



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

November 9, 1989

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 89-018-01; SUPPLEMENT

This Supplemental Licensee Event Report is being submitted pursuant to the requirements of 10CFR 50.73. A discussion of the Salem Unit 2 (Docket No. 50-311) investigation results has been added.

Sincerely yours,

L. K. Miller
General Manager -
Salem Operations

MJP:pc

Distribution

8911200065 891109
PDR ADOCK 05000272
S PDC

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Salem Generating Station - Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 7 2 1	PAGE (3) OF 0 4
---	---	---------------------------

TITLE (4)
SSPS Cabinet Connections Unsatisfactory Due To Inadequate Initial Fabrication

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 2	8 9	8 9	0 1	8 0	0 1	1 1	0 9	Salem - Unit 2		0 5 0 0 0 3 1 1
									0 5 0 0 0		

OPERATING MODE (9) 6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) R E F	20.402(b)		20.406(c)		50.73(a)(2)(iv)		73.71(b)			
	20.406(a)(1)(i)		50.36(c)(1)	<input checked="" type="checkbox"/>	50.73(a)(2)(v)		73.71(c)			
	20.406(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vi)		OTHER (Specify in Abstract below and in Text, NRC Form 366A)			
	20.406(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)					
	20.406(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(vii)(B)					
	20.406(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(ix)					

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME M. J. Pollack - LER Coordinator		6 0 9 3 3 9 - 4 0 2 2	
AREA CODE			

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		
B	JGC	ON	W120	Y							

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)		
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)			<input checked="" type="checkbox"/> NO		
MONTH	DAY	YEAR			

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

On 5/2/89, during testing following modifications to the Solid State Protection System (SSPS), several wires were discovered to not be properly connected to the circuit board connectors. SSPS cabinets 100% visual inspection and 100% pull-testing was performed. Results showed that 119 of 2644 clips were unsatisfactory for Train A and 103 of 2644 clips were unsatisfactory for Train B. Discussion with the technician indicates the wires in the SSPS cabinet were in contact with the circuit board, and it was only through physical movement that they had become disconnected. Review of modification work performed on SSPS showed that many of the areas identified as having unsatisfactory connections have not been modified since they were originally delivered by Westinghouse. The root cause of this occurrence has been attributed to inadequate connection of the TERMI-POINT clips during initial SSPS fabrication performed by Westinghouse. Westinghouse has stated that they were unaware of any similar occurrences involving SSPS, but intended to issue a Technical Bulletin on the subject. Full visual inspection and a complete pull-test of each train of the SSPS Input, Logic and Output cabinets has been completed. All connections that did not pass the inspection and/or test were replaced and pull-tested satisfactorily. Prior to restart of Salem Unit 1, both SSPS trains underwent functional testing and response time testing. On 10/17/89, the U-2 SSPS visual inspection and pull-testing was completed. Results show that 36 of 2150 clips Train A and 23 of 2150 Train B clips were deficient. The deficiencies were corrected upon discovery.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station Unit 1	DOCKET NUMBER 5000272	LER NUMBER 89-018-01	PAGE 2 of 4
------------------------------------	--------------------------	-------------------------	----------------

PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

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

IDENTIFICATION OF OCCURRENCE:

Solid State Protection System cabinet connections unsatisfactory due to inadequate initial fabrication

Event Date: 5/02/89

Report Date: 11/09/89

This report was initiated by Incident Report Nos. 89-284, 89-633, and 89-636.

CONDITIONS PRIOR TO OCCURRENCE:

Refueling Outage - Mode 6

DESCRIPTION OF OCCURRENCE:

On May 2, 1989, during testing following modifications to the Solid State Protection System (SSPS) [JG], a technician discovered that two wires had become dislodged from the circuit board connectors. The wires are connected to the circuit board by TERMI-POINT clips. The technician notified the job supervisor, and subsequent visual inspection of the circuit board indicated that some additional connections were deficient. 100% visual inspection and 100% pull-testing was performed on the input, logic and output cabinets of the SSPS. The pull-testing performed used more conservative acceptance criteria than that specified by the vendor (specified in AMP document IS 1933). AMP allows clip movement up to one half of clip length. For the pull-testing performed on the SSPS, failure was based on any clip movement. The results of the visual inspection and pull testing indicated that 119 clips were unsatisfactory (out of 2644 tested) for Train A and 103 clips were unsatisfactory (out of 2644 tested) for Train B.

Discussion with the technician indicates that the wires in the SSPS cabinet were in contact with the circuit board, and it was only through physical movement that they had become disconnected. Review of modification work performed on SSPS showed many of the areas identified as having unsatisfactory connections have not been modified since they were originally delivered by Westinghouse.

APPARENT CAUSE OF OCCURRENCE:

The root cause of this occurrence has been attributed to inadequate connection of the TERMI-POINT clips during initial SSPS fabrication performed by Westinghouse.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station	DOCKET NUMBER	LER NUMBER	PAGE
Unit 1	5000272	89-018-01	3 of 4

APPARENT CAUSE OF OCCURRENCE: (cont'd)

The SSPS for Salem Unit 1 was supplied by Westinghouse Electric Corporation. The SSPS cabinets are Westinghouse Serial No. 0002, dated November 5, 1971. The TERMI-POINT clips and the circuit board connectors were supplied to Westinghouse by AMP Incorporated (AMP Spec. No. 108-14011). Westinghouse performed the connection work in-house, which consisted of using the TERMI-POINT clips to connect the Type 22 AWG wire (6 strands) to the circuit board pins.

Westinghouse has stated that they were unaware of any similar occurrences involving SSPS, but intended to issue a Technical Bulletin on the subject.

ANALYSIS OF OCCURRENCE:

The both Salem Unit's SSPS's consist of two redundant trains (A and B), which provide two types of protective outputs (reactor trip and Engineered Safety Features). The SSPS also supplies data to the computer and reactor status panel in the control room. Each train's cabinet consists of an input relay bay, a logic bay and an output relay bay. In addition to the protective cabinets, there are two demultiplexing cabinets, an interface cabinet, and an output test cabinet. The demultiplexing cabinets provide input to the control room computer and reactor status panel.

The SSPS receives input from selected plant process and protection instrumentation. Based on those inputs, the logic portion of the SSPS initiates reactor trip and/or Engineered Safeguards Features (ESF) actuation. SSPS outputs actuate the appropriate components needed for reactor trip and ESF to bring the plant to a safe condition.

The results of SSPS operability testing and SSPS performance during plant transients (both Units) shows that the SSPS has historically been operational. This is further substantiated by the fact that, according to the technician who discovered the condition, the wires were in contact with the circuit board. Salem Unit 1 was in a refueling outage at the time the condition was discovered. The SSPS was not required to be operational, and there was no immediate threat to public health and safety. However, since visual inspection and pull-testing indicated unacceptable connections, PSE&G recognizes the potential for physical movement, via a seismic event or other external means, that may cause some of the SSPS wires to become disconnected. The failure of SSPS connections could prevent the automatic initiation of reactor trip or ESF functions. Therefore, since both trains of the SSPS were discovered to have unacceptable connections, this event is reportable in accordance with Code of Federal Regulations 10CFR 50.73(a)(2)(v).

CORRECTIVE ACTION:

Full visual inspection and a complete pull-test of each train of the SSPS Input, Logic and Output cabinets has been completed. All

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station	DOCKET NUMBER	LER NUMBER	PAGE
Unit 1	5000272	89-018-01	4 of 4

CORRECTIVE ACTION: (cont'd)

connections that did not pass the inspection and/or test were replaced and pull-tested satisfactorily. This was done using more stringent pull-test criteria than required by AMP Document IS 1933.

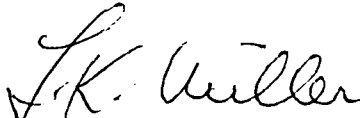
Prior to restart of Salem Unit 1, both SSPS trains underwent functional testing and response time testing as required by the plant Technical Specifications.

Via letter dated May 16, 1989, PSE&G provided the NRC with a Notification of Defect pursuant to the requirements of 10CFR Part 21.

The SSPS vendor, Westinghouse Electric Corporation, was notified of the condition and indicated that they would issue a Technical Bulletin.

An evaluation justifying continued operation of Unit 2 has been completed.

On October 17, 1989, the Unit 2 SSPS Input, Output, and Logic Bays visual inspection and pull-testing was completed. Results show that 36 of 2150 clips were deficient for Train A and 23 of 2150 were deficient for Train B. The deficiencies were corrected upon discovery.


General Manager -
Salem Operations

WM:pc

SORC Mtg. 89-108