITLE (4)

ESF Actuation: Automatic Start of Motor Driven Auxiliary Feedwater Pumps.

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)
										0 5 0 0 0
0 6	2 2	9 3	9 3	— 0 0 9	— 0 0	0 7	1 9	9 3		0 5 0 0 0

OPERATING MODE (9)	3	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	x 50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
M. J. Pollack - LER Coordinator	6 0 9 3 3 9 - 2 2 1 3

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	x NO				

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

On June 22, 1993, at 0326 hours, 21 and 22 motor driven Auxiliary Feedwater (MDAFW) Pumps automatically started due to 21 and 22 Steam Generator Feed Pumps (SGFPs) tripping on low suction pressure (an Engineered Safety Feature). Both SGFPs had been running in support of Condensate System cleanup. At the time, Condensate Polishing System 24 demineralizer (DM) vessel was being restored to service. The SGFPs tripped during the tagging release of the 24 DM vessel. Investigation revealed that the reduced SGFP suction pressure was a direct result of a pressure transient induced during the 24 DM vessel tagging release. The root cause of this event is "Management/QA Deficiency". Adequate control was not maintained over concurrent testing performed during the 24 DM vessel maintenance work such that the 24CP2 arming controls remained "OPEN" and was not considered when restoring the vessel to service. A Chemistry Department troubleshooting procedure is being developed. In the interim, a temporary revision to an existing procedure was completed. This procedure provides an automatic sequence that refills the vessel and details specific valve manipulation. The circumstances surrounding the cause of this event and the ways in which it could have been prevented will be reviewed with applicable Chemistry Department personnel. Also, the requirement to employ plans in support of testing/troubleshooting activities will be stressed. This event will be reviewed by the Nuclear Training Center for lessons learned.

PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as {xx}

IDENTIFICATION OF OCCURRENCE:

Engineered Safety Feature Actuation: Automatic Start of Motor Driven Auxiliary Feedwater Pumps

Event Date: 6/22/93

Report Date: 7/19/93

This report was initiated by Incident Report No. 93-277.

CONDITIONS PRIOR TO OCCURRENCE:

Mode 3 Reactor Power 0% - Unit Load -0- MWe

DESCRIPTION OF OCCURRENCE:

On June 22, 1993, at 0326 hours, 21 and 22 motor driven Auxiliary Feedwater (MDAFW) Pumps {BA} automatically started due to 21 and 22 Steam Generator Feed Pumps (SGFPs) tripping on low suction pressure. The unit was maintained in MODE 3 (Hot Standby). Both SGFPs had been running in support of Condensate System cleanup prior to Unit restart.

At the time of the event, Condensate Polishing System (CPS) {SF} 21, 22, and 23 demineralizer (DM) vessels were in stand-by with the 25 and 26 DM vessels in service. 24 DM vessel, which had been out of service in support of maintenance, was being restored to service (for standby operation) at the time of the event. The SGFPs tripped during the tagging release of the 24 DM vessel. Investigation revealed that the reduced SGFP suction pressure was a direct result of a pressure transient induced during the 24 DM vessel tagging release.

The automatic start of the MDAFW Pumps is an Engineered Safety Feature (ESF) {JE} actuation, which was reported to the Nuclear Regulatory Commission in accordance with Code of Federal Regulations 10CFR 50.72(b)(2)(ii), at 0724 hours (same day).

ANALYSIS OF OCCURRENCE:

The Auxiliary Feedwater System consists of two (2) MDAFW pumps, one (1) steam driven auxiliary feedwater pump and associated valves and piping. It is required to be operable in Modes 1 (Power Operation),

ANALYSIS OF OCCURRENCE: (cont'd)

2 (Startup), and 3 (Hot Standby). The system is designed to cooldown the Reactor Coolant System (RCS) {AB} to less than 350°F from normal operating conditions in the event of a total loss of off-site power. At less than 350°F, the Residual Heat Removal (RHR) System {BP} is used to remove excess RCS heat.

As stated, this event involved the automatic start of the MDAFW Pumps upon loss of both SGFPs, which is an ESF function. Therefore, this event is reportable to the Nuclear Regulatory Commission in accordance with Code of Federal Regulations 10CFR50.73(a)(2)(iv).

Prior to this event, the CPS 24 DM vessel had been cleared and tagged in support of maintenance. Tagging included the DM vessel inlet manual isolation valve, 24CP1 (Posi-Seal Butterfly Valve). Concurrent to the vessel maintenance, air leakage testing of the 24 DM vessel automatic inlet isolation valve actuator, 24CP2 was conducted. This manipulation generated an "OPEN" signal to the valve actuator from the valve OPEN/CLOSE control switch. Per design, the 24 DM vessel pressurizing bypass valve, 24CP4, opened and 24CP2 controls received an "OPEN" arming signal, which would cause 24CP2 to automatically open with less than 8 psid across the valve. Control air to 24CP2 was tagged closed preventing automatic valve operation. The 24CP2 valve "OPEN" signal remained armed (per design). There is no positive indication when the valve is armed. (reference Attachment 1, schematic of system)

On June 21 maintenance on 24 DM vessel was completed and a flange, which had been removed to allow the vessel to drain, was reinstalled. Prior to this event, it was not recognized that 24CP1, which although closed, was leaking past its valve seat. Consequently, leakage occurred through the open 24CP4 via 24CP1. This leakage initiated 24 DM vessel fill despite the fact that the 24CP1 valve was tagged closed.

On June 22, a tagging release of 24 DM vessel was completed. When the 24CP1 was opened, the rate of vessel fill increased. With the 24 DM vessel vent valve closed, an air bubble formed in the vessel. Condensate System pressure (610 psi) caused the vessel to pressurize. Once the differential pressure decreased to 8 psid across 24CP2, the valve automatically opened due to the armed OPEN signal.

Pressurizing of the 24 DM vessel caused the air bubble to compress. Once the 24CP2 opened, the air bubble released into the Condensate System piping causing a pressure transient which resulted in momentary low suction pressure to the SGFPs inlet piping and the subsequent trip of the SGFPs.

APPARENT CAUSE OF OCCURRENCE:

The root cause of this event is "Management/QA Deficiency" (per NUREG 1022). Adequate control was not maintained over concurrent testing performed during the 24 DM vessel maintenance work such that the 24CP2 arming controls remained "OPEN" and was not considered when restoring the vessel to service.

In this event, the vent valve was cleared and tagged in support of the 24 DM vessel planned maintenance. When the vessel was to be returned to service, it was one of the first tags to be released. Operational considerations were not taken as to the potential that the vessel was filling via the 24CP1 and 24CP4 valves and that the 24CP2 valve controls had an armed "OPEN" signal from the concurrent work.

A contributing factor to the cause of this event is the lack of positive indication of the status of the 24CP2 "OPEN" signal.

PRIOR SIMILAR OCCURRENCES:

On March 16, 1993, Salem Unit 2 experienced a reactor trip (reference LER 311/93-005-00) which was initiated by a pressure transient from the Condensate Polishing System which tripped a SGFP. Although the results are comparable to the event addressed in this LER, the specific causal factors differ. The March 16 event was initiated by the failure of a differential pressure switch which had failed due to water intrusion from a leaking valve.

SAFETY SIGNIFICANCE:

Steam Generator level was maintained during this event. The automatic start of the MDAFW Pumps although inadvertent, functioned per design upon the trip of both SGFPs. The health and safety of the public was not affected by this event.

CORRECTIVE ACTION:

The circumstances surrounding the cause of this event and the ways in which it could have been prevented will be reviewed with applicable Chemistry Department personnel. Included in the review will be the need to apply a blocking tag to the CP2 valve switch when a DM vessel is to be cleared and tagged for maintenance. Also, the requirement to employ plans in support of testing/troubleshooting activities will be stressed.

A Chemistry Department troubleshooting procedure is being developed. In the interim, a temporary revision to Chemistry Procedure SC.CH-SO.CP-0842(A), "Condensate Polisher Resin Transfer" was completed. This procedure provides an automatic sequence that refills the vessel and opens the CP2 valve. The temporary revision

CORRECTIVE ACTION: (cont'd)

provides manual intervention to ensure the vessel is full of water and has no air prior to the CP2 valve opening.

This event will be reviewed by the Nuclear Training Center for lessons learned. Revisions to existing programs will be made as appropriate. Considerations include reviewing the Chemistry Department training programs to ensure that system operational consequences are adequately addressed.

The need to provide positive indication of the status of the CP2 valve "OPEN" signal indication is being assessed. Action will be taken based on the results of this assessment.

General Manager -
Salem Operations

MP:pc

SORC Mtg. 93-067

ATTACHMENT 1