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LER 272 / 2002- 004 - 00
SALEM GENERATING STATION UNIT 1
FACILITY OPERATING LICENSE DPR- 70
DOCKET NO. 50-272

This Licensee Event Report entitled "Manual Reactor Trip and Automatic Auxiliary Feedwater Actuation on Low Steam Generator Level due to Feedwater Pump Runback" is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A). The attached LER contains no commitments.

Sincerely,

A handwritten signature in black ink, appearing to read "L. H. Waldinger", written over a circular scribble.

L. H. Waldinger
Director Site Operations

Attachment

WJM

C Distribution
RTL 3E.111

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME Salem Generating Station Unit 1	2. DOCKET NUMBER 05000272	3. PAGE 1 OF 4
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4. TITLE
Manual Reactor Trip and Automatic Auxiliary Feedwater Actuation on Low Steam Generator Level due to Feedwater Pump Runback

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	12	02	2002 - 004 - 00			01	13	03	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)								
10. POWER LEVEL	100	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)					
		<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)					
		<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 73.71(a)(4)					
		<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(5)					
		<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A					
		<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)						
		<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)						
		<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)						
		<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)								

12. LICENSEE CONTACT FOR THIS LER

NAME William McTigue, Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 856-339-1033
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

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

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On November 12, 2002, Salem Unit 1 was manually tripped due to a Steam Generator Feedwater Pump (SGFP) runback resulting from voltage decrease in the control power to its governor. The undervoltage occurred when a technician inadvertently grounded the power circuit for a valve limit switch during troubleshooting. The runback was not annunciated in the control room; a level alarm was received several minutes later. Operators initiated main turbine runback and reduced reactor power. As level continued to decrease to the trip setpoint, operators initiated a manual reactor trip. Auxiliary feedwater (AFW) pumps started automatically as expected, and plant shutdown was achieved without complications.

The root causes are silent SGFP runback that requires manual operator action, inadequate error prevention while taking voltage readings, and lack of recognition of the risk of troubleshooting. Corrective actions include design changes to minimize and improve plant response to SGFP runbacks, review of the human performance aspects of the root causes and procedural improvements for managing risk of work activities.

Operator actions were in accordance with procedures and the plant responded as designed to the manual reactor trip. There were no safety consequences associated with this event. This event is reported pursuant to 10CFR50.73(a)(2)(iv)(A) due to reactor trip and AFW system actuation.

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		YEAR	SEQUENTIAL NUMBER		REVISION NUMBER		
Salem Generating Station Unit No. 1	05000272	2002	0	0	4	00	2 OF 4

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

PLANT AND SYSTEM IDENTIFICATION

Westinghouse – Pressurized Water Reactor
 Feedwater System – EISS Identifier {BF/--} *
 Auxiliary Feedwater System {BA/--}
 Control Rod Drive System {AA/--}
 Feedwater/Steam Generator Water Level Control System {JB/--}
 Plant Protection System {JC/--}

*Energy Industry Identification System {EISS} codes and component function identifier codes appear as (SS/CCC)

CONDITIONS PRIOR TO OCCURRENCE

Mode 1 – 100% power. No structures, systems, or components were inoperable at the time of the occurrence that contributed to the event. The Control Rod Drive System {AA} was in manual to support axial flux difference target value determination.

DESCRIPTION OF OCCURRENCE

At approximately 0945 on November 12, 2002, 11 Steam Generator Feedwater Pump (SGFP) {BF/P} began a runback in response to a momentary voltage decrease in the control power to its governor {JB/GRL}. The undervoltage condition occurred when a technician inadvertently grounded the power circuit for the 11 SGFP warm-up valve limit switch during troubleshooting of the valve's position indication. Initiation of SGFP runback is not annunciated in the control room. Operators were alerted to the transient several minutes later by the control console alarm for steam generator level program deviation that is activated if level in any steam generator is +/- 5% from the program value. Operator actions included manual main turbine runback followed by tripping the 11 SGFP to initiate automatic turbine runback. Control rods were inserted via manual control until rod control was placed in automatic, after which rod insertion continued to reduce reactor power.

Operators observed steam generator level was decreasing toward the low-low reactor trip setpoint of 14% and initiated a manual reactor trip. All three auxiliary feedwater pumps {BA/P} started as designed on low-low steam generator water level after the reactor trip. Plant response was as expected and operators commenced shutdown in accordance with operating procedures.

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

CAUSE OF OCCURRENCE

The root causes of this event are 1) the design feature of the SGFP control system that allows SGFP runback without annunciation and requires manual operator action to recover steam generator level. The operators were not alerted to the transient until steam generator level had begun to decrease as indicated by the program deviation alarm. 2) Failure of the technician to use error prevention techniques that would have prevented the initiating event (i.e., shorting the valve limit switch circuit that resulted in undervoltage at the SGFP governor). 3) Lack of risk recognition associated with troubleshooting. The Control Room Supervisor, Work-It-Now (WIN) team Senior Reactor Operator (SRO), maintenance supervisor and technician did not adequately recognize and manage the risk associated with taking voltage readings at the valve limit switch.

PRIOR SIMILAR OCCURRENCES

Recent SGFP runbacks have occurred at Salem but they did not require actuation of the reactor protection system. In April 2001 a SGFP runback without annunciation occurred at Salem Unit 1 during a reduction in reactor power. The pump runback was due to a momentary overvoltage condition associated with transfer of the SGFP control power supply inverter. In April 2002 a Salem Unit 2 SGFP runback without annunciation occurred after a bus transfer between two station power transformers. The bus transfer was performed while the SGFP's control power supply inverter was aligned to its alternate source, resulting in a momentary undervoltage condition. Corrective actions included governor power supply conditioning to prevent pump runback due to voltage spikes, and improved procedural controls for inverter alignment and bus transfers. In both prior events, the operators promptly responded to the transient and recovered steam generator level before the low-low level setpoint was reached.

Review of Salem and Hope Creek LERs over the past two years did not identify any events resulting from inadequate error prevention techniques or lack of risk recognition associated with troubleshooting.

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

SAFETY CONSEQUENCES AND IMPLICATIONS

There were no safety consequences associated with this event. Plant response to the manual reactor trip was normal. The auxiliary feedwater pumps started as designed and maintained adequate flow to the steam generators. Operator actions to safely shut down the plant were in accordance with procedures.

A review of this event determined that a Safety System Functional Failure (SSFF) as defined in Nuclear Energy Institute (NEI) 99-02 has not occurred.

This event is being reported pursuant to 10CFR50.73(a)(2)(iv)(A) due to manual reactor trip and automatic actuation of the auxiliary feedwater system.

CORRECTIVE ACTIONS

1. PSEG is evaluating design changes that would reduce the likelihood of and improve plant response to SGFP runbacks.
2. Human performance aspects of the root causes of this event have been addressed in accordance with PSEG company policy.
3. Work management and maintenance procedures are being revised to improve guidance for managing work activities with regard to risk.

COMMITMENTS

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