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

LER 311/03-001-00
SALEM GENERATING STATION - UNIT 2
FACILITY OPERATING LICENSE NO. DPR-75
DOCKET NO. 50-311

Gentlemen:

This Licensee Event Report entitled "Manual Reactor Trip Due To Degradation Of Condenser Heat Removal" is being submitted pursuant to the requirements of 10CFR50.73 (a)(2)(iv)(A).

Sincerely,

L. Waldinger
Director - Operations

Attachment

BJT

C Distribution
LER File 3.7

IE22

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

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 information collection.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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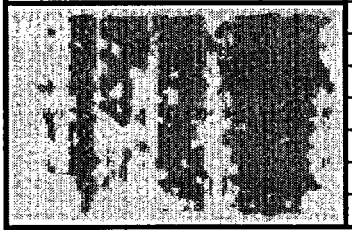
4. TITLE

MANUAL REACTOR TRIP DUE TO DEGRADATION OF CONDENSER HEAT REMOVAL

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
03	29	03	03	– 001	– 00	05	22	03	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1
10. POWER LEVEL	80



11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50.73(a)(2)(iv)(A)	73.71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Brian J. Thomas, Licensing Engineer	856-339-2022

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	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

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

A manual reactor trip was initiated at 0442 on March 29, 2003, with reactor power level at approximately 80%. The manual reactor trip was initiated in response to degradation of the normal plant heat sink when three of six Circulating Water (CW) pumps were emergency tripped due to loss of the CW traveling screens, with a fourth pump already out of service for condenser water box cleaning. All safety systems operated as designed following the reactor trip. The unit was stabilized in Mode 3 with the reactor at normal operating temperature and pressure with core cooling being provided by the auxiliary feedwater system and main steam dumps to the condenser.

The cause of manual reactor trip is attributed to the inability of the Unit 2 Circulating Water (CW) system to handle the excessively high river debris (detritus, hydroids, trash, etc.) levels in the Delaware River due to the design capability of the CW traveling screens. The CW traveling screen shear pins were replaced, the condenser water boxes were cleaned and Operations procedures were reviewed and modified as appropriate to assist plant operators in actions to take during high detritus levels. An ongoing CW improvement project is developing CW traveling screen improvements to increase the reliability of the CW system.

This report is being made in accordance with 10CFR50.73(a)(2)(iv)(A), "any event or condition that resulted in manual or automatic actuation of any of the system listed in paragraph (a)(2)(iv)(B)."

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
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TEXT *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

PLANT AND SYSTEM IDENTIFICATION

Westinghouse – Pressurized Water Reactor

Reactor Protection System (JC/-)
Circulating Water System (KE/)

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

CONDITIONS PRIOR TO OCCURRENCE

Salem Unit 2 was in Mode 1 at approximately 80% power with an unplanned power reduction in progress at the time the reactor was manually tripped.

DESCRIPTION OF OCCURRENCE

On March 29, 2003, Salem Unit 2 was operating at 99% power with Delaware River detritus level at level 2 (≥ 2000 Kg/$10^6 m^3$) in accordance with abnormal operating procedure SC.OP-AB.ZZ-0003, "Component Biofouling". The 23 B Circulating Water (CW) pump (KE/P) was removed from service at 0111 on March 29, 2003, to allow cleaning of the condenser water box associated with that pump to reduce the differential pressure across the condenser bay. At this point five of the six CW pumps remained in service to support continued plant operation. At 0423, plant operators initiated an emergency trip of the 21B and 22A CW pumps when the shear pins broke on the CW traveling screens for these pumps and the differential pressure across these traveling screens increased. Operators then entered abnormal operating procedure SC.OP-AB.CW-0001, "Circulating Water System Malfunction." At 0428, operators entered abnormal procedure S2.OP-AB.LOAD-0001, "Rapid Load Reduction," in preparation for a load reduction in order to maintain the appropriate condenser back pressure for the plant operating load. A 1% per minute load reduction was initiated at 0430 to reduce load to 75% power. At 0436 the load reduction rate was increased to 3% per minute due to rising condensate temperature. At 0441, the shear pin on the 21A circulator broke and the operators tripped the 21A CW pump. At this point only two of the six CW pumps remained for condenser heat removal. A manual reactor trip (JC/-) was initiated at 0442 with reactor power level at approximately 80%. All safety systems operated as designed following the reactor trip. The unit was stabilized in Mode 3 with the reactor at normal operating temperature and pressure with core cooling provided by the auxiliary feedwater system and main steam dumps to the condenser.

This report is being made in accordance with 10CFR50.73(a)(2)(iv)(A), "any event or condition that resulted in manual or automatic actuation of any of the system listed in paragraph (a)(2)(iv)(B)."

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

CAUSE OF OCCURRENCE

The cause of manual reactor trip is attributed to the inability of the Unit 2 Circulating Water (CW) system to handle the excessively high river debris (detritus, hydroids, trash, etc.) levels in the Delaware River due to the design capability of the CW traveling screens. The shear pins in three of the CW traveling screens failed on shear as designed due to the excessive debris loading on the screens. The daily peak detritus level was measured at approximately 18,000 $Kg/10^6m^3$ on March 29th, which is well above action level 2 ($\geq$ 2000 $Kg/10^6m^3$), the highest action level for river detritus levels, in accordance with abnormal operating procedure SC.OP-AB.ZZ-0003, "Component Biofouling". The increase in grass loading was very rapid as noted by the succession of failed CW traveling screen shear pins. The CW traveling screens are not designed to handle the excessive amount of detritus seen on March 29th and therefore the shear pins operated as expected (failing on excessive shear forces) to protect the major screen components from damage. Upon loss of the CW traveling screens, plant operators initiated the appropriate actions in accordance with operating, abnormal and emergency procedures.

PRIOR SIMILAR OCCURRENCES

A review of LERs for Salem and Hope Creek for the previous two years identified one event (LER 272/01-008-00) which is similar to one discussed in this LER in regards to the plant being tripped due to river debris. LER 272/01-008-00 documents that a failed surge arrester on the number 2 station power transformer caused a partial loss of offsite power leading to three of six CW pumps tripping. Power was reduced on Unit 1 to maintain condenser backpressure but due to high levels of river debris, one of the three remaining CW pumps tripped causing an increase in condenser back-pressure. Due to the increasing condenser back-pressure, operators manually tripped Salem Unit 1 in accordance with operating procedures. The corrective actions cited in this LER were specific to failure of the surge arrestor and would not have prevented this current event from occurring.

Salem Units 1 and 2 have experienced several down powers over the past two years due to circulating water system (traveling screen shear pin failure, high condenser water box delta pressure, etc.) problems as a result of river debris. A Circulating Water improvement project has been established as a result of these events to review maintenance practices, operating practices and the CW design to increase the reliability of the CW system.

SAFETY CONSEQUENCES

There were no safety consequences associated with the manual reactor trip. Operators appropriately responded to the degradation in condenser pressure (loss of circulating water pumps) and the potential loss of normal heat sink by manually tripping the reactor. Plant response to the manual reactor trip was normal. All safety systems operated as required.

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.

CORRECTIVE ACTIONS:

1. The shear pins were replaced on the failed CW traveling screens.
2. The condenser water boxes were cleaned to ensure a differential pressure of less than 12 psid prior to plant restart.
3. Operations procedures were reviewed and enhanced as appropriate to assist plant operators in actions to take during high detritus levels.
4. An ongoing Circulating Water/Service Water improvement project had already been established to improve the response and reliability of the CW system. CW traveling screen improvements are currently being developed as part of this project. New prototype screen designs are expected to be complete by June 2003 with installation of the new screen designs to occur at a rate of four screens per year (combined for both Units 1 and 2). Additionally the CW/SW improvement project is evaluating the installation of in-line debris filters in order to reduce or eliminate the need to clean the condenser water boxes.

COMMITMENTS

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