

JAN 05 2001



LR-N01-005

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

**SALEM GENERATING STATION - UNIT 1**  
**DOCKET NO. 50-272**  
**LICENSEE EVENT REPORT NO. 00-005-00**

Dear Sir:

This Licensee Event Report entitled, "Reactor Trip Due To A Failed Circuit Card In Solid State Protection System," is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Sincerely,  
  
David Garchow  
Vice President – Operations

Attachment

JCN

C     Distribution  
      LER File

IE22

**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 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1) <b>Salem Generating Station Unit 1</b>		DOCKET NUMBER (2) <b>05000272</b>	PAGE (3) <b>1 OF 4</b>
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TITLE (4)  
**Reactor Trip Due To A Failed Circuit Card In Solid State Protection System**

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 NAME	DOCKET NUMBER
12	08	00	00	-- 005	-- 00	01	08	00	FACILITY NAME	DOCKET NUMBER <b>0500</b>
									FACILITY NAME	DOCKET NUMBER <b>0500</b>

OPERATING MODE (9) <b>1</b>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)										
POWER LEVEL (10) <b>100</b>	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 20.2203(a)(2)(vii)	<input type="checkbox"/> 20.2203(a)(2)(viii)	<input type="checkbox"/> 20.2203(a)(2)(ix)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 20.2203(a)(2)(vii)	<input type="checkbox"/> 20.2203(a)(2)(viii)	<input type="checkbox"/> 20.2203(a)(2)(ix)	<input type="checkbox"/> 20.2203(a)(2)(x)	<input type="checkbox"/> 73.71
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(vi)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(vi)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(vii)	Specify in Abstract below or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME <b>John C. Nagle, Licensing Engineer</b>	TELEPHONE NUMBER (Include Area Code) <b>(856) 339-3171</b>
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	JE	AA	W120	Y					
X	SB	V	A585	N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

At approximately 0630, on December 8, 2000, Salem Unit 1 Operators received an overhead alarm "Rx Trip - Low Tave". Immediate investigation determined that the Steam Generator levels were falling and the Operator initiated a manual trip. Post trip review determined that an automatic reactor trip occurred, one second prior to the manual trip, in response to low low level in the 13 steam generator. The level in the steam generator fell as result of the feedwater regulating valves going closed due to an invalid signal from the Solid State Protection System. All safety systems performed as designed in response to the trip. Auxiliary feedwater started as designed and steam generator level was returned to proper levels.

Post trip investigation determined that an output driver circuit card in the Solid State Protection System had failed, causing the feedwater regulating valves to go closed. The defective circuit card was replaced and the Solid State Protection System was satisfactorily retested and the unit was returned to service on December 10, 2000.

The failed circuit card will be returned to the manufacturer for further analysis to determine the cause of failure.

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

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Salem Generating Station Unit 1	05000272	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		00	- 005	- 00	

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

**PLANT AND SYSTEM IDENTIFICATION**

Westinghouse - Pressurized Water Reactor  
 \* Energy Industry Identification System {EIIS} 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 1 (Power Operation), at 100% power. There were no structures, systems or components that were inoperable at the start of the event that contributed to the event.

**DESCRIPTION OF OCCURRENCE**

On December 8, 2000, Salem Unit 1 was operating at 100% power. At approximately 0630, operators (Utility, Licensed Reactor Operator) received a "Rx Trip-Low Tave" overhead alarm. As they responded to the alarm, they noted decreasing level in the steam generators {SG/-} and they initiated a manual reactor trip. Post trip review determined that an automatic reactor trip occurred approximately one second prior to the manual trip. The reactor trip occurred in response to a low-low level signal in the 13 Steam Generator. Following the reactor trip, all safety systems functioned properly and operations personnel responded as required. There was a minor equipment issue, post trip, in that the main steam check valve to the Steam Generator Feed Pump(11MS46){SB/V} only closed to 30%.

The low level in the steam generator caused the actuation of the Reactor Protection System {JC/-}, therefore this event is being reported in accordance with 10CFR50.73 (a) (2) (iv). This event was reported to the NRC under 10CFR50.72 (b) (2) (ii) on December 8, 2000.

**APPARENT CAUSE OF OCCURRENCE**

Post trip review determined that the apparent cause of this event was the closure of the feedwater regulating valves (BF19){SJ/V} resulting in the loss of feed flow to the steam generators. The closure of these valves was the result of a false signal from the Solid State Protection System {JE/-}. Troubleshooting of the Solid State Protection System {JE/-} identified a defective A train safeguards output driver circuit card (A517){JE/AA} (Westinghouse Part No. 6056D32G01). The failed driver card was replaced with a new card and the Solid State Protection System was satisfactorily retested. The failure also caused the "Rx Trip-Low Tave" alarm which had alerted the operators to the failure.

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**PRIOR SIMILAR OCCURRENCES**

A review of LERs for Salem Units 1 and 2 for the past two years identified one LER involving a reactor trip caused by a circuit board malfunction. Salem LER 272/00-003-00 reported a "Reactor Trip Caused By A Failed Voltage Regulation Circuit Card In The Rod Control System." The defective Control Rod Drive System voltage regulation circuit card which caused that event supplies power to the stationary coils of the control rods. There is, however, no history of board failures for the Solid State Protection System. In addition, LERs were submitted for the following reactor trips in which circuit boards were associated: 272-99-010 reported a reactor trip in which the cause of the event was traced to a poor connection on one of the rod control system power regulator boards; and, 272-00-002 reported a manual reactor trip due to a rapidly decreasing main generator electrical output, while a circuit card in the Electrohydraulic Control (EHC) system was being replaced. This was attributed to a momentary power decrease on an adjacent card while installing the power regulator boards.

The corrective actions to prevent recurrence of the events described above would not have prevented this event.

**ASSESSMENT OF SAFETY CONSEQUENCES AND IMPLICATIONS**

There were no safety consequences or implications associated with this event. All systems performed as designed to safely shutdown the reactor and maintain the reactor in a safe shutdown condition.

A review of this event determined that a Safety System Functional Failure (SSFF) as defined in NEI 99-02 did not occur.

**CORRECTIVE ACTIONS**

1. The failed driver circuit card was replaced with a new card and the Solid State Protection System was satisfactorily retested.
2. All remaining A Train driver cards and the B Train driver cards were successfully tested.
3. The failure of the 11MS46 check valve to fully close was reviewed to determine the effect on safety. This review determined that the valve would have performed the design function, if required. The failure to fully close appears to have been caused by packing bindings which is being tracked within the corrective action program.

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

**CORRECTIVE ACTIONS (continued)**

4. A TARP team (Transient Assessment Response Team) was promptly assembled to review the trip and associated issues and to provide assistance to the Operating Shift.
5. The failed driver circuit card will be returned to the manufacturer for further analysis to determine the cause of the failure. Based upon the results of the analysis by the vendor, further corrective actions may be required. A supplemental LER will be submitted to document the results of that analysis if those results significantly change the significance, implications, or consequences of this event or if the analysis results require substantial changes in the corrective actions.

**COMMITMENTS**

The corrective actions cited in this LER are voluntary activities and do not constitute commitments.