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Nuclear Energy

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The Northeast Utilities System

FEB 24 2000

Docket No. 50-336
B18002

Re: 10 CFR 50.73(a)(2)(iv)

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

Millstone Nuclear Power Station, Unit No. 2
Licensee Event Report 2000-001-00
Manual Reactor Trip Due to Secondary System Transient

This letter forwards Licensee Event Report (LER) 2000-001-00, documenting an event that occurred at Millstone Nuclear Power Station, Unit No. 2, on January 27, 2000. This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(iv).

There are no regulatory commitments contained within this letter.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: C. J. Schwarz
Station Director

BY: _____
D. S. McCracken
Assistant Station Director - Safety

Attachment (1): LER 2000-001-00

cc: H. J. Miller, Region I Administrator
J. I. Zimmerman, NRC Project Manager, Millstone Unit No. 2
D. P. Beaulieu, Senior Resident Inspector, Millstone Unit No. 2

IE22

Docket No. 50-336
B18002

Attachment 1

Millstone Nuclear Power Station, Unit No. 2

LER 2000-001-00

February 2000

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an 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)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Millstone Nuclear Power Station Unit 2	05000336	1 OF 6

TITLE (4)

Manual Reactor Trip Due to Secondary System Transient

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 NAME	DOCKET NUMBER
01	27	2000	2000	-- 001 --	00	02	24	2000	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	100		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
			20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)	X	50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
R. Joshi, MP2 Acting Regulatory Compliance Supervisor	(860) 440-2080

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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 15 single-spaced typewritten lines) (16)

On January 27, 2000 at approximately 1427 hours with the unit in Mode 1 at 100 percent power, a manual reactor trip was initiated due to a rapid decrease in the "B" Steam Generator (SG) level to approximately 57 percent and the trip of a SG feedwater pump. The plant response was uncomplicated with safety systems performing as expected. The plant was stabilized at normal post trip parameters (Mode 3) and operating shift personnel reacted appropriately. Operators manually initiated the auxiliary feedwater system to restore SG water levels.

It was determined that this event was caused by the loss of all heater drain flow to the suction of the SG feedwater pumps as a result of bulk flashing in the heater drain tank. As event precursors, it was determined that the transient was initiated due to the restoration of the 2A feedwater heater's sight glass causing oscillations in the feedwater control system that adversely affected the systems' ability to recover from the transient. Also, it was concluded that the heater drain tank vent control valve 2-HD-104 control logic wiring did not permit the valve to function properly in order to mitigate the consequences of a loss or rapid reduction of extraction steam pressure on the heater drain tank.

Completed corrective actions include optimizing the feedwater heater system performance by improving the stroke time for the level controller valve, and correcting the control logic for 2-HD-104 such that the valve will close to prevent depressurization of the heater drain tank.

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

I. Description of Event

On January 27, 2000 at approximately 1427 hours with the unit in Mode 1 at 100 percent power, a manual reactor [RCT] trip was initiated due to a rapid decrease in the "B" Steam Generator (SG) level to approximately 57 percent and the trip of a SG feedwater pump (SGFP) [P]. The plant response was uncomplicated with safety systems performing as expected. The plant was stabilized at normal post trip parameters (Mode 3) and operating shift personnel reacted appropriately. Operators manually initiated the auxiliary feedwater system [BA] to restore SG water levels.

After post-trip analysis, it was determined that the transient was initiated following a leak repair and restoration of the 2A feedwater heater [HX] sight glass [LG] (see figures 1 and 2 for simplified arrangement sketches of the heater drain system [SM] and sight glass/level sensor). This action combined with a slow actuation of the 2A feedwater heater level control valve [LCV] 2-HD-103C, exacerbated the severity of the transient, resulting in a large volume of relatively hot water entering the heater drain tank [TK]. Heater drain tank pressure increased, stopping or reducing flow from the 3A/B feedwater heaters resulting in high level and automatic extraction steam valve isolation.

With extraction steam isolated to the 3A/B heaters, steam pressure in those heaters decayed approximately 30 psi over a short time period. During this period, the heater drain tank vent valve [VTV] 2-HD-104 to the 3A/B feedwater heaters remained open from the initiation of the transient until the main turbine [TRB] tripped following the reactor trip. This vent valve should have closed upon receipt of either the 3A or 3B heater high level alarm. With the vent valve open and extraction steam isolated, the 3A/B heaters condensed steam from the heater drain tank and caused a rapid depressurization of the tank. Because conditions in this portion of the feedwater heater system are near saturation conditions, the sudden loss of pressure caused the water in the heater drain tank to flash to steam which ultimately resulted in a loss of net positive suction head to the heater drain pumps and loss of heater drain flow to the SGs. Shortly thereafter, SG feed pump suction pressure decreased and resulted in a SGFP trip. As level in the SGs began to decrease, the primary plant was manually tripped.

Because the event resulted in a manual actuation of the reactor protection system, it is being reported pursuant to the requirements of 10CFR50.73(a)(2)(iv).

II. Cause of Event

It was determined that this event was caused by the loss of all heater drain flow to the suction of the SGFPs as a result of bulk flashing in the heater drain tank. As event precursors, it was determined that the transient was initiated due to the restoration of the 2A feedwater heater's sight glass causing oscillations in the feedwater control system that adversely affected the systems' ability to recover from the transient. Also, it was concluded that the heater drain tank vent control valve 2-HD-104 control logic wiring did not permit the valve to function properly in order to mitigate the consequences of a loss or rapid reduction of extraction steam pressure on the heater drain tank.

III. Analysis of Event

The feedwater heater drain system is a non-safety related system which is not required to safely shutdown the plant or mitigate the consequences of an accident. However, this system is necessary for operation at 100 percent power since it provides approximately 30 percent of feedwater flow to the steam generators. In this event, the plant was not able to recover from the initiating transient which ultimately resulted in a total loss of feedwater

heater drain flow. The plant was manually tripped. There were no challenges to the primary plant response and all safety systems responded as expected. As a result, this event is classified as being of low safety significance.

IV. Corrective Action

As a result of this event, the following actions have been performed:

1. The feedwater heater system performance was optimized by improving the stroke time for the level controller valve.
2. The control logic for 2-HD-104 has been corrected such that the valve will close to prevent depressurization of the heater drain tank.

In addition, other corrective actions to improve the feedwater heater drains system performance are being addressed via the Millstone Corrective Action Program.

V. Additional Information

Similar Events

The following similar events relate to past feedwater heater system trips. Although each involved the feedwater heater drains system, no clear lines could be drawn to show that the corrective actions from these past events would have precluded this present event.

LER 99-009: "Manual Reactor Trip Due to Steam Leak in Turbine Building"

Reported a manual reactor trip as a result of secondary plant anomaly. In this instance, a steam leak in the turbine building occurred following erratic feedwater heater level response. The cause of the event was determined to be inadequate controls associated with the adjustment and grooming of the feedwater heater level control valves which resulted in an overpressure condition when the shell side relief valve lifted. Corrective actions included refining of controls for adjusting feedwater heater string controls and clarifying guidance for torqued connections when significant dynamic piping loads are expected.

LER 95-032: "Manual Reactor Trip Due to Unisolable Secondary Steam Leakage"

Reported a manual trip as a result of a steam leak in a secondary system within the turbine building. The leak was caused by a 14 inch vertical rupture in the 8 inch diameter recirculation line from the discharge of the "B" heater drain pump to the heater drain tank. The root cause of the rupture was attributed to water hammer on an already degraded section of piping that resulting in the piping exceeding its burst pressure. Corrective actions primarily involved, equipment damage and erosion/corrosion inspections, and a design review of the heater drains system to verify adequacy for all operational conditions.

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

LER 86-006: "Auto Rx Trip on Low Steam Generator Level Resulting from Loss of Heater Drains Flow"

Reported an automatic plant trip on low steam generator level as a result of a loss of heater drains flow. The loss of flow was due to the closure of level control valve 2-HD-109 located downstream of the combined discharge of both heater drains pumps. The valve closure was the result of a failed fitting connection on the supply to the controller's signal air regulator. The cause of this event was attributed to cyclic vibration stresses compounded by the possibility that the original installation of the tubing may have overstressed the fitting connection. Corrective actions involved parts replacement and upgrading the support of the affected valve. Other plant valves with similar controllers were inspected and modified to provide adequate support.

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

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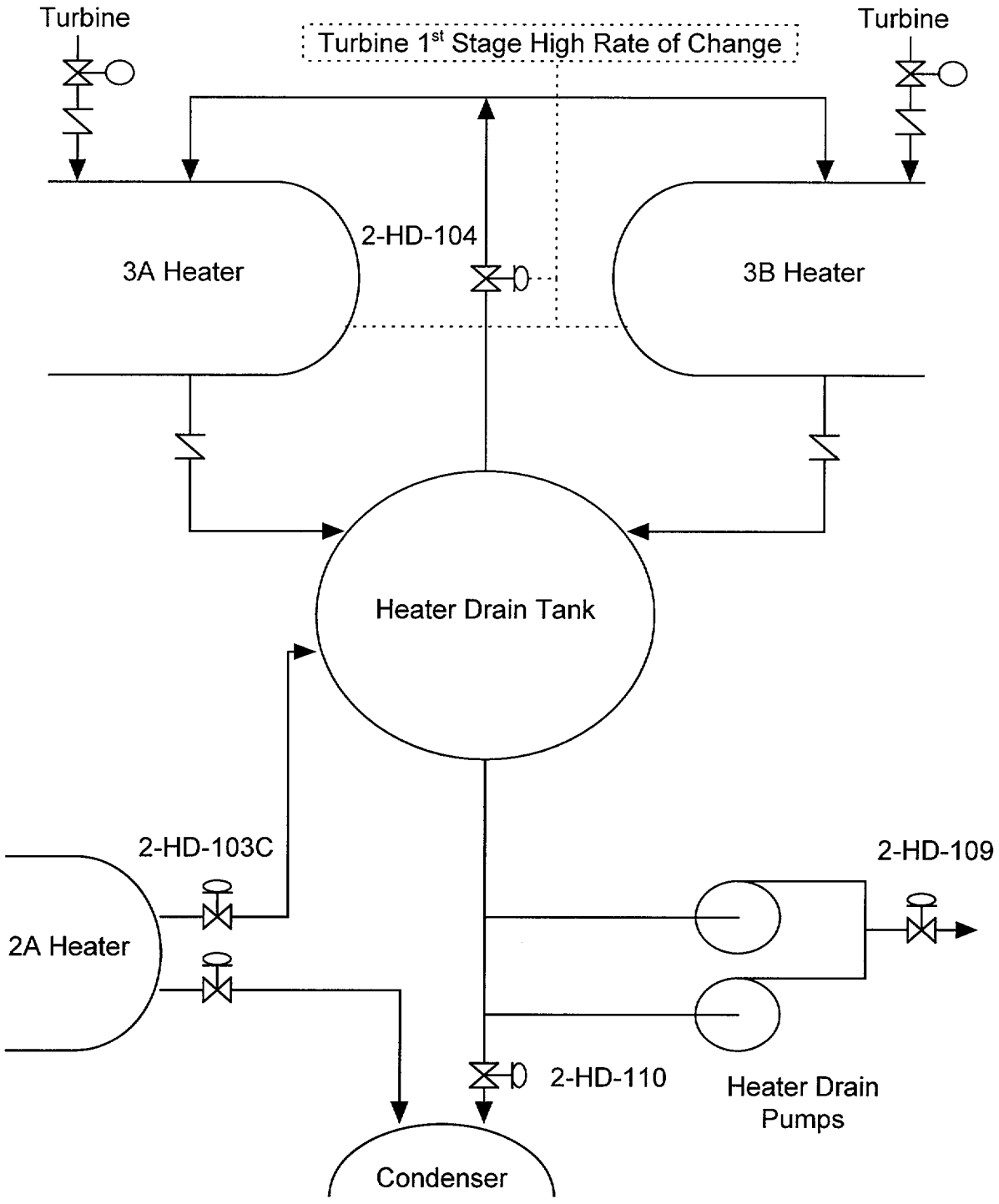
TEXT *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

Figure 1

"Simplified Heater Drain System Sketch"



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

Figure 2

"Heater Sight Glass / Level Sensor Arrangement"