



**Northeast  
Nuclear Energy**

Rope Ferry Rd. (Route 156), Waterford, CT 06385

Millstone Nuclear Power Station  
Northeast Nuclear Energy Company  
P.O. Box 128  
Waterford, CT 06385-0128  
(860) 444-4300  
Fax (860) 444-4277

The Northeast Utilities System

August 20, 1996

Docket No. 50-336  
B15691

Re: 10 CFR 50.73

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

This letter forwards Licensee Event Report (LER) 94-027-01 documenting an event that occurred at Millstone Nuclear Power Station, Unit No. 2 on September 3, 1994. This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(i).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

P. M. Richardson  
Director - Millstone Unit No. 2

Attachment: LER 94-027-01

cc: H. J. Miller, Region I Administrator  
P. D. Swetland, Senior Resident Inspector, Millstone Unit No. 2  
D. G. McDonald, Jr., NRC Project Manager, Millstone Unit No. 2

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**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 (IT-  
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 2

DOCKET NUMBER (2)

05000336

PAGE (3)

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TITLE (4)

Channel "B" Linear Range NI Inoperable

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
09	03	94	94	027	01	08	20	96	FACILITY NAME	DOCKET NUMBER
										05000
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
		20.2201(b)			20.2203(a)(2)(v)			<input checked="" type="checkbox"/>	50.73(a)(2)(i)	50.73(a)(2)(viii)
POWER LEVEL (10)		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  
M. D. Ehredt, Nuclear Licensing SupervisorTELEPHONE NUMBER (Include Area Code)  
(860)440-2142**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).☒ NO**EXPECTED  
SUBMISSION**

MONTH DAY YEAR

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

On September 3, 1994, at 0426 hours, with the plant in mode 1, at approximately 5% power, it was determined that the Channel "B" Linear Range Nuclear Instrument (NI) was inoperable when the plant changed operating modes from mode 2 to mode 1. Instrument technicians called in to investigate, found High Voltage (HV) Connector J6 disconnected from its jack on the back of Channel "B" Drawer. If J6 is not connected, the High Voltage supply to the ion chambers is interrupted and the drawer output will fail low. This event is being reported pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B), "any operation or condition prohibited by the plant's Technical Specifications."

The cause of this event is personnel error. It was concluded that HV Connector J6 on the Linear Range NI Power Drawer was not properly reconnected following maintenance. It is believed that subsequent and repeated opening and closing of the Drawer caused the connector to loosen. Initial corrective actions reconnected HV Connector J6 and ensured proper operation of the Channel "B" Linear Range NI.

This supplement 1 of this LER clarifies the cause of the event, and modifies the corrective action.

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

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

**I. Description of Event**

On September 3, 1994, at 0426, with the plant in mode 1 at approximately 5% power, it was determined that the Channel "B" Linear Range Nuclear Instrument was inoperable when the plant changed operating modes from mode 2 to mode 1. During the previous shift's performance of the Reactor Protection System channel check, Linear Range NI Power Channels A, B, C & D read 1.88% -0.1%, 1.8%, and 1.9%, respectively. These values met the channel check acceptance criteria (deviation between channels less than 5% during mode 1 or mode 2 operations), allowing transition to operating mode 1 on backshift.

After shift turnover, the power ascension to mode 1 (>5% Thermal Power) continued. Channel "B" did not track consistently with the other three channels. The plant entered mode 1 at 0425 on September 3. At 0426 the Control Room received a "Channel Deviation" alarm on Channel "B." When Operators checked the Plant Process Computer (PPC) in response to the alarm, indication for Channel "B" was -0.11%, which differed more than 5% from the other channels. Technical Specifications Action Statement 3.3.1.1, was entered, and Channel "B" was declared inoperable. No automatic or manual safety responses occurred.

Instrument technicians called in to investigate, found High Voltage Connector J6 disconnected from the jacks on the back of Channel "B" Drawer. If J6 is not connected, the High Voltage supply to the ion chambers is interrupted and the drawer output will fail low.

**II. Cause of Event**

When the Channel "B" Linear Range NI drawer was opened, technicians found connector J6 disconnected from its jack. The J6 connector for each Model NP-6 Dual Linear Power Drawer energizes two B -10 ion chambers which then indicate neutron flux in the Linear (Power) Range. If J6 is not properly connected, the High Voltage supply to the ion chambers is interrupted and drawer output will fail low. The cause of this event is personnel error. It was concluded that HV Connector J6, on the Linear Range NI Power Drawer, was not properly reconnected following maintenance. It is believed that subsequent and repeated opening and closing of the Drawer caused the connector to disconnect.

The J6 connector for each drawer is removed and reinstalled twice in each of two separate test procedures. The last time either of these procedures was performed, prior to the event, was July 21, 1994. Personnel reinstalling the connector did not confirm that the connection was correctly and securely made up. After monthly testing in mode 1, technicians confirm proper system restoration by comparing Linear Range NI Power Drawer indication with other channels before testing on a second drawer is started. Below mode 1, this comparison is not meaningful because neutron flux levels are off-scale low for the Linear Range NIs. The Unit experienced no deviation alarms on Channel "B" between July 21 and July 27, when the unit came off line for upgrade of the Reactor Coolant Pump (RCP) Oil Collection System. Because no deviation alarms were received, it can be assumed that the J6 connector did not come loose until during the shutdown.

The J6 connector is subject to bending stresses from the position of the connector relative to the cable bundle for the drawer. If not properly reconnected after being removed for testing, the stresses from repeated opening and closing the NI drawer could cause J6 to work loose. Five procedures require Linear

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Range NI Power Drawers to be opened for access to test potentiometers. Three of these procedures were performed during the August shutdown. Two of them were performed during the week prior to the J6 connector being found disconnected. Neutron flux levels were off-scale low for the Linear Range NIs, which would preclude discovery of a loose J6 connector by either channel deviation alarms, or comparison with other channels. While shut down, technicians also removed and reinstalled the J6 connector on the "B" Linear Range NI Drawer, while conducting ground loop isolation for Channel "B" ion chamber cabling. Again, neutron flux levels were off-scale low, prohibiting comparison with other channels.

III. Analysis of Event

This event is being reported pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B), "any operation or condition prohibited by the plant's Technical Specifications."

Channel "B" was declared operable prior to entering mode 1, and then subsequently found to be inoperable, because the J6 High Voltage connector was disconnected from the Linear Range NI Drawer.

The safety consequences of this event have been determined to be negligible. The ability of the Reactor Protection System to provide a trip signal from two of the three channels of Linear Range NIs (the minimum called for by the plant Technical Specifications) was unaffected.

IV. Corrective Action

The J6 Connector was reinstalled. When the "B" drawer was reenergized, NI power indication on all four channels matched closely at approximately 7% power. The Instrument & Control (I&C) technician who had performed the most recent work related to connector J6 was counseled on the need to ensure that this, and similar connectors, are properly and securely made up.

The next time connector J6 was removed and replaced for testing, the following cautionary note to technicians was added to the work package: "Ensure that connector J6 is documented with lifted lead form (WC-10 attachment 3). Ensure connector is secure."

All NI drawer connectors were verified to be properly terminated to their respective jacks during the refueling outage, which started October 1, 1994.

This event was discussed in detail during an I&C Department meeting.

Supplement 0 of this LER reported the suspected cause as a combination of personnel error and equipment configuration. The corrective actions presented in supplement 0 included verification of proper termination and a commitment to install cable-restraining harnesses to the linear Range HV cables in the RC05A/B/C/D cabinets to relieve tension on the cables and their electrical connections. The connectors in question are BNC connectors, which lock in position through J-shaped slots over pins on the drawer connection. A subsequent investigation concluded that the equipment configuration was not a contributing factor for this event, since when J6 connectors are properly locked they can not be inadvertently disconnected. The corrective actions presented in supplement 1 of this LER will increase the awareness of I&C technicians in confirming the connectors are properly and securely made up to prevent recurrence of this event. It has

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been concluded that the installation of cable restraining harnesses, as discussed in supplement O of this LER, would not enhance the HV Connector design.

V. Additional Information

ELIS Codes:

Linear Range Nuclear Instrumentation Drawer, Channel "B" JC-IMOD

Similar Events

None.

Manufacturer Data

The drawer is Gulf General Atomics Model NP-6 Dual Linear Range Drawer, ELJ 179-00005L, serial number W61149-5.