

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Salem Generating Station - Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 1 1 1	PAGE (3) 1 OF 0 4
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TITLE (4)
Nos. 22 & 24 Steam Generators - Several Tubes Found Degraded; Categorization C-3

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)
10	05	88	88	019	00	10	18	88			0 5 0 0 0

OPERATING MODE (9) R E F	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)										
POWER LEVEL (10)	20.402(b)	20.406(c)	50.73(a)(2)(iv)	73.71(b)							
	20.406(a)(1)(i)	50.36(e)(1)	50.73(a)(2)(v)	73.71(c)							
	20.406(a)(1)(ii)	50.36(e)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)							
	20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	T. S. 6.9.1.8							
	20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(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		AREA CODE 6 0 9	3 3 9 - 4 0 2 2

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		
B	T	A	S	G							
			W	1	2	0					
					Y						

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

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

On 10/5/88, eddy current examinations of Nos. 22 & 24 Steam Generators (S/Gs) revealed 46 and 45 Row 1 defective tubes, respectively. The tubes showed indications of single or multiple circumferential cracking in the tangent area. As per Technical Specification 4.4.6.2, this places the S/Gs in Category C-3. The apparent cause of this event has been attributed to the design of the S/G tubes. Row 1 tubes of Westinghouse Series 51 S/Gs have been shown to be subject to degradation of the inside diameter in the tangential region of the u-bend. This degradation is caused by a phenomenon known as Primary Side Stress Corrosion Cracking (PWSCC). The Row 1 and Row 2 tubes in all four S/Gs have been inspected. No additional defective tubes, other than previously identified, were found. The Row 1 tubes in all 4 S/Gs will be plugged this outage. A helium leak rate test was performed in Nos. 22 and 24 S/Gs upon completion of tube plugging. No additional concerns were identified. An emergency license amendment has been issued to modify the S/G tube sampling method when the number of defective tubes detected requires an additional inspection sample. It allows additional inspections only of the No. 1 and No. 2 Rows in the subject S/Gs since the eddy current examinations originally conducted indicate that the PWSCC is restricted to these Rows. A safety evaluation has been completed which assures that the safety and flow margins are not adversely affected as a result of the plugging of the Row 1 tubes. During the upcoming Salem Unit 1 refueling outage (scheduled April 1989), Rows 1 and 2 for all 4 S/Gs will be inspected.

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PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

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

IDENTIFICATION OF OCCURRENCE:

Nos. 22 and 24 Steam Generators - Several Tubes Found Degraded; Categorization C-3

Event Date: 10/05/88

Report Date: 10/18/88

This report was initiated by Incident Report Nos. 88-415 and 88-416.

CONDITIONS PRIOR TO OCCURRENCE:

Refueling Outage

DESCRIPTION OF OCCURRENCE:

On October 5, 1988 at 0800 hours, eddy current examinations of No. 24 Steam Generator (S/G) revealed forty-five (45) defective tubes of 84 inspected in Row 1. The tubes showed indications of single or multiple circumferential cracking in the tangent area. As per Technical Specification 4.4.6.2, this placed the S/Gs in Category C-3. An additional 159 tubes were inspected in other Rows, however, none of those indicated any sign of defective tubes.

On October 5, 1988 at 1730 hours, eddy current examinations of No. 22 S/G revealed 46 defective tubes of 84 inspected in Row 1. The tubes exhibited the same problems as the tubes from No. 24 S/G. An additional 729 tubes were inspected in other Rows, however, none of those indicated any sign of defective tubes.

Technical Specification Category C-3 is:

"More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective."

Technical Specification Table 4.4-2 requires prompt notification to the Nuclear Regulatory Commission pursuant to Technical Specification 6.9.1.8. This notification includes, "within 24 hours by telephone and confirmed by telegraph, mailgram or facsimile transmission to the Administrator of the Regional Office, or his designee no later than the first working day following the event, with a written followup report within 14 days". The NRC was notified of these events by telephone the same day as the events. In addition a letter was telecopied to the NRC Regional Administrator (as well as mailing the letter) as required by Technical Specification 6.9.1.8.

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APPARENT CAUSE OF OCCURRENCE:

The apparent cause of this event has been attributed to the design of the S/G tubes. Row 1 tubes of Westinghouse Series 51 S/Gs have been shown to be subject to degradation of the inside diameter in the tangential region of the u-bend. This degradation is caused by a phenomenon known as Primary Side Stress Corrosion Cracking (PWSCC).

ANALYSIS OF OCCURRENCE:

As stated above, PWSCC is a known analyzed phenomenon. In November 1987, 2 tubes in No. 24 S/G exhibited PWSCC. The recent inspection showing 45 additional tubes to be defective due to this phenomenon substantiates the rapid growth of PWSCC.

Investigation of this event has revealed that the defects found as a result of the eddy current examinations are similar to those discovered in Row 1 examinations at Zion, North Anna, Kewaunee, Trojan, Sequoyah, and other plants.

In addition to the eddy current testing, helium leak testing was conducted on the No. 24 S/G. No. 24 S/G, just prior to shutdown, had exhibited a primary to secondary leakrate of approximately 1.6 gpd. Results of this testing revealed three (3) of the tubes in Row 1, which had also been identified as defective by the eddy current testing, were "leakers". No. 22 S/G, just prior to initiation of the outage also exhibited primary to secondary leakage (approximately 4.6 gpd).

Technical Specification Table 4.2-2 requires prompt notification to the Nuclear Regulatory Commission pursuant to Technical Specification 6.9.1.8. This LER satisfies the written followup report requirement.

Technical Specification 6.9.1.8 states:

"The types of events listed below shall be reported within 24 hours by telephone and confirmed by telegraph, mailgram or facsimile transmission to the Administrator of the Regional Office, or his designee no later than the first working day following the event, with a written followup report within 14 days". The written followup report shall include, as a minimum, a completed copy of a licensee event report form. Information provided on the licensee event report form shall be supplemented, as needed, by additional narrative material to provide complete explanation of the circumstances surrounding the event."

CORRECTIVE ACTION:

An emergency license amendment (i.e., reference PSE&G letter NLR-N88164) has been issued to modify the S/G tube sampling method when the number of defective tubes detected requires an additional inspection sample. This amendment allows additional inspections only of the No. 1 and No. 2 Rows in the subject S/Gs since the eddy current examinations originally conducted this current outage indicate that the PWSCC is restricted to these Rows.

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CORRECTIVE ACTION: (cont'd)

The Row 1 and Row 2 tubes in all four S/Gs have been inspected. No additional defective tubes, other than previously identified, were found.

The Row 1 tubes in all four (4) S/Gs will be plugged this outage in addition to any other tubes found defective.

A helium leak rate test was performed in Nos. 22 and 24 S/Gs upon completion of tube plugging. No additional concerns were identified.

A safety evaluation (No. S-C-RC-XX-MSE-0750-0) has been completed which assures that the safety and flow margins are not adversely affected as a result of the plugging of the Row 1 tubes.

During the upcoming Salem Unit 1 refueling outage (scheduled April 1989), Rows 1 and 2 for all four (4) Unit 1 S/Gs will be inspected.



General Manager -
Salem Operations

MJP:pc

SORC Mtg. 88-088



Public Service Electric and Gas Company P.O. Box E Hancocks Bridge, New Jersey 08038

Salem Generating Station

October 18, 1988

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

Dear Sir:

SALEM GENERATING STATION
LICENSE NO. DPR-75
DOCKET NO. 50-311
UNIT NO. 2
LICENSEE EVENT REPORT 88-019-00

This Licensee Event Report is being submitted in accordance with Technical Specification 4.4.6.2 Table 4.4-2 pursuant to the requirements of Technical Specification 6.9.1.8. This report is required within fourteen days of discovery.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "L. K. Miller".

L. K. Miller
General Manager-
Salem Operations

MJP:pc

Distribution

The Energy People