

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
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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

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TITLE (4)

Non-Conservative Assumptions Used In Technical Specifications Shutdown Margin Curve

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	23	97	97	007	00	02	21	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)			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)		<input checked="" 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)			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)		EXPECTED SUBMISSION	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO				

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

On January 14, 1997, as the result of an engineering review, it was postulated that an incorrect assumption had been made in determining the degree of error in a Cycle 6 Shutdown Margin Curve which had previously been found to be in error. Subsequent Engineering evaluation concluded that the Cycle 6 Shutdown Margin - Mode 3 curve had been non-conservative. On January 23, 1997, with the unit in Mode 5, a prompt event report was made to the Nuclear Regulatory Commission of this historical condition pursuant to 10CFR50.72(b)(2)(iii)(A) as an event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shutdown the reactor and maintain it in a safe shutdown condition.

The cause of this event has been determined to be the lack of procedures for the generation and documentation of reactor plant operational information.

This condition was significant in that the use of an incorrect curve in determining the RCS boron concentration required to ensure adequate shutdown margin could have prevented the fulfillment of the safety function of the systems needed to maintain the reactor in a safe shutdown condition. A comparison between the actual RCS boron concentration values measured during periods of Mode 3 operation and the required shutdown margin RCS boron concentrations for Cycle 5 and Cycle 6 verified that, due to intentional over-boration, there had been no violation of the shutdown margin requirements contained within Technical Specification 3.1.1.1.2. Therefore, the safety consequence of this event was minimal.

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I. Description of Event

On January 14, 1997, as the result of an engineering review, it was postulated that an incorrect assumption had been made in determining the degree of error in a Cycle 6 Shutdown Margin Curve which had previously been found to be incorrect. Subsequent engineering evaluation concluded that the Cycle 6 Shutdown Margin - Mode 3 curve had been non-conservative. On January 23, 1997, with the unit in Mode 5, a prompt event report was made to the Nuclear Regulatory Commission of this historical condition pursuant to 10CFR50.72(b)(2)(iii)(A) as an event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shutdown the reactor and maintain it in a safe shutdown condition.

Reactor Engineering produced the Cycle 6 Shutdown Margin - Mode 3 curves in May of 1995. These curves were based upon information contained within the vendor-supplied Nuclear Design Report (NDR). On June 14, 1996, it was discovered that one of the curves (Mode 3, All-Rods-In (minus 1), Reactor Coolant System Temperature equal to 557 degrees Fahrenheit) had been developed improperly.

A calculation was performed to determine the correct data, which were then compared to the data used to plot the incorrect curve. The original data were found to be non-conservative by up to 4 parts per million (ppm) boron over a core burnup range of 2000-4000 Megawatt Days per Metric Ton Uranium (MWD/MTU). This determination was based upon an assumption that a 100 ppm boron addition to the required shutdown margin RCS boron concentration listed in the NDR was 'available margin'. Since the plant was not in Mode 3 during this burnup window, and that the curves were not required to be used, the event was determined to be not reportable. A review of other Cycle 6 curves which were developed by Reactor Engineering found no additional errors.

On January 14, 1997, it was suggested that the assumption that the 100 ppm boron allowance listed in the NDR was "available margin" could be incorrect. It was subsequently determined that the 100 ppm boron allowance was an analytical margin that could not be used by plant personnel as "available margin". Without credit for the boron allowance, the burnup window over which the original curve was non-conservative expanded to a range of 0 to ~14500 MWD/MTU. The unit was operated in Mode 3 three times during this burnup window. A review of plant records was conducted to compare actual RCS boron concentration values which were measured during Mode 3 operations to the corrected required shutdown margin RCS boron concentrations. It was verified that, due to over-boration for extra margin, no violation of the Technical Specification shutdown margin requirements had occurred. However use of this curve by operations personnel in determining adequate shutdown margin alone could have prevented the reactor from being maintained in a safe shutdown condition.

This condition is therefore being reported pursuant to 10CFR50.73(a)(2)(v)(A), as an event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shutdown the reactor and maintain it in a safe shutdown condition.

II. Cause of Event

The cause of this event has been determined to be the lack of procedures for the generation and documentation of reactor plant operational information.

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III. Analysis of Event

This condition was significant in that the use of an incorrect curve in determining the RCS boron concentration required to ensure adequate shutdown margin could have prevented the fulfillment of the safety function of the systems needed to maintain the reactor in a safe shutdown condition.

A comparison between the actual RCS boron concentration values measured during period of Mode 3 operation and the required shutdown margin RCS boron concentration for Cycle 6 was conducted following determination of the condition being reported. There were no adverse safety consequence in that during this cycle, it was verified that, due to intentional over-boration, there had been no violation of the shutdown margin requirements contained within Technical Specification 3.1.1.1.2.

IV. Corrective Action

The following corrective action will be taken:

1. The Reactor Engineering procedure will be revised to provide for the generation and documentation of reactor plant operational information provided to the operating shift by September 1, 1997.
2. A supplement to LER 96-009-00 will be submitted by March 1, 1997 to correct the statement related to additional conservatism.

V. Additional Information

During the preparation of this report, LER 96-009-00 was reviewed as a potentially similar event. It was determined that the 100 ppm RCS boron allowance listed in the NDR was considered to be "available margin".

Similar Events

LER 96-009-00 Inoperable Shutdown Margin Monitors from Low Count Rate, Due to Inadequate Design Control

On April 23, 1996, with the plant in Mode 5, at 0-percent power, Engineering personnel discovered that both channels of Shutdown Margin Monitors were inoperable due to the instrument count rate being below a minimum count rate for operability. A review of previous outages indicates the condition may have existed three times within the last two years during Mode 5 operation. The condition is prohibited by Technical Specification 3.3.1, Table 3.3-1, Item 21, which requires two Shutdown Margin Monitor (SMM) channels to be OPERABLE.

Upon discovery an immediate notification was made pursuant to 10CFR50.72(b)(1)(ii)(B). A subsequent review determined that there was no safety significance associated with the shutdown margin monitors being inoperable. The Reactor Coolant System (RCS) was borated significantly higher than the boron concentration assumed in the analysis of a dilution event for the shutdown condition. The SMM alarms at a setpoint above the neutron count rate, 15 minutes prior to

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criticality, to provide time for operator action to mitigate an unintended dilution. A review of this event and the historical events indicated that the actual, higher than required, RCS boron concentrations provided reasonable assurance of meeting the required 15-minute alarm time to criticality for a postulated dilution event.

As immediate action the plant complied with the applicable Technical Specification Action Statement. The action taken to prevent recurrence was to reduce the SMM setpoint. During a corrective action review of the vendor's boron dilution analysis, a potential non-conservative assumption on subcritical multiplication was identified, and an immediate notification was made on May 13, 1996, pursuant to 10CFR50.72(b)(1)(ii)(B). A subsequent review determined that the analysis was acceptable, and the plant was not in a condition that was outside the design basis.

Manufacturer Data

None