

EXPIRES 04/30/98

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)

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.

FACILITY NAME (1)

Millstone Nuclear Power Station Unit 3

DOCKET NUMBER (2)

05000423

PAGE (3)

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TITLE (4)

Potential For Recirculation Spray System (RSS) Piping Failure Due To RSS Pump Stopping And Restarting
During Accident Conditions

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	13	97	97	003	00	02	11	97	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		000	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)		<input checked="" type="checkbox"/> 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

J.M. Peschel, MP3 Nuclear Licensing Manager

TELEPHONE NUMBER (Include Area Code)

(860)437-5840

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)

YES	<input checked="" type="checkbox"/> NO
(If yes, complete EXPECTED SUBMISSION DATE).	

EXPECTED SUBMISSION

MONTH DAY YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On January 13, 1997, an engineering evaluation determined the Recirculation Spray System (RSS) heat exchangers and piping may be susceptible to water column separation, and subsequent water hammer, if the RSS pumps are restarted during design basis accident conditions. This condition has been determined to be outside the design basis and the RSS was declared inoperable. NRC notification of this event was made pursuant to 10CFR50.72(b)(1)(ii)(B), on January 13, 1997. The Unit was in Mode 5 and in an extended shutdown. The cause of this event is design deficiency due to inadequate RSS design scope which did not incorporate and analyze the system susceptibility to waterhammer and its effects.

An evaluation of the RSS water column separation issue will be performed to determine if transient piping and equipment loads are acceptable or require design modification.

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

I. Description of Event

On January 13, 1997 with the Unit in Mode 5, it was determined that water column separation and subsequent waterhammer may occur in the Recirculation Spray System (RSS) in response to:

- RSS pump starting, with subsequent manual stopping and restarting in accordance with the Emergency Operating Procedures (EOPs) for a design basis accident, and
- RSS pump automatic starting and subsequent loss of power to the RSS pumps (single failure), followed by equipment recovery leading to pump restart.

Event discovery occurred during a review for Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions". Event notification was made on January 13, 1997, pursuant to requirements of 10CFR50.72(b)(1)(ii)(B), as a condition that is outside the design basis of the plant.

Present RSS design ensures the pumps could operate with initially empty piping downstream of the pumps. However, the effects upon the RSS from a partially filled system or a water column separation condition and the subsequent waterhammer when the pumps are restarted were not considered. This waterhammer could occur because the RSS piping is subject to partial draindown if the RSS pumps are stopped, thereby making the RSS piping susceptible to water column separation.

Emergency operating procedures allow the RSS pumps to be manually stopped and then restarted, as required to maintain containment pressure and to control radiation levels during Design Basis Accident (DBA) conditions. Repressurization of the containment may occur after the RSS pumps are manually stopped. As such, the RSS was declared inoperable due to the potential for RSS system failure if the RSS pumps are started and stopped following a design basis event. This condition has been determined to be reportable, pursuant to 10CFR50.73(a)(2)(ii)(B), as a condition that was outside the design basis of the plant.

II. Cause of Event

The cause of this condition was a design deficiency which resulted in inadequate initial RSS System design scope in that it did not incorporate and analyze for susceptibility of waterhammer conditions and the effect on the RSS system.

III. Analysis of Event

There were no adverse safety consequences from this condition, in that the Unit has not experienced an event requiring the actuation of the RSS. However, waterhammer in a train of the RSS could damage the involved RSS train's pressure boundary and may potentially result in secondary damage to the redundant RSS train. This damage could create a containment radiation release pathway, which would necessitate use of the RSS containment isolation valves. These valves may also be adversely affected by the waterhammer and resulting consequences, potentially inhibiting the ability of the valves to terminate or minimize a release pathway.

In addition, a harsh environment could be created in the Emergency Safety Features Building, which would be beyond the Unit design basis. This could occur if elevated temperature water from the containment sump flooded the building as a result of RSS System pressure boundary damage within the building.

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

IV. Corrective Action

The following actions will be taken in response to this event:

1. An evaluation of the RSS water column separation issue will be performed to determine if transient piping and equipment loads are acceptable or require design modification.

V. Additional Information

None

Similar EventsLER 96-006-00: "Plant Shutdown Required by Technical Specification, for Auxiliary Feedwater Containment Isolation Valves Declared Inoperable"

This LER reported an original plant design deficiency with Auxiliary Feedwater containment isolation valves where the valves would not remain closed against the containment peak design pressure. This event was similar with respect to the cause of the event being design deficiency. However, the corrective action for this event would not have revealed the concern with water column separation and resultant waterhammer due to operation of the RSS pumps.

LER 96-007-00: "Containment Recirculation Spray, Quench Spray, and Safety Injection Systems Outside Design Basis Due to Design Errors"

This LER reported that the Unit had operated in a condition that was outside the design basis due to inadequate design of the RSS spray piping and supports for thermal loads due to accident temperatures. This could have resulted in stresses above the design allowable stresses for "Faulted" conditions. This event was similar in that due to a design deficiency, the potential existed that the RSS may not have been able to fulfill its required safety function. However, the corrective action for this event considered the effects of temperature and would not have revealed the concern with water column separation and resultant waterhammer due to operation of the RSS pumps.

Manufacturer DataEIIS System Codes

Containment Spray System - BE

EIIS Equipment Codes

Piping - PSX