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

Gentlemen:

LICENSEE EVENT REPORT 272/01-008
SALEM GENERATING STATION - UNIT 1
FACILITY OPERATING LICENSE NO. DPR-70
DOCKET NO. 50-272

This Licensee Event Report "Salem Unit 1 Manual reactor Trip " is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(iv). The attached report contains no commitments.

Sincerely,

D. F. Garchow
Vice President -
Operations

Attachment

/EHV

C Distribution
LER File 3.7

IE22

Rec'd 11/14/01

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
SALEM GENERATING STATION UNIT 1	05000272	1 OF 5

4. TITLE

Salem Unit 1 - Manual Reactor Trip

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
09	24	01	01	– 008	– 00	11	15	01	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1
10. POWER LEVEL	100

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)	0.73(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)
E. H. Villar, Licensing Engineer	856-339-5456

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)

At 2351, on September 24, 2001 a manual reactor trip was initiated in accordance with operating procedures due to the loss of condenser vacuum. At approximately 2243 hours on September 24, 2001 the number 2 Station Power Transformer {XFMR} (SPT) in the Salem Switchyard experienced an electrical fault on one of its associated surge arresters {LAR}. The electrical transient initiated by the fault resulted in the loss of the # 2 station power transformer, and for Salem Unit 1, in the loss of three of the six condenser circulating {NN} water pumps {PMP}, the loss of its circulating water traveling screens {SCN}, as well as the sensing instrumentation for the differential pressure across the traveling screens. With only three of six circulating water pumps operating per unit, both Salem units reduced electrical load to maintain main condenser vacuum. Following the restoration of electrical power to the circulating water bus, one of the remaining Salem 1 circulating water pumps tripped on high differential pressure. As condenser vacuum could not be maintained, Salem Unit 1 licensed control room operators manually tripped the reactor per the guidance of the abnormal operating procedure. The loss of the SPT is attributed to a failed arrester. Some of the corrective actions taken were: (1) The failed arrester was replaced, and (2) Similar arresters in other transformers were also replaced. This condition is being reported in accordance with the requirements of 10CFR50.73(a)(2)(iv).

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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

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

IDENTIFICATION OF OCCURRENCE

Event Date: September 24, 2001
Discovery Date: September 24, 2001

CONDITIONS PRIOR TO OCCURRENCE

Salem Unit 1 and Salem Unit 2 were in MODE 1 (POWER OPERATION) at the time of the event.

No structures, systems, or components were inoperable at the time of the occurrence that contributed to the event.

DESCRIPTION OF OCCURRENCE

At 2351, on September 24, 2001 a manual reactor trip was initiated in accordance with operating procedures due to the loss of condenser vacuum. At approximately 2243 hours on September 24, 2001 the number 2 Station Power Transformer {XFMR} (SPT) in the Salem Switchyard experienced an electrical fault on one of its associated surge arresters {LAR}. The failure of this surge arrester resulted in the loss of both the number 2 and 4 main station power transformers and station power transformers 12, 14, 22 and 23. As a result of the loss of these transformers each Salem Unit lost three of the six condenser circulating {NN} pumps. Additionally, Salem Unit 1 lost power to its circulating water traveling screens {SCN}, as well as the sensing instrumentation for the differential pressure across the traveling screens. With only three of six circulating water pumps operating per unit, both Salem units reduced electrical load to maintain main condenser vacuum. Following the completion of the power reduction, Salem Unit 1 personnel restored electrical power to the Unit 1 circulating water bus and the circulating water traveling screens. Shortly after the power was restored to the traveling screens, one of the three remaining circulating water pumps tripped due to high differential pressure across its associated traveling screen. As a result of this additional loss of a circulating water pump and the resultant increase in condenser back-pressure, Salem Unit 1 licensed control room operators initiated a manual trip in accordance with the guidance provided in the abnormal operating procedure.

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DESCRIPTION OF OCCURRENCE (cont'd)

Salem Unit 2 circulating water traveling screens were unaffected by the loss of the 2 SPT, therefore the power reduction was sufficient to maintain main condenser vacuum.

Equipment and components associated with the Salem 1 reactor trip functioned as required. However, as a result of the loss of the number 2 station power transformer the operation of the following components was affected: (1) Power to the 4 kV vital bus station power transformer tap changer was interrupted during the event resulting in lower than normal bus voltages. However, bus voltage remained above the protection set point, (2). A series of Solid State Protection System {JG} (SSPS) train disagreement indications were noted on 2RP4 (Unit 2 Reactor Protection System Indicator Panel). This condition was assessed by the licensed control room operators and did not result in any complications with the orderly reduction of power of Salem 2 or the post trip recovery of Salem 1, (3) The Unit 1 App R Emergency Lighting {FH} actuated, causing a drain of the batteries. These lights were considered unavailable until power was restored and 72 hours had elapsed for the batteries to be fully charged. The proper compensatory actions, as required by the Salem Fire Protection Program were implemented during the period of inoperability of the emergency lights, and (4) The Unit 1 steam generator power relief valves (MS-10) were used to vent steam during the transient due to the loss of the condenser steam dump valves.

This electrical transient had minor effects on the Hope Creek Station. Prompt and proper assessment of the transient's effect by the Hope Creek licensed control room operators resulted in no adverse operational consequences to the Hope Creek station.

APPARENT CAUSE OF OCCURRENCE

The cause of the loss of the number 2 station power transformer was attributed to the failure of a surge arrester. The cause of the arrester failure was an internal short due to corrosion build up due to aging/end of life of the arrester. The life span of these types of arresters is between 20 and 30 years. The service life of the failed arrester was approximately 26 years.

The manual reactor trip was initiated due to the increase in condenser back-pressure following the loss of one of the three remaining circulating water pumps as a result of the high levels of detritus in the river.

SAFETY SIGNIFICANCE AND IMPLICATIONS

There were no actual safety consequences associated with this event. All safety systems performed as designed in response to the trip.

Offsite power is the preferred source of power to the stations for safe and reliable operation, including safe shutdown during design basis events. A partial loss of offsite power (one of the two sources of off-site power) resulted from the arrester failure and the attendant loss of the station power transformer. Other than the age related degradation of the arresters, there were no other common mode failure mechanisms. The numbers 1 and 3 main station power transformers that remained powered provided the preferred offsite power source to the stations (via 11, 13, 21, and 24 station power transformers) during this event. Power to the 4 kV vital bus station power transformer tap changer was interrupted during the event resulting in lower than normal bus voltages. However, bus voltage remained above the protection set point.

There was no impact or challenges to plant safety systems at Salem 1, Salem 2 or Hope Creek during this event. There were no offsite releases of radioactive material as a result of the events.

Based on the above, this event did not present a risk to the health and safety of the public.

A review of this event determined that a Safety System Functional Failure (SSFF) as defined in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, did not occur.

PREVIOUS OCCURRENCES

A review of events over the past two years identified no reportable events due to failures of surge arresters at the Salem Generating Stations.

There were, however, other similar electrical transients on June 13 and July 8, 2001.

The cause identified and the immediate corrective actions taken for the June 13 event would not have prevented this event.

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

PREVIOUS OCCURRENCES (cont'd)

The direct cause of the July 8, 2001 event was also a failed arrester. As a result of this event, replacement arresters were ordered but they did not arrive in time to prevent this failure. The July 8 event did not result in a reactor trip because the detritus levels on the river were not enough to result in the loss of circulators due to high differential pressure across the circulating water screens.

CORRECTIVE ACTIONS

1. The failed gap-type surge arrester in the number 2 station power transformer was replaced with a new metal oxide varistor type arrester.

2. The gap-type surge arresters associated with the number 1 and 2 station power transformers were replaced with metal oxide varistor type arresters.

3. The gap-type arresters associated with the Hope Creek step up transformer have been replaced with metal oxide varistor type arresters.

4. Other gap-type arresters in the switchyards were left in-service. However, they were evaluated and determined to be satisfactory based on their limited service life, and replacement of these arresters will be completed within the next 18 months.

5. An equipment reliability plan for arresters will be developed. It is expected that it will be in place by December 14, 2001.

6. Additional corrective actions may be taken, as necessary, as a result of the completion of the root cause investigation into this event. These actions will be included in the PSEG corrective action program.

COMMITMENTS

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