NORTHEAST UTILITIES
The Connecticut Light And Power Company
Western Massachusetts Electric Company
Holyoke Water Power Company
Northeast Utilities Service Company
Northeast Nuclear Energy Company

General Offices · Selden Street, Berlin Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06414-0270
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Re: 10CFR50.73(a)(2)(i)
10CFR50.73(a)(2)(v)
10CFR50.73(a)(2)(vii)
October 1, 1990
MP-90-1068

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

Reference: Facility Operating License No. NPF-49
Docket No. 50-423
Licensee Event Report 90-023-01

Gentlemen:

This letter forwards Licensee Event Report 90-023-01 which is being submitted to revise the anticipated completion date for the action to prevent recurrence. Licensee Event Report 90-023-00 was submitted pursuant to: 10CFR50.73(a)(2)(vii), as an event where a single condition caused two independent trains to become inoperable in a single system designed to mitigate the consequences of an accident; 10CFR50.73(a)(2)(v), any event or condition which alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident; and pursuant to 10CFR50.73(a)(2)(i), any event or condition prohibited by the Technical Specifications.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: Stephen E. Scace
Director, Millstone Station

BY: Carl H. Clement
Millstone Unit 3 Director

SES/BWN:mo

Attachment: LER 90-023-01

cc: T. T. Martin, Region I Administrator
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2 and 3
D. H. Jaffe, NRC Project Manager, Millstone Unit No. 3

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NRC Form 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

Estimated burden per response to comply with this information collection request: 50.0 hrs. Forward comments regarding burden estimate to the Records and Reports Management Branch (p-530), U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Millstone Nuclear Power Station Unit 3	0 5 0 0 0 4 2 3	1 OF 0 5

TITLE (4) Both Trains of Containment Recirculation Pump Area Coolers Inoperable Due to an Inadequate Surveillance Procedure

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	
0 6	1 5	9 0	9 0	- 0 2 3	- 0 1	1 0	0 1	9 0		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS BEING 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)	20.402(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	X 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 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)(iv)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Barrett W. Nichols, Senior Engineer, X5493	2 0 3 — 4 4 7 - 1 7 9 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	
B	B E	H X	G 2 1 0	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 July 5, 1990 at approximately 1005 hours, while in Mode 1 at 80% power, 580 degrees Fahrenheit and 2250 psia, a detailed engineering evaluation determined that both trains of Containment Recirculation Spray had been inoperable simultaneously, due to fouling of the associated area cooler heat exchangers.

On June 18, 1990 at 1300 hours, the "B" train Containment Recirculation Pump Area Cooler was found to be degraded when damage and fouling was found in the heat exchanger heads. On June 15, 1990, similar damage had been found in the "A" train unit and repaired. Subsequent engineering analysis determined that both trains of the Containment Recirculation Pump Area Coolers would not have been able to satisfy their design basis accident heat load.

The root cause of the event was an inadequate surveillance procedure which was not designed to detect the damage which was discovered in this event.

As corrective action, the damaged heat exchangers were cleaned and repaired. The heat exchangers will be visually inspected twice each operating cycle.

I. Description of Event

On July 5, 1990 at approximately 1005 hours, while in Mode 1 at 80% power, 580 degrees Fahrenheit and 2250 psia, a detailed engineering evaluation determined that both trains of Containment Recirculation Spray had been inoperable simultaneously, due to fouling of the associated area cooler heat exchangers.

On June 18, 1990 at 1300 hours, while in Mode 1 at 100% power, the "B" train Containment Recirculation Pump Area Cooler (3HVQ*ACUS2B) was found to be degraded when damage and fouling was found in the heat exchanger head. On June 15, 1990, at 1725 hours, while in Mode 1 at 80% power, similar damage had been found in the "A" Train unit, 3HVQ*ACUS2A. 3HVQ*ACUS2A was repaired and returned to service on June 16, 1990.

On June 13, 1990 the "B" train Residual Heat Removal Pump Area Cooler 3HVQ*ACUS1B, had been opened and substantial fouling found (reference Licensee Event Report 90-020). As part of the corrective action, the opposite train unit and the Containment Recirculation Pump Area coolers were subsequently inspected due to the similarity of design.

While cleaning each of the two Containment Recirculation Pump Area Coolers, damage to the divider plate between the combined inlet and outlet head of the heat exchangers was found (see attached figure). The divider plates developed holes (app. 1" diameter in 3HVQ*ACUS2A and app. 1 3/8" by 1 3/4" in 3HVQ*ACUS2B). The holes developed from a 1/4" drainage hole provided by the vendor. The 3HVQ*ACUS2B unit was completely fouled in the return head with Tubularia Hydroids. A detailed engineering evaluation of the operability of the heat exchangers was initiated. The engineering evaluation was completed on July 5, 1990. The conclusion was that the each of the heat exchangers were inoperable as a result of the eroded drainage hole and fouling.

The heat exchanger return heads were inspected in January of 1988 and showed no sign of fouling. There was no inspection of the heat exchanger inlet/outlet heads at that time. Differential pressure measurements taken as part of normal surveillances did not show any signs of degradation. The normal heat load in the area prevented adequate performance testing at design conditions. Growth of the hole prevented the differential pressure from exceeding the established threshold values where maintenance would be required.

II. Cause of Event

The root cause of the event was an inadequate surveillance procedure. The surveillance procedure was not designed to detect divider plate failure. The surveillance procedure was designed to identify macrofouling of the heat exchanger utilizing existing plant instrumentation and did not include performance testing of heat exchangers.

A contributing cause was the hole in the divider plate which was part of the design of the heat exchangers. Fouling of the heat exchanger forced additional flow through the 1/4" drainage hole in the inlet/outlet head divider plate. As the velocity increased, the copper nickel material of the divider plate eroded away increasing the size of the hole. The process occurred at a rate which prevented a high differential pressure from being detected by the surveillance program.

III. Analysis of Event

This event is reportable pursuant to: 10CFR50.73.(a)(2)(vii), as an event where a single condition caused two independent trains to become inoperable in a single system designed to mitigate the consequences of an accident; 10CFR50.73(a)(2)(v), any event or condition which alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident; and 10CFR50.73(a)(2)(i), any event or condition prohibited by the Technical Specifications.

Based on the results of a detailed engineering evaluation which determined that the units were inoperable, an immediate notification per the requirements of 10CFR50.72.(b)(2)(iii) was performed on July 5, 1990.

In response to a Containment Recirculation Pump start the associated Containment Recirculation Pump and Area cooler starts to provide cooling to the pump cubicle. The cooler ensures that the Containment recirculation pumps, motors and associated electrical components do not over heat.

If a design basis loss of coolant accident (LOCA) were to occur with the two area coolers in a degraded condition, the Containment Recirculation Pumps could potentially fail due to overheating if no other compensatory measures were taken and worst case design conditions existed. An alarm would annunciate to alert control room personnel of a high area temperature condition. Other compensatory measures (opening doors to increase ventilation) could prevent temperatures in the area from exceeding the design basis conditions.

Neither of the Containment Recirculation Pump and Area Coolers had exhibited any sign of high differential pressure, which is the parameter measured in the surveillance program. This was due to flow bypassing the heat exchanger tubes through the hole in the divider plate.

IV. Corrective Action

When fouling was identified, each heat exchanger was immediately cleaned of debris and the differential pressure at design flow verified to be acceptable.

The divider plates on 3HVQ*ACUS2A and 2B units were repaired using a monel patch. A 1/4" diameter drain hole was drilled in the patch to maintain consistency with the original design. By utilizing monel for the repair, the galvanic impact of a different material was minimized. Monel is not susceptible to the same flow erosion as the original copper nickel material.

During the upcoming refueling outage (tentatively scheduled for February, 1991) 3HVQ*ACUS2A and 2B will be visually inspected per the requirements of NRC Generic Letter 89-013, "Service Water System Problems Affecting Safety Related Equipment". Additionally, the existing surveillance program will be changed to measure additional parameters to better assess the condition of the Service Water System heat exchangers.

All of the Containment Recirculation Pump Area and Residual Heat Removal Pump Area cooler heat exchangers have been put on a twice an operating cycle preventive maintenance program to inspect and clean the units as required. A visual inspection of the heat exchangers will be performed by October 30, 1990, to determine if fouling or damage to the divider plate is occurring.

Due to the generic implications, all of the heat exchangers in the Service Water System have been reviewed for similar problems. All other heat exchangers subject to this type of fouling have been inspected within the past six months.

V. Additional Information

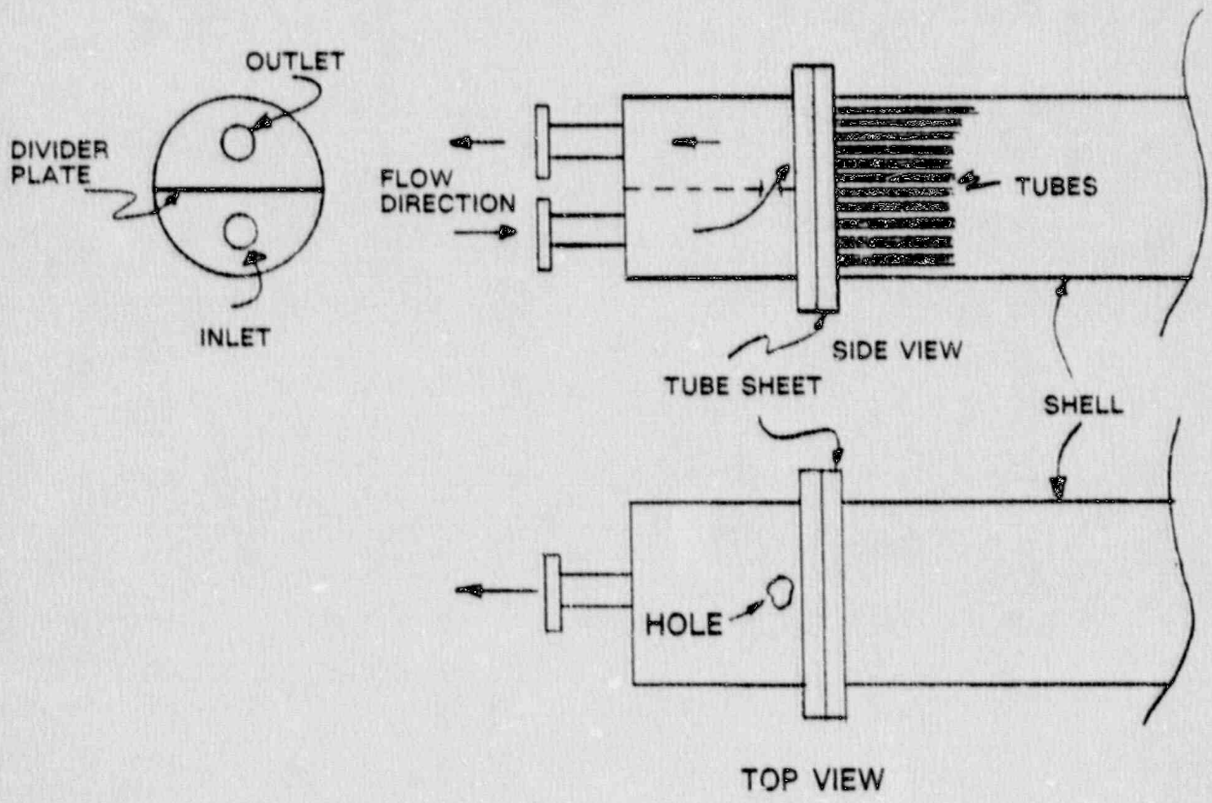
Generic Letter 89-013, "Service Water System Problems Affecting Safety-Related Equipment" specifically addresses the loss of heat transfer capability of heat exchangers in the Service Water System. Millstone 3 has committed to test or inspect all heat exchangers in the Service Water System by the end of the third refueling outage (tentatively scheduled for February, 1990). The existing surveillance program will continue to be used in conjunction with inspections recommended in the Generic Letter.

A review of the Institute of Nuclear Power Operations (INPO) Nuclear Plant Reliability Data System (NPRDS) data base did not reveal any other failures of this type. The heat exchanger manufacturer is Graham Manufacturing Company Inc.

A similar event of heat exchanger fouling is discussed in Licensee Event Report 90-020. The event discussed in this Licensee Event Report was identified as a result of the corrective actions of LER 90-020.

EIIS Codes

System	Components
Containment Recirculation Spray System - BE	Heat Exchangers - HX



SCHEMATIC OF HVQ HEAT EXCHANGERS