

## 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)

Residual Heat Removal Pump Suction Relief Valve Setpoint Not in Accordance With Technical Specifications

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	
09	18	96	96	-- 034 --	02	12	17	97	FACILITY NAME	DOCKET NUMBER	
OPERATING MODE (9)		5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)								
POWER LEVEL (10)		000	20.2201(b)		20.2203(a)(2)(v)		<input checked="" type="checkbox"/> 50.73(a)(2)(i)		50.73(a)(2)(viii)		
			20.2203(a)(1)		20.2203(a)(3)(i)		<input type="checkbox"/> 50.73(a)(2)(ii)		50.73(a)(2)(x)		
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(iii)		73.71		
			20.2203(a)(2)(ii)		20.2203(a)(4)		<input type="checkbox"/> 50.73(a)(2)(iv)		OTHER		
			20.2203(a)(2)(iii)		50.36(c)(1)		<input type="checkbox"/> 50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A		
			20.2203(a)(2)(iv)		50.36(c)(2)		<input type="checkbox"/> 50.73(a)(2)(vii)				

## LICENSEE CONTACT FOR THIS LER (12)

NAME

David A. Smith, 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

(If yes, complete EXPECTED SUBMISSION DATE).

☒ NOEXPECTED  
SUBMISSION  
DATE (15)

MONTH

DAY

YEAR

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

On September 18, 1996 with the plant in Mode 5, during a review conducted by plant engineering personnel, it was determined that the actual setpoint for the Residual Heat Removal (RHR) pump suction relief valves was not in accordance with the requirements of Technical Specifications (TS). Contrary to the TS limit of 450 psig, the actual lift pressure for the RHR pump suction relief had been set at 440 psig. This condition was reported on October 18, 1996 pursuant to 10CFR50.73(a)(2)(i)(B) as an operation or condition prohibited by the plant's TS.

On August 29, 1997 with the plant in Mode 5, while performing a review of RHR suction relief valve surveillance test procedures, it was discovered that previous RHR relief valve calibrations were performed incorrectly resulting in the B train RHR relief valve setpoint being outside the tolerance allowed by the TS Limiting Condition for Operation. Consequently, this condition is being reported pursuant to 10CFR50.73(a)(2)(i)(B) as any operation or condition prohibited by the plant's TS.

The cause of the September 1996 event was attributed to insufficient configuration control within the design control program. The cause of the August 29, 1997, event was a deficiency in the relief valve setpoint testing program temperature correction data. As an immediate corrective action for the August 29, 1997 event, the B train RHR valve was declared inoperable, recalibrated to the correct setpoint and declared operable. The RHR setpoint calculation will be revised to properly incorporate the RHR pump suction relief valve temperature correction for the full temperature range. In addition, an evaluation of the RHR relief valve setpoint effect will be completed on the RHR pump discharge piping stress analyses.

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I. Description of Event

On September 18, 1996 with the unit in Mode 5, during a review conducted by plant engineering personnel, it was determined that the actual setpoint for the Residual Heat Removal (RHR) pump suction relief valves was not in accordance with the requirements of Technical Specification Limiting Condition for Operation 3.4.9.3.a.2 and 3.4.9.3.a.3, "Reactor Coolant System - Overpressure Protection Systems." Technical Specifications (TS) require that the RHR pump suction relief be set at 450 pounds per square inch gauge (psig) in order to provide adequate over pressure protection when the temperature of any Reactor Coolant System (RCS) cold leg is less than 350 degrees Fahrenheit (°F). Contrary to this requirement the actual lift pressure for the RHR pump suction relief had been set at 440 psig. This condition was reported on October 18, 1996 pursuant to 10CFR50.73(a)(2)(i)(B) as an operation or condition prohibited by the plant's Technical Specifications.

On July 10, 1997, License Amendment 143 was incorporated resulting in an RHR relief valve setpoint of  $\geq 426.8$  psig and  $\leq 453.2$  psig. On August 29, 1997, with the plant in Mode 5, while performing a review of RHR suction relief valve surveillance test procedures, it was discovered that previous RHR relief valve calibrations were performed incorrectly. The valve vendor requires a setpoint temperature correction factor of +3% when valves are used in 250°F or higher service but are tested/set at ambient temperatures. This is to compensate for physical changes in the relief valve such as spring loading, etc. The valves have always been tested and calibrated in this manner. At cold conditions (<250°F), the vendor's +3% temperature correction factor no longer applies. Since this relief valve must operate in both temperature ranges, this effectively narrows the setpoint acceptance tolerance to -0%, +3% or (440 to 453.2 psig) (See Figure 1).

A review of the most recent RHR suction relief valve setpoint calibration records revealed that although the "A" relief valve had been calibrated to 453 psig (July 8, 1992), within the TS range, the B train RHR relief valve had been set to 455 psig (August 24, 1993), which was outside the TS setpoint tolerance range by 1.8 psig. Subsequently, between August 24, 1993 to the present, the Unit operated in a condition prohibited by the plant's Technical Specifications. This condition is therefore reportable pursuant to 10CFR50.73(a)(2)(i)(B).

II. Cause of Event

On March 26, 1985 during the construction of the unit, the Architect/Engineer (A/E) issued a design change, which lowered the setpoint for the RHR suction relief valve from 450 psig to 440 psig. This design change did not specify that a technical specification change was required. The design change was supported by the issuance of a setpoint calculation change on April 29, 1985. Subsequently, the plant Maintenance Department established the relief valve test program. In implementing the relief valve test program, insufficient information was extracted from design documents when establishing the appropriate temperature correction values for testing of valves contained within the program.

The cause of the August 29, 1997, event was a deficiency in the relief valve setpoint testing program. Inadequate management attention was applied to implementation of the relief valve test program during construction which led to an ineffective transfer of information between the engineering and maintenance departments. Engineering had included the RHR system maximum operating temperature, as opposed to the system operating temperature range, in various design documents. The Maintenance Department used this temperature information to determine the relief valve temperature correction factor not realizing that the valves are required to operate over temperature ranges rather than at a specific temperature. This led to the incorrect relief valve setpoint being implemented in the field.



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III. Analysis of Event

The unit has operated using the 440 psig setpoint as required by the original A/E design change and the associated setpoint calculation. The 440 psig setpoint is the technically correct setpoint for the RHR suction relief valves to ensure over pressure protection for the RHR piping in accordance with ASME requirements. Subsequent relief valve capacity calculations were based on the 440 psig setpoint. Over pressure protection of RHR piping and Low Temperature Over Pressure/Cold Over Pressure Protection System (LTOP/COPPS) requirements also have utilized the 440 psig setpoint for calculations performed following the initial design change.

For the August 1997 event regarding the 455 psig B RHR relief valve set pressure, the ability of the valve to function as a Cold Over Pressure Protection (COPPS) relief valve was demonstrated in an engineering calculation. A single RHR relief valve at a set pressure of 440 psig and 10% accumulation has sufficient capacity to limit reactor vessel pressure to 547 psig, which is below the 10CFR50 Appendix G "Fracture Toughness Requirements" overpressure limit of 558 psig. The TS setpoint range of 426.8 psig to 453.2 psig was selected based on a 440 psig setpoint and the  $\pm 3\%$  opening pressure tolerance allowed by ASME III NC-7614.2(b), "Protection Against Overpressure - Popping Pressure Tolerance," for relief valves with set pressures  $> 70$  psig. Therefore, an RHR relief valve which is set to the higher end of the TS range is considered to have a 440 psig setpoint and the 455 psig value is considered as only a 1.8 (455 minus 453.2) psig increase in this setpoint. Consequently, the maximum pressure limit of the reactor vessel was not challenged due to the 455 psig set pressure. As a result, the safety significance and consequences of an overpressure event occurring, while the B RHR valve was set outside the TS allowed range, were minimal.

The 455 psig B RHR relief valve set pressure also is expected to have a minimal effect on the RHR pump discharge piping stress analyses. The pump discharge design pressure of 600 psig is exceeded when the relief valve lifts. However, ASME III NC-3612.3 allows peak pressure during infrequent upset conditions to exceed design pressure if it can be shown that the peak pressure does not cause pipe wall stresses from exceeding allowable values. NU will confirm that peak pressure that would occur with the B RHR pump suction relief valve set at 455 psig would have no deleterious effect on the RHR pump discharge piping stress analysis.

IV. Corrective Action

As a result of the September 18, 1996 event, a Technical Specifications change was implemented on July 10, 1997 that revised the setpoint value identified in Technical Specifications 3.4.9.3.a.2 and 3.4.9.3.a.3 from 450 psig to  $\geq 426.8$  psig and  $\leq 453.2$  psig.

As an immediate corrective action for the August 29, 1997 event, the B train RHR was declared inoperable. After correcting the surveillance testing procedure to take into account the RHR relief valve's hot/cold settings and gauge accuracies the valve was calibrated to the correct setpoint.

Since plant construction, programmatic barriers have been implemented that provide assurance of adequate interdepartmental interface. For this instance, the specific issues that led to the inaccurate information being transmitted between departments and subsequently, being incorrectly implemented in the field are being addressed within the Millstone Corrective Action Program.

The following corrective actions will be performed:

1. The setpoint calculation will be revised to properly incorporate the RHR pump suction relief valve temperature correction for the full temperature range prior to entry into Mode 4.

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2. An evaluation of the RHR relief valve setpoint effect on the RHR piping stress analyses will be completed prior to entry into Mode 4.

V. Additional Information

None

Similar Events

Listed below are historical LERs whose causes can be attributed to insufficient configuration control within the design control program. Many of these events were identified as a result of the Configuration Management Review Process.

- LER 96-007-00 Containment Recirculation Spray, Quench Spray, and Safety Injection System Outside Design Basis Due to Design Errors
- LER 96-009-02 Inoperable Shutdown Margin Monitors from Low Count Rate, Due to Inadequate Design Control
- LER 96-013-00 Residual Heat Removal System Design Deficiency Due to Non-conservative Original Design Assumption
- LER 96-026-02 Non-Conservative Primary Grade Water Flow Rates Used in Boron Dilution Safety Analysis
- LER 97-003-00 Potential For Recirculation Spray System (RSS) Piping Failure Due To RSS Pump Stopping And Restarting During Accident Conditions
- LER 97-015-00 Potential Vortexing of Recirculation Spray System Pumps
- LER 97-021-00 Defective Design of RSS Expansion Joint Tie Rod Assembly
- LER 97-026-00 Potential Loss of Net Positive Suction Head for Recirculation Spray System Pumps
- LER 97-029-00 Design Basis Concern on SGTR Analysis for MSPRBV
- LER 97-031-00 RHR Valve Low Pressure Open Permissive Bistable Setting Set Non-Conservatively
- LER 97-035-00 Potential Nonconservatism for Steam Generator Water Level Low-Low Trip Setpoint Due to PMA Term Uncertainties
- LER 97-046-00 Containment Recirculation Spray System Cubicle Flood Potential

Manufacturer DataEIIS System Code

Residual Heat Removal (PWR) .....BP

EIIS Component Code

Valve, Relief.....RV



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**Figure 1**

**RHR Relief Valve Setpoint Diagram**

