NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Salem Generating Station - Unit 1	0 5 0 0 0 2 7 2	1 OF 0 4

TITLE (4) Weld Area Degradation of No. 12 Component Cooling Heat Exchanger Service Water Piping

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)
										0 5 0 0 0
0 3	0 9	8 4	8 4	— 0 0 8	— 0 1	0 4	2 9	8 5		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
5		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
0 0 0		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
J. L. Rupp	6 0 9 — 3 3 9 - 4 3 0 9

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	B I	P S P	P 4 5 3	Y							

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

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

On March 9, 1984, during a refueling outage, radiography of sixteen (16) welds in the Service Water piping associated with No. 12 Component Cooling Heat Exchanger revealed possible indications in the vicinity of nine (9) of the welds. This radiography was performed as the result of weld repairs which were effected during the previous refueling outage. Further analysis revealed that pitting corrosion was occurring in the heat affected zone of the welds, although the welds themselves were in excellent condition. A complete mapping of the stainless steel piping was performed and indicated that the pitting damage was not confined to the weld areas alone, but was rather extensive throughout the piping. Because of the degraded condition of this safety-related system, the event was originally reported in accordance with 10CFR 50.73(a)(2)(v). This supplemental report identifies the root cause and corrective action taken as a result of that occurrence. The pitting corrosion was determined to have been caused by the low velocity brackish water in contact with the stainless steel piping. Design Change Request 1EC-1874 was issued and implemented which replaced the stainless steel pipe associated with No. 12 Component Heat Exchanger with carbon steel pipe coated with a polyethylene copolymer coating.

IE22

PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are indentified in the text as [XX].

IDENTIFICATION OF OCCURRENCE:

Weld Area Degradation of No. 12 Component Cooling Heat Exhanger Service Water Piping

Event Date: 03/09/84

Report Date: 04/29/85

This report was initiated by Incident Report No. **84-042**

CONDITIONS PRIOR TO OCCURRENCE:

Mode 5 - Rx Power 000 % - Unit Load 0000 MWe

DESCRIPTION OF OCCURRENCE:

On November 21, 1982, during a refueling outage, leakage was discovered from a weld on the Service Water [BI] piping to No. 12 Component Cooling Water Exchanger [CC]. Subsequent radiography on November 23, 1982, revealed that a pocket existed in the joint. Extensive radiography of similar joints revealed that a majority of the welds were possibly degraded. Due to the significant number of problems apparent by November 30, 1982, prompt notification was made to the USNRC, with written confirmation transmitted later that day. LER 82-091/01T, dated December 8, 1982, documented that occurrence.

A supplement to the original report, LER 82-091/01X-1, dated June 8, 1983, documented the apparent cause and corrective action. A summary of that report is as follows: The joints of concern were located on four to twenty-four inch (4"-24") diameter stainless steel Service Water piping to the heat exchanger. The piping was made up of subassemblies, whose joints were shop assembled utilizing 316 stainless steel consumable inserts for the root passes, with the remainder of the joint completed with 16-8-2 filler metal. These subassemblies were then welded together in the field using backing rings and 308 stainless steel filler metal. The degraded welds consisted of both shop and field welds. Samples of the degraded welds were removed from the affected piping and sent to the PSE&G Research Corporation for evaluation. The test results revealed that the degradation was weld metal corrosion of the circumferential welds, related to bio-fouling. In addition, on the field welds, the backing rings supplied a crevice which accelerated the corrosion.

DESCRIPTION OF OCCURRENCE: (cont'd)

Minimum corrosion was evident in the base pipe material. Accelerated corrosion tests on weld specimens utilizing various filler materials were performed. Test results showed that Inconel 625 filler metal offered the best corrosion resistance, and the best compatibility with the 316 stainless piping. Based on these findings, all welds in the stainless steel Service Water piping to No. 12 Component Cooling Heat Exchanger were repaired using the Inconel 625 filler metal.

As a result of that occurrence, Field Directive S-1-M600-NFD-107 was issued requesting follow-up radiographic inspections of a percentage of the repaired welds during the following (fifth) refueling outage. On March 9, 1984, radiography of sixteen (16) of the welds revealed possible indications in the vicinity of nine (9) of the welds. A coupon was removed from one of the weld areas and sent to PSE&G Research Corporation and to the University of Delaware for analysis. The results revealed that pitting corrosion was occurring in the heat affected zone of the welds, although the welds themselves were in excellent condition. A complete mapping of the stainless steel piping was performed and indicated that the pitting damage was not confined to the weld areas alone, but was rather extensive throughout the piping.

APPARENT CAUSE OF OCCURRENCE:

The pitting corrosion was determined to have been caused by the low velocity brackish water in contact with the stainless steel piping.

ANALYSIS OF OCCURRENCE:

The operability of the Component Cooling System ensures that sufficient cooling capacity is available for continued operation of safety-related equipment during normal and accident conditions. The redundant cooling capacity of the system, assuming a single failure, is consistent with the assumptions used in the FSAR. The piping indications were found while the unit was shutdown, and prior to the system being excessively degraded. The piping degradation was not sufficient enough to have prevented the system from functioning as designed, and this event involved no undue risk to the health or safety of the public. Because of the degraded condition of this safety-related system, the event was reported in accordance with the Code of Federal Regulations, 10CFR 50.73(a)(2)(v). This supplemental report identifies the root cause and corrective actions taken as a result of that occurrence.

CORRECTIVE ACTION:

An investigation of alternate base piping materials, various coatings (for either the existing stainless steel pipe or replacement pipe) and/or repair of the pitted areas was performed. Reuse of the existing stainless steel pipe presented numerous questions as to its eventual longevity, repairability and ability to accept a coating. It was concluded that all of the stainless steel pipe associated with No. 12 Component Cooling Heat Exchanger should be replaced with carbon steel pipe coated with a polyethylene copolymer coating. The coating was fully evaluated and found acceptable for service in brackish water. Design Change Request 1EC-1874 was issued to perform this modification. Work was completed on August 13, 1984, during the fifth refueling outage. These repairs were restricted to the piping associated with No. 12 Component Cooling Heat Exchanger, as the redundant heat exchanger utilizes cement lined carbon steel piping.

J. W. Gallagher Jr.

General Manager-
Salem Operations

JLR:tns

SORC Mtg 85-075

PSE&G

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

Salem Generating Station

April 29, 1985

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

Dear Sir:

SALEM GENERATING STATION
LICENSE NO. DPR-70
DOCKET NO. 50-272
UNIT NO. 1
LICENSEE EVENT REPORT 84-008-01
SUPPLEMENTAL REPORT

Pursuant to the requirements of 10CFR 50.73(a)(2)(v), we are submitting supplemental Licensee Event Report for Reportable Occurrence 84-008-01.

Sincerely yours,

J. M. Zupko, Jr.
General Manager -
Salem Operations

JR:jlr

CC: Distribution

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