NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104

EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND 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.

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 3

TITLE (4)

Service Water Strainer Backwash System Susceptibility to Freezing Following a Loss of Intake Structure Non-Vital Heating

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	31	96	96	-- 004 --	01	12	03	97	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
			20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)	100		20.2203(a)(1)		20.2203(a)(3)(i)	X	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)		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. G. Joshi, MP2 Regulatory Compliance Manager	(860) 440-2080

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
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 31, 1996, at 1200 hours, with the plant in Mode 1 at 100% power, it was discovered that the service water strainer backwash system, which provides common service to both service water trains, is vulnerable to freezing, and therefore is susceptible to a common mode failure, if the non-vital intake structure heating system failed to operate. The previous LER 96-004 had an incorrect event date and this supplement reflects the correct event date as noted in LER Block 5 above. Subsequent to the discovery, a prompt report was initiated pursuant to the requirements of 10 CFR 50.72 (b)(1)(ii)(B). This LER is being submitted pursuant to the requirements of 10 CFR 50.73 (a)(2)(ii)(B), reporting of any condition that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant.

The apparent cause of this event was an inadequate original design that did not consider the effects of freezing conditions on the strainer backwash system.

A design change has been implemented that replaced the common backwash discharge line with three independent backwash lines and relocated the discharge points such that they would not be susceptible to outdoor weather conditions. Additional design changes are being implemented that will install three temperature switches in the intake structure to monitor the ambient temperature and arranged to start the strainer backwash cycle on detection of the approach of freezing conditions. This modification will be completed prior to entry into Mode 4 from the current outage.

There were no automatic or manually initiated safety systems activated as a result of this event.

FACILITY NAME (1)	DOCKET	LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Millstone Nuclear Power Station Unit 2	05000336	96	-- 004 --	01	2 OF 3

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

I. Description of Event

On January 31, 1996, at 1200 hours, with the plant in Mode 1, at 100% power, it was discovered that the service water strainer backwash system, which provides common service to both service water trains, is vulnerable to freezing, and therefore is susceptible to a common mode failure, if the non-vital intake structure heating system failed to operate. Subsequent to the discovery, a prompt report was initiated pursuant to the requirements of 10 CFR 50.72 (b)(1)(ii)(B). This event was identified while investigating the January 8, 1996 event in which an ice plug blocked the discharge of the common strainer backwash line. This previous event was reported in LER 96-002 that was submitted to the NRC Staff on February 5, 1996.

The intake structure heating system consists of electric space heaters energized by a non-vital power system. A heating system failure, or loss of non-vital power following a Loss of Normal Power event in conjunction with freezing outdoor temperatures, could result in freezing conditions within the intake structure.

The backwash system is designed to automatically actuate when strainer differential pressure increases beyond a determined setpoint. At the backwash setpoint, the backwash valve opens and the strainer motor is energized to flush debris from the strainer. This debris is flushed through the backwash piping and discharged outside the intake structure. Freezing conditions within the intake structure have the potential to result in freezing of the instrumentation lines that control the initiation of the automatic backwash and provide the control room indication of high differential pressure conditions within the strainer. Additionally, loss of intake structure heating has the potential to cause ice blockage in the piping where stagnant water normally stands, at the outlet of each service water strainer. The formation of ice plugs has the potential to prevent flow in the backwash piping. Consequently, the strainers on both trains of the service water system could reach a high differential pressure and cause the service water system to be in a condition outside its design basis.

II. Cause of Event

The apparent cause of this event was an inadequate original design that did not consider the effects of freezing conditions on the strainer backwash system.

III. Analysis of Event

An investigation has concluded that the backwash system was never designed to operate in subfreezing temperatures following a loss of the non-safety related intake structure heating system. Freezing conditions in conjunction with a loss of intake structure heating could result in both a loss of control room indication of strainer differential pressure and the ability of the strainers to backwash. Subsequently, the strainers on both trains of the service water system could reach a high differential pressure and cause the service water system to be in a condition outside its design basis.

This event is being reported pursuant to the requirements of 10 CFR 50.73 (a)(2)(ii)(B), reporting of any condition that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant.

The safety significance of the strainer backwash system freezing, concurrent with a design basis event is high. However, the potential for such an event to occur is low, since compensatory measures are in place that will ensure the operability of strainer backwash during low temperature conditions.

There were no automatic or manually initiated safety systems activated as a result of this event.

IV. Corrective Action

Following the discovery that the strainer backwash system is vulnerable to freezing, a temporary log was established to monitor the intake structure temperature every four hours so that a loss of intake structure heating is recognized before temperatures fall below freezing. The temporary log has since been replaced with a procedure change to operations form 2669A-1, "Unit 2 Turbine Building Rounds." The operations form provides the guidance for monitoring the intake structure temperature. After the discovery of low temperatures in the intake structure (below 40 degrees), actions will be initiated to prevent freezing of components within the intake structure, including but not limited to, supplementing building heating.

A design change has been implemented that replaced the common backwash discharge line with three independent backwash lines. This design change also relocated the discharge points such that they would not be susceptible to outdoor weather conditions.

Additional design changes are being implemented that will install three temperature switches in the intake structure to monitor the ambient temperature and arranged to start the strainer backwash cycle on detection of the approach of freezing conditions. This modification will be completed prior to entry into Mode 4 from the current outage.

V. Additional Information

LER 96-002 reported that corrective actions had been implemented to prevent ice plugging at the open end of the backwash line where it drains into the discharge trough. This corrective action consisted of removing a two foot long horizontal run of pipe which extended through the intake wall so that the backwash line would end inside the intake structure with a vertical discharge into the trough. Subsequent to this modification, it was discovered that the open end of the line was still susceptible to ice buildup. Although the ice buildup did not result in blockage of the backwash line, temporary corrective measures were implemented to prevent ice buildup. As stated above, a design change is being implemented to reduce the susceptibility of the backwash discharge lines to ice buildup.

Similar Events

LER 96-002

Manufacturer Data

None

EIIS Codes:

Energy Industry Identification System (EIIS) code for Service Water is [BI].