Dominion Nuclear Connecticut, Inc.
Millstone Power Station
Rope Ferry Road
Waterford, CT 06385

Dominion

MAY 26 2006

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

Serial No.	06-171B
MPS Lic/GJC	R0
Docket No.	50-336
License No.	DPR-65

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 2
LICENSEE EVENT REPORT 2006-001-01
LOSS OF CHARGING FUNCTION

This letter forwards Licensee Event Report (LER) 2006-001-01. This is revision 1 to the LER 2006-001-00, which documented an event that occurred at Millstone Power Station Unit 2 on January 9, 2006. Revision 0 of the LER was submitted pursuant to 10 CFR 50.73(a)(2)(v)(A) as an event or condition that could have prevented fulfillment of a safety function of structures or systems needed to shutdown and maintain the reactor in a safe shutdown condition.

If you have any questions or require additional information, please contact Mr. David W. Dodson at (860) 447-1791, extension 2346.

Very truly yours,

J. Alan Price
Site Vice President – Millstone

IE22

Attachments: (1)

Commitments made in this letter: None.

cc: U.S. Nuclear Regulatory Commission
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Mr. S. M. Schneider
NRC Senior Resident Inspector
Millstone Power Station

Attachment 1

Licensee Event Report 2006-001-01
Loss of Charging Function

Millstone Power Station Unit 2
Dominion Nuclear Connecticut, Inc. (DNC)

NRC FORM 366 (6-2004) NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0066), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)
Loss of Charging Function

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
01	09	2006	2006	001	01	05	26	2006	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	X 50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify In Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
David W. Dodson, Supervisor Nuclear Station Licensing	(860) 447-1791

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
☐	YES (If yes, complete EXPECTED SUBMISSION DATE).	☒ NO				

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

On January 9, 2006, Millstone Power Station Unit 2 was operating in Mode 1 at 100% power. At approximately 0435, with one charging pump running, operators received a charging pump discharge pulsation dampener failure alarm. At 0455 charging header flow indication began to drop. The operators evaluated this as a loss of both facilities of the charging system. All charging pumps were declared inoperable at 0455. Additional investigation indicated potential gas binding of the charging pumps. At 0554 the operators vented and started one charging pump and declared it operable, restoring one train of the charging system.

The failure of a discharge pulsation dampener bladder allowed the contained gas volume to expand into the system piping, including the suction header. The cause of the bladder failure resulted from operating the bladder at a high pre-charge pressure combined with changes made to the dampener shell during fabrication, which allowed improper seating of the bladder at the point of contact with the shell. The root cause of the event was attributed to an over reliance on industry operating experience and faulty design assumptions. Together these two factors resulted in a conclusion that passive failure of a bladder with the potential for a common mode loss of charging was not a credible event.

The charging pumps have two credited safety functions associated with normal operation and shutdown of the reactor plant. These functions are Inventory Control, and Boration for Reactivity Control. For this reason the failure of the charging system is considered reportable under the provisions of 10 CFR 50.73(a)(2)(v)(A), as an event or condition that could have prevented fulfillment of a safety function of structures or systems needed to shutdown and maintain the reactor in a safe shutdown condition.

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

1. Background

The charging portion of the Millstone Power Station Unit 2 (MPS 2) Chemical Volume Control System (CVCS) [CB] is comprised of three positive displacement pumps. The charging pumps have two credited safety functions associated with normal operation and shutdown of the reactor plant. These functions are Inventory Control, and Boration for Reactivity Control. One pump is usually in service with the other two pumps automatically starting, as necessary, in response to the pressurizer level control. The design basis safety analyses in Chapter 14 of the Final Safety Analysis Report (FSAR) demonstrate acceptable results without credit for charging.

The suction and discharge of each charging pump is equipped with a pulsation dampener. In November 2003 the liquid filled swirl type pulsation dampeners on the discharge piping for each pump were replaced with nitrogen pressurized bladder/shell type pulsation dampeners to mitigate the cracking of socket welded piping joints. The bladder is designed with a metallic grommet/button on the bottom to prevent the extrusion of the bladder into the shell nozzle. In March 2004 Dominion Nuclear Connecticut (DNC) changed the bladder precharge pressure from 1800 psig to 2000 psig. The 2000 psig pre-charge pressure is at the upper limit of pressure recommended by the vendor. This change was intended to improve the dampening function and provide increased margin to allow for gas leakage from the bladder fill connection. This in turn would allow extending the frequency of bladder pressure monitoring.

2. Event Description

On January 9, 2006, MPS 2 was operating in Mode 1 at 100% power. At approximately 0435, with one charging pump [P] running, operators received a charging pump discharge pulsation dampener failure alarm. At 0455, charging header flow indication began to drop. The operators evaluated this as a loss of both facilities of the charging system. All charging pumps were declared inoperable at 0455.

Additional investigation indicated potential gas binding of the charging pumps. At 0554 the operators vented and started one charging pump and declared it operable, restoring one train of the charging system.

The failure of the charging system is reportable under the provisions of 10 CFR 50.73(a)(2)(v)(A), as an event or condition that could have prevented fulfillment of a safety function of structures or systems needed to shutdown and maintain the reactor in a safe shutdown condition.

2. Cause

The direct cause of the loss of charging was failure of a discharge pulsation dampener bladder which allowed the contained gas volume to leak into the dampener shell. Upon securing the pump, discharge pressure decayed thereby allowing the gas to expand into the system piping, including the suction header. The cause of the bladder failure is attributed to operating the bladder at the higher pre-charge pressure combined with changes made to the dampener shell during fabrication which allowed improper seating of the bladder at the point of contact with the shell.

The root cause of the event was attributed to an over reliance on industry operating experience and faulty design assumptions. Together these two factors resulted in a conclusion that passive failure of a bladder with the potential for a common mode loss of charging was not a credible event.

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

3. Assessment of Safety Consequences

There were no safety consequences associated with this event. The unit remained at power throughout the event.

The charging system has two credited safety functions:
1. Inventory Control
2. Boration for Reactivity Control

The impacts of a loss of charging on these safety functions are as follows.
1. Inventory Control: As an alternative to charging, inventory control can be achieved by Reactor Coolant System (RCS) depressurization and High Pressure Safety Injection (HPSI).
2. Boration for Reactivity Control: Like Inventory Control, Boration can be achieved using (HPSI) following RCS depressurization.

4. Corrective Action

The following corrective actions have been entered into the Millstone Station's Corrective Action Program:

1. Formal training on failure mode identification and evaluation techniques to support design change preparation will be developed.
2. Key lessons learned from this event will be provided in Engineering Support (ES) continuing training.
3. DNC will develop and implement modifications to the charging system to prevent nitrogen intrusion into the common pump suction header from a postulated bladder failure.
4. The design of the discharge dampener assembly will be changed to address the shell geometry discrepancy.
5. Future purchase orders with Energy Steel (the discharge pulsation dampener shell manufacturer) will include DNC holdpoints requiring use-as-is and repair nonconformance dispositions to be reviewed and approved by DNC prior to commencing with further fabrication.

Additional corrective actions are being taken in accordance with the station's corrective action program.

5. Previous Occurrences

A previous event occurred on Unit 2 on March 7, 2003, which resulted in the loss of the charging function. This was reported in LER 2003-003-00 and supplemented in LER 2003-003-01

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].