Northeast
Nuclear Energy

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The Northeast Utilities System

Donald B. Miller, Jr.
Senior Vice President - Millstone

January 12, 1996

B15507

Re: 10CFR50.73(a)

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

Reference: Facility Operating License No. DPR-65
Docket No. 50-336
Licensee Event Report 95-045-00

This letter forwarded Licensee Event Report 95-045-00 required to be submitted within thirty (30) days pursuant to 10CFR50.73(a).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Donald B. Miller, Jr.
Senior Vice President - Millstone Station

DBM/PJL/pab

Attachment: LER 95-045-00

cc: T. T. Martin, Region I Administrator
P. D. Swetland, Senior Resident Inspector, Millstone Unit Nos. 1, 2, and 3
G. S. Vissing, NRC Project Manager, Millstone Unit No. 2

IE22
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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 4

TITLE (4)

Plant Shutdown Due to Indeterminate Structural Integrity of Charging Valve 2-CH-435

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
12	14	95	95	--	045	--	00	01	12	96	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)	X 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)	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)
Philip J. Lutzi, Nuclear Licensing	(860) 440-2072

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
B	CB	RV	V085							

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION	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 December 14, 1995, at 1649 hours, with the plant in Mode 1, 100% power, a controlled reactor/plant shutdown was initiated. The Unit entered Technical Specification Action Statement (TSAS) 3.0.3 since the structural integrity of leaking check valve, 2-CH-435, could not be adequately assessed and the requirements of TSAS 3.4.10 could not be complied with. The structural integrity of 2-CH-435 could not be assessed since it was not possible to isolate the valve and perform an inspection or repair during operation.

The root cause of the event was in the application of preload on the bonnet fasteners during original installation of valve 2-CH-435. The preload on two of the fasteners was less than the original manufacturer's recommended torque of 130 ft-lbs.

The corrective action taken included disassembly, inspection and reassembly of the valve. In addition, an augmented inspection of other similar valves subjected to similar operating conditions was performed. No body to bonnet leakage was observed.

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)					PAGE (3)
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER	
Millstone Nuclear Power Station Unit No. 2	05000336	95	--	045	--	00	2 of 4

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

I. Description of Event

December 14, 1995, at 1649 hours, with the plant in Mode 1, at 100% power, a controlled reactor/plant shutdown was initiated. The Unit entered TSAS 3.0.3 subsequent to determining that the structural integrity of leaking check valve, 2-CH-435, could not be adequately assessed and the requirements of TSAS 3.4.10 could not be complied with. The structural integrity of 2-CH-435 could not be assessed since it was not possible to isolate the valve and perform an inspection or repair during operation. This event was initially reported under the requirements of 10CFR50.72 at the time the plant shutdown commenced.

Valve 2-CH-435 is a Velan two-inch ANSI class 1500 lb, spring loaded, piston check valve constructed from forged type 316 stainless steel, and is Nuclear Class I. This valve is used to provide thermal relief for the charging side of the regenerative heat exchanger. The flow path in which the valve is located is not normally utilized. This un-utilized piping leg is created by closing a manual isolation valve located just downstream (i.e. on the RCS side) of valve 2-CH-435.

During a containment entry on December 14, 1995, while performing a surveillance of an adjacent valve (2-CH-434), personnel noted the buildup of boron residue on 2-CH-435. Operations was notified and Engineering was mobilized to perform an inspection of the valve. Engineering reported that an active steam leak had encompassed approximately one-fourth of the circumference of the bonnet and was impinging one of the studs. Boric Acid had encased all four studs and nuts. No visible loss of base metal was noted on the nuts, valve body, or bonnet. It was estimated that the liquid leakage quantity was approximately one drop per minute.

Various options were evaluated and dismissed for repair of the valve on-line. Since engineering was unable to asses the condition of the fasteners, a conservative decision was made concerning the structural integrity of valve 2-CH-435. Operations subsequently determined that TSAS 3.4.10 could not be complied with and a plant shutdown then commenced in accordance with TSAS 3.03.

A search of the maintenance history database was performed to determine if previous work had been performed on 2-CH-435 that could provide some insight into why the valve leaked. It was found that no work had been performed on this valve since the inception of the computer based maintenance program in 1983. A search was also performed in Nuclear Records to determine if any Maintenance Requests had been performed and no records were found. Therefore, it was concluded this valve had not received any maintenance since its original installation.

During disassembly, breakaway torque was measured and recorded for each of the four bonnet nuts. These breakaway torques were compared with the original manufacturer recommended torque of 130 ft-lbs. The as-found breakaway torques for the four bonnet nuts were observed as 70 ft-lbs, 90 ft-lbs, 170 ft-lbs, and >250 ft-lbs. The lower torque values were found on the side of the bonnet that was leaking. The condition of the valve body, valve bonnet, and seat ring were inspected and all found to be good. The studs were removed and examined utilizing a fluorescent penetrant inspection and no cracking was observed. Also, no wastage was noted due to the boric acid. The material type was confirmed as 17-4 PH, stainless steel, which is not susceptible to boric acid corrosion.

II. Cause of Event

The root cause of the event was an original installation error resulting in the uneven application of preload on the bonnet fasteners two of which were less than the original manufacturer recommended torque of 130 ft-lbs.

A root cause evaluation was performed that concluded the root cause of the leak is an installation error that occurred during plant construction. Additionally, thermal/pressure cycling, in conjunction with uneven preload, was a likely contributing factor affecting the sealing capability of the flexitalic gasket that eventually caused the valve to leak. Phenomena such as creep, stress relaxation, gasket hysteresis or thermal/pressure cycling would not have resulted in uneven preload of the fasteners. Having eliminated these phenomena and, based on a comparison of the breakaway torque values observed during disassembly with the manufacturer's original recommended torque values, the root cause evaluation concluded that the cause of the leakage was the result of preload on the bonnet fasteners, which was less than the original manufacturer torque of 130 ft-lbs.

III. Analysis of Event

This event is being reported under the criteria of 10CFR50.73(a)(2)(i)(A), "The completion of any nuclear plant shutdown required by the plant's Technical Specifications."

Based on performance history and visual inspections of similar valves, it is believed that this was an isolated event. Since the installation of valve 2-CH-435, a program has been established to promote good bolting practices which ensures proper torqueing methods are applied when installing fasteners.

The manufacturer currently recommends increasing the fastener torque to improve the reliability of the sealing of the flexitalic gasket. This recommendation will be factored into the corrective actions for this event.

The safety consequences of this event were low since the fasteners were found to not be susceptible to boron induced corrosion and subsequent inspection of the fasteners and the valve body/bonnet indicated that the structural integrity of the valve was never degraded. Additionally, there were no automatic or manually initiated safety systems activated as a result of this event.

IV. Corrective Action

The immediate corrective action was to repair the valve. The valve was disassembled, the components inspected, and reassembled with new fasteners and gaskets.

Prior to returning the plant to operation, engineering performed a review of other similar valves whose design met two criteria. The first criterion selected charging system check valves with identical design and operating conditions. In this group two valves were identified. The second criterion selected valves that were, in a high energy system connected to the reactor coolant system, not readily isolable for pressure boundary maintenance, four bolt bonnet design of any style, and had no maintenance history. In this group seventy valves were identified. A sample population of eleven valves were inspected including both valves from the first criterion and nine valves from the second criterion. Visual Inspections performed on these valves detected no signs of leakage or degradation and provided assurance that no similar condition existed.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)					PAGE (3)
		YEAR		SEQUENTIAL NUMBER		REVISION NUMBER	
Millstone Nuclear Power Station Unit No. 2	05000336	95	--	045	--	00	4 of 4

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

A review of design drawings for similar valves will be conducted to verify that no susceptible fasteners are installed where the potential for boron corrosion exists.

During a scheduled plant shutdown, similar valves will be inspected to verify adequate preload of the fasteners. Additionally, if identified, any fasteners susceptible to boron corrosion will be replaced. These actions will be completed prior to the next operating cycle (cycle 14).

V. Additional Information

Similar Events: A similar event occurred on August 5, 1993 and was reported in LER 93-018-00.

Manufacturer Data: Velan 2" Bolted Bonnet Piston Check Valve, ANSI Class 1500, Model No. PI-0633-N-13