NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
NORTH ANNA POWER STATION, UNITS 1 and 2	0 5 0 0 0 3 3 8	1 OF 0 4

TITLE (4)

RECIRCULATION SPRAY HEAT EXCHANGERS NOT PLACED IN DRY LAYUP AS STATED IN THE UFSAR

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	1 3	8 8	8 8	— 0 1 6	— 0 0	0 6	1 0	8 8	NORTH ANNA, UNIT 2	0 5 0 0 0 3 3 9
										0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		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)	X 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
G. E. Kane, Station Manager	7 0 3 8 9 4 - 5 1 5 1

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	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 9	1 5	8 8

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

The Recirculation Spray Heat Exchangers (RSHX) for North Anna were designed for dry layup conditions during normal operations. In late 1980, the RSHXs were approved for wet layup. Following the May 1988 flowing of the Unit 2 RSHXs with Service Water (SW), a reevaluation of the acceptability of wet layup was performed. As a result of this reevaluation, it was discovered that the RSHX purchase specifications assumed no fouling.

The reviews performed under 10CFR50.59 to allow wet layup may not have completely accounted for the biological fouling which could occur during wet layup conditions. The RSHXs for both Unit 1 and Unit 2 were chemically cleaned and are currently in dry layup. A surveillance test to monitor the RSHX for dry layup has been developed and implemented.

The major impact of biological fouling on the RSHXs is degraded heat transfer capability. Based on preliminary results of an evaluation, the ultimate heat sink temperature required by Technical Specification 3.7.5.1 would be limited to 90 to 92 degrees F rather than the 95 degrees F currently allowed by T.S. 3.7.5.1. Only a small percentage of North Anna operation has occurred with SW temperatures above the 90 to 92 degrees F range and no operation has occurred above 95 degrees F. This event is reportable pursuant to 10CFR50.73(a)(2)(ii)(B).

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

1.0 Description of Event

The Recirculation Spray Heat Exchangers (RSHX) (EIIS System Identifier BE, Component Identifier HX) for North Anna were designed for dry layup conditions during normal operations. This required isolating and draining the RSHXs prior to startup after cold shutdown condition following Service Water (SW) (EIIS System Identifier BI) header isolation valve tests. Due to SW header isolation valve leakby during normal operations, an evaluation was performed and approved by the Station Nuclear Safety and Operating Committee in November 1980 for Unit 2 and April 1981 for Unit 1, to leave the RSHXs in wet layup with Primary Grade (PG) water. In July 1984, the chemical treatment program for the SW system was revised to include both corrosion and biofouling protection. The SW chemical treatment program was demonstrated to be effective, and the RSHXs were subsequently approved for wet layup with treated SW. Following the May 1988 flowing of the Unit 2 RSHXs with SW, (see LER N2-88-003-00), a reevaluation of the acceptability of wet layup was performed. As a result of this reevaluation, it was discovered that the RSHX purchase specifications assumed no fouling. However, operation in wet layup with treated SW will result in some biological fouling only. The amount of biological fouling was conservatively assessed to be bounded by a 0.001 fouling factor (reference Table T-2.41 of Section 9 of the TEMA Standard). The RSHXs for both Unit 1 and Unit 2 were chemically cleaned and are currently in dry layup.

This event is reportable pursuant to 10CFR50.73(a)(2)(ii)(B).

2.0 Significant Safety Consequences and Implications

The RSHXs had been designed to provide sufficient heat removal capability to depressurize the containment within one hour and maintain it subatmospheric for the duration of the event. The major impact of biological fouling on the RSHXs is degraded heat transfer capability. An evaluation to determine the impact of fouling on the Design Basis Analysis for containment depressurization is being performed. The preliminary results indicate that for a conservative fouling factor assumption of 0.001, the ultimate heat sink temperature required by Technical Specification (T.S.) 3.7.5.1 would be limited to 90 to 92 degrees F rather than the 95 degrees F currently allowed by T.S. 3.7.5.1. Only a small percentage of North Anna operation has occurred with SW temperatures above the 90 to 92 degrees F range and no operation has occurred above 95 degrees F. Also, the results of inspections and biological sampling before and after chemical cleaning support the conclusion that the use of the limiting TEMA fouling factor of 0.001 was conservative in all cases and that the actual fouling factor may have been lower.

The RSHXs which are currently in dry layup are now assumed to have a fouling factor consistent with the 95 degrees F temperature limit required by T.S. 3.7.5.1. This assumed fouling factor will be verified by reperforming the applicable Updated Final Safety Analysis Report (UFSAR) safety analyses. Pending final verification, the ultimate heat sink temperature required by T.S. 3.7.5.1 will be limited to 92 degrees F by an Operations Standing Order.

3.0 Cause of the Event

The reviews performed under 10CFR50.59 to allow wet layup may not have completely accounted for the biological fouling which could occur during wet layup conditions.

4.0 Immediate Corrective Actions

Immediately after discovering the possibility that the actual tube wall fouling on the SW side of the RSHXs may be greater than the design fouling factor of zero, a Justification for Continued Operation (JCO) was provided which very conservatively lowered the ultimate heat sink temperature required by Technical Specification 3.7.5.1 from 95 degrees F to 84 degrees F. An Operations Standing Order was also issued limiting the SW temperature to 83 degrees F.

5.0 Additional Corrective Action

The following additional corrective actions were performed:

- The RSHX header supply and discharge valves were leak checked and adjusted as necessary to minimize the inleakage of SW.
- Each RSHX was full flow flushed with treated SW for approximately one hour.
- Each RSHX was chemically cleaned to eliminate any biological fouling.
- Each RSHX was drained and left in a dry layup condition.
- The normally open supply and return motor operated valves to each RSHX were closed to provide redundant isolation from the SW system. (An evaluation under 10CFR50.59 was performed prior to closing these valves.)
- A drain valve was installed in the SW supply cross connect line and return cross connect line between the redundant isolation valves. This point is low in the piping system and allows periodic draining of any SW that may have leaked by the isolation valves.

- Biological sampling and a boroscope inspection of the RSHX tubes were performed to verify the effectiveness of the chemical cleaning.
- The JCO was revised to reflect less conservative ultimate heat sink temperature limits based on the chemical cleaning, restoration of dry layup, and the verification of the chemical cleaning effectiveness.

6.0 Actions to Prevent Recurrence

A surveillance program to monitor the RSHX for dry layup has been developed and implemented.

10 CFR 50.73

Vepco

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION
P. O. BOX 402
MINERAL, VIRGINIA 23117

June 10, 1988

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. N-88-022
NO/DEQ: nih
Docket No. 50-338
50-339

License No. NPF-4
NPF-7

Dear Sirs:

The Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to North Anna Units 1 and 2.

Report No. LER 88-016-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to Safety Evaluation and Control for their review.

Very truly yours,

M L Bowling

for G. E. Kane
Station Manager

Enclosure

cc: U. S. Nuclear Regulatory Commission
101 Marietta Street, N. W.
Suite 2900
Atlanta, Georgia 30323

Mr. J. L. Caldwell
NRC Senior Resident Inspector
North Anna Power Station

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