

NORTHEAST UTILITIES



The Connecticut Light And Power Company
Western Massachusetts Electric Company
Holyoke Water Power Company
Northeast Utilities Service Company
Northeast Nuclear Energy Company

General Offices: Selden Street, Berlin Connecticut

P.O. BOX 276
HARTFORD, CONNECTICUT 06141-0270
(203) 665-5000

Re: 10CFR50.73(a)(2)(v)
February 24, 1992
MP-92-203

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

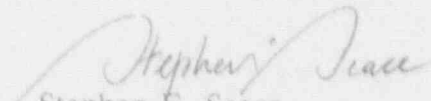
Reference: Facility Operating License No. NPF-49
Docket No. 50-423
Licensee Event Report 92-002-00

Gentlemen:

This letter forwards Licensee Event Report 92-002-00 required to be submitted within thirty (30) days pursuant to 10CFR50.73(a)(2)(v), any event or condition that alone could have prevented fulfillment of a safety function of structures or systems that are needed to mitigate the consequences of an accident.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY


Stephen E. Scace
Director, Millstone Station

SES/GTB:ljs

Attachment: LER 92-002-00

cc: T. T. Martin, Region 1 Administrator
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2 and 3
V. L. Rooney, NRC Project Manager, Millstone Unit No. 3

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NRC Form 366 (6-89)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED OMB NO. 3150-0104 EXPIRES 4/30/92 Estimated burden per response to comply with this information collection request: 50 D.H.S. Forward comments regarding burden estimate to the Records and Reports Management Branch (p-53C), U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503.	
LICENSEE EVENT REPORT (LER)					
FACILITY NAME (1) Millstone Nuclear Power Station Unit 3				DOCLET NUMBER (2) 0 5 0 0 0 4 2 3 1 OF 0 5	
TITLE (4) Seismic Deficiencies Found in Safety Related Instrument Cabinets Foxboro SPEC 200 Equipment					
EVENT DATE (5)		LER NUMBER (6)		REPORT DATE (7)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
0 1	2 4	9 2	9 2	0 0 2	0 0
				OTHER FACILITIES INVOLVED (8)	
				FACILITY NAMES	
				0 5 0 0 0 0 0 0	
				0 5 0 0 0 0 0 0	
OPERATING MODE (9) 5		THIS REPORT IS BEING SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)			
POWER LEVEL (10) 0 0 0 0		20.402(b)		20.402(c)	
		20.405(a)(1)(iii)		50.36(c)(1)	
		20.405(a)(1)(iv)		50.36(c)(2)	
		20.405(a)(1)(v)		50.36(c)(3)	
		20.405(a)(1)(vi)		50.36(c)(4)	
		20.405(a)(2)(i)		50.73(a)(2)(iv)	
		20.405(a)(2)(ii)		50.73(a)(2)(v)	
		20.405(a)(2)(iii)		50.73(a)(2)(vi)	
		20.405(a)(2)(iv)		50.73(a)(2)(vii)	
		20.405(a)(2)(v)		50.73(a)(2)(viii)	
		20.405(a)(2)(vi)		50.73(a)(2)(ix)	
		20.405(a)(2)(vii)		50.73(a)(2)(x)	
LICENSEE CONTACT FOR THIS LER (12)					
NAME Gary T. Bohn, Senior Engineer, Ext. 5515				TELEPHONE NUMBER	
				AREA CODE	
				2 0 3 4 4 7 1 1 7 9 1	
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	
SUPPLEMENTAL REPORT EXPECTED (14)					EXPECTED SUBMISSION DATE (15)
YES (If yes, complete EXPECTED SUBMISSION DATE)					MONTH DAY YEAR
X NO					
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)					
<p>On January 24, 1992, at 1300 hours, while shutdown in Mode 5 (Cold Shutdown), an engineering evaluation determined that the potential existed for some Foxboro Specification SPEC 200 Instrumentation to be inoperable due to inadequate documentation to support seismic qualification. The evaluation was initiated as the result of a Foxboro Advisory issued October 22, 1991, on potential installation errors which could compromise the seismic qualification of the SPEC 200 equipment. The advisory identified that dummy modules should be installed in spare slots and input/output modules should have rail guides and bumper assemblies. Inspection of our safety-related SPEC 200 equipment found dummy modules, rail guides and bumper assemblies missing. It was determined that the missing bumper assemblies from active cards could have allowed card failure during a seismic event and prevented the fulfillment of the safety function associated with the Auxiliary Feedwater System.</p> <p>The cause of this event is insufficient vendor information from Foxboro. Instructions addressing the need for bumper assemblies had not been received prior to the October 1991 advisory.</p> <p>The SPEC 200 racks have been updated with the installation of dummy modules, rail guides and bumper assemblies and are in full compliance with Foxboro qualification requirements.</p>					

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Estimated burden per response to comply with this information collection request: 50.0 hrs. Forward comments regarding burden estimate to the Records and Reports Management Branch (p-530), U.S. Nuclear Regulatory Commission, Washington, DC 20555, 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) 0 5 0 0 0 4 2 3 9 2	LER NUMBER (6)			PAGE (3) 0 2 OF 0 6
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	

TEXT (if more space is required, use additional NRC Form 366A's) (17)

1. Description of Event

On January 24, 1992, at 1300 hours, while shutdown in Mode 5 (Cold Shutdown) an engineering evaluation determined that the potential existed for certain safety related Foxboro Specification (SPEC) 200 Instrumentation to be considered inoperable due to inadequate seismic qualification. The evaluation was initiated as the result of a Foxboro Advisory issued October 22, 1991, on potential installation errors which could compromise the seismic qualification of the SPEC 200 equipment. The Advisory indicated that the SPEC 200 equipment racks should have all open slots filled with Dummy Modules (i.e., dummy cards and dummy nest sets). In addition, Foxboro also identified that the SPEC 200 Input/Output modules require rail guides and bumper assemblies to be installed in each card slot to conform to the configuration in the seismic qualification testing. Discussions with Foxboro revealed that preliminary testing had been performed on the loaded racks with no bumper assemblies. The amount of board deflection, and component loosening on the boards warranted the installation of vibration-dampening material (i.e., bumper assemblies) for each card.

As a result of the deficiencies found during equipment inspections, the engineering evaluation determined that the missing bumper assemblies from active cards could have allowed card failure during a seismic event and potentially prevented the Auxiliary Feedwater System (FWA) from performing its safety function. The SPEC 200 card failure would affect the operation of the auxiliary feedwater throttle valves. Generally a card failure will result in the associated component failing in the safe state (i.e., FWA throttle valves fail open). However, there are some failure modes which could cause the component to fail such that it will not meet the safety function. In the case of FWA there are failure modes which could cause a throttle valve to fail closed. If similar failure modes occurred in the other independent trains, this could cause the loss of safety function for FWA. Failures in each of the four independent trains would be required to lose the safety function.

Inspection of the safety related SPEC 200 equipment determined the following unsatisfactory conditions existed within the seven safety related racks: Dummy Cards - 12 missing; Dummy Nests - 4 missing; Rail Guides, Active Cards - 6 missing & Spare (Dummy) Slots 23 missing; Bumper Assemblies, Active Cards - 72 missing & Spare (Dummy) Slots - 16 missing. It should be noted that there are 20 cards per nest and 5 nests per rack. Seven racks support approximately 700 cards.

Once the scope of the deficiencies were known, engineering evaluated the impact the missing components had in the following two areas: operability of the SPEC 200 cabinets without the dummy modules installed, and operability of the individual cards without rail guides and/or bumper assemblies being installed.

The configuration with the missing dummy modules were evaluated against the equipment seismic qualification report and generic test results, which tested the equipment under a number of conditions. Per Foxboro, the qualification testing of the SPEC 200 racks had rail guides and bumper assemblies installed for all modules and the racks were seismically tested in both fully loaded (all spare slots loaded with dummy modules) and partially loaded (unbalanced - missing dummy modules) conditions. It was determined that the Millstone 3 seismic response spectra was well below the generic tests and the resulting reduction in weight would not adversely affect the equipments response to a seismic event. Therefore, the qualification of the rack and associated components would remain valid without the dummy modules.

The lack of rail guides and bumper assemblies were investigated. Discussions with Foxboro and evaluation of the equipment qualification report (which did not specifically identify the need for rail guides or bumper assemblies) determined that there was a potential for individual cards to become inoperable due to the lack of the bumper assemblies. During a seismic event the back of the unrestrained card could possibly see mechanical resonance of enough magnitude in the horizontal plane parallel to the instrument face to cause components to loosen and fail.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Estimated burden per response to comply with this information collection request: 60.0 hrs. Forward comments regarding burden estimate to the Records and Reports Management Branch (P-530), U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (3)			PAGE (5)	
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Millstone Nuclear Power Station Unit 3	0500042392	—	002	00	03	OF 06

TEXT (If more space is required, use additional NRC Form 365A (6) (17))

The initial engineering evaluation of the installed Foxboro equipment concluded that the potential existed for card failure to impact the operability of the Auxiliary Feedwater and the Containment Recirculation Systems. These safety related Systems are required to be fully operable per the plants technical specifications. A subsequent engineering evaluation determined that the Containment Recirculation System would not have lost the ability to perform its safety function and is considered operable. In addition, there were a number of ventilation systems affected, to varying degrees, which potentially could have components fail to automatically operate but the systems were capable of performing their required safety functions. The remaining cards which were potentially affected provided signals to 10CFR50 Appendix R Auxiliary panels, the plant computer and miscellaneous indications/alarms. The evaluation determined that failures of these cards would not impede the operation of any safety related equipment.

A review of Foxboro installation documentation indicated that some of the missing bumper assemblies dated back to initial installation. Approximately 35 cards were associated with additions made subsequent to initial plant startup.

No immediate corrective action had to be taken with the plant in cold shutdown for maintenance. The Foxboro SPEC 200 rail guides and bumper assembly repairs were coordinated with the card inspections to minimize the impact on plant equipment. Card inspections required equipment and train outages.

II. Cause of Event

The cause of this event is lack of vendor information from Foxboro addressing the need for bumper assemblies. The Operations, Instructions & Maintenance Manual (OIM) supplied by Foxboro at equipment delivery did not address the qualified configuration for these devices. Instruction MI-2AN-105 "N-2ANU Analog Nests," which provides the directions for dummy modules, rail guides and bumper assemblies had not been supplied with the equipment, since the instruction had not been issued yet. The Foxboro installation drawings made no reference to the bumper assemblies. The Equipment qualification report did not address the bumpers or rail guides and obscurely implied the need for the dummy modules. Prior to the receipt of the Foxboro advisory of October 1991, Millstone 3 was not aware of the need for the bumper assemblies.

As a result of this investigation, a contributing factor is a deficiency with the Millstone Technical Information Center document control system for the Foxboro Technical Manuals. The technical information center had out-of-date SPEC 200 technical manuals in the Equipment Specification File. The Units Instrument & Controls Department (I&C) library, which is also a document control station, had a full set of manuals maintained up-to-date. If the equipment specification file had been up-to-date, the issue may have been found during a 1990 engineering review.

An investigation of the document control system determined that in November 1990, a consolidated set of Foxboro manuals had been entered into the stations technical information center, under a new document number. At that time, the Millstone 3 equipment specification file was not updated and it is not known if Instruction MI-2AN-105 was incorporated in the I&C manuals. In October 1991, a new set of Foxboro technical manuals were purchased and replaced the 1990 manuals in the technical information center. Again, the equipment specification file for Unit 3 was not updated. The new manual contained Instruction MI-2AN-105, 1987 revision. MI-2AN-105 has since been updated to the October 1991 revision.

Per Foxboro, equipment instruction updates were provided with the purchase of new parts and would be included in the shipment packages. Unless new instrument racks were purchased, the customer probably would not have received the instruction. Millstone 3 had not purchased any new instrument racks after the initial order.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Estimated burden per response to comply with this information collection request: 50.0 hrs. Forward comments regarding burden estimate to the Records and Reports Management Branch (p-630), U.S. Nuclear Regulatory Commission, Washington, DC 20545, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)
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Unit 3	0 6 0 0 0 4 2 3	9 2 - 1 0 2 - 0 1 0	0 4 OF 0 6

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

III. Analysis of Event

This event is being reported in accordance with 10CFR50.73(a)(2)(v), as an event or condition which alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequence of an accident. As part of the required actions in response to the January 24, 1992 engineering evaluation conclusion, an immediate notification was performed pursuant to 10CFR50.72(b)(2)(ii).

The failure of the Foxboro SPEC 200 cards without the bumper assemblies during a postulated seismic event was conservatively considered possible due to the fact there is no technical basis currently available for qualifying the cards without the bumper assemblies. Foxboro had performed preliminary vibration testing on a rack assembly without the bumper assembly in 1973 and found card deflection and component damage resulted with 2g's at 25Hz. The test card failed in such a manner that the electrical output went to zero volts and visual inspection revealed that components failed at the point where the pins were soldered to the board. It should be noted, that the Millstone 3 seismic response spectra is well within Foxboro's generic qualification testing, by at least a factor of 3 margin on acceleration including the ZFA range.

The following summarizes the effect the loss of SPEC 200 cards have on the function of the Auxiliary Feedwater system:

The SPEC 200 system controls the operation of the Auxiliary Feedwater (FWA) Flow Control Valves, which are Target Rock modulating solenoid valves.

The FWA flow control valves fail in the open position on loss of power or control signal.

Each Steam Generator can be fed from (2) electric FWA pumps or (1) turbine driven FWA pump. The feed flow from the electric FWA pumps to each steam generator is controlled by a single modulating control valve, 3FWA*HV31(A,B,C,D), which is in series with a motor operated valve for double isolation protection. The auxiliary feedwater flow from the turbine driven FWA pump to each steam generator has two series modulating control valves, 3FWA*HV32(A,B,C,D) and 3FWA*HV36(A,B,C,D).

The SPEC 200 cards which control the twelve FWA modulating control valves are positioned in three different cabinets and are located in multiple nests in each cabinet. Also, four cards are required for the control of a single FWA modulating control valve.

The loss of total FWA feedwater flow would require the following failures of SPEC 200 cards: at least four cards for the electric FWA pump and at least four cards for the turbine driven FWA pump. One card for each steam generator flow path per pump, for a total of eight cards.

The most probable failure mode for the Foxboro cards without bumper assemblies during a seismic event would be for components to loosen or separate from the board and cause the circuit to open (i.e., no electrical output). The potential for a card to short-out and stay shorted is less probable and this would be needed to provide the signal to drive the modulating valves shut. A shorted card generally tends to self destruct due to increased current which causes components to fail and opens the electrical circuit. In addition, not all the SPEC 200 cards for the FWA control valves were without bumper assemblies, so these cards probably would not fail unless they were directly adjacent to failed ones and could be damaged by contact.

In conclusion, engineering does not consider the potential for a total loss of Auxiliary Feedwater Flow to be very credible. It would require the loss of at least eight different cards located in three different cabinets and all the cards to fail in the shorted, full signal, condition to drive the FWA modulating control valves to the closed position.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Estimated burden per response to comply with this information collection request: 50.0 hrs. Forward comments regarding burden estimate to the Records and Reports Management Branch (p-630), U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503.

FACILITY NAME (1)

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Millstone Nuclear Power Station
Unit 3

YEAR

SEQUENTIAL
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TEXT (If more space is required, use additional NRC Form 366A.s) (17)

If the postulated worst case scenario did occur and auxiliary feedwater flow was totally lost to all steam generators the consequences of the event would be mitigated by operator actions through the implementation of Emergency Operating Procedure (EOP) 35 FR-H.1, "Response to Loss Of Secondary Heat Sink". The procedure provides guidance for re-establishing the auxiliary feedwater flow or alternative heat sink sources (i.e., main feed pump, condensate pump or last resort RCS bleed and feed). The plant would not be in an unanalyzed condition at any time while responding to this event. The immediate need for heat sink could be provided and the restoration of auxiliary feedwater flow could be re-established by removing the power fuses to FWA modulating control valves and allowing them to fail open.

The Containment Recirculation System (RSS) was initially considered inoperable due to the loss of automatic control of the minimum flow recirculation valves for RSS pumps: 3RSS*P1A & 3RSS*P1B. The loss of automatic control would not render the valves inoperable. These valves have an override function which allows the operator to take manual control from the main control board. The RSS system consists of four RSS pumps, two have automatic minimum flow recirculation capability. These valves are used when shifting the RSS system from containment spray to cold leg injection. There is a period during the transfer from containment spray to cold leg injection where minimum recirc flow is required to avoid dead heading the pump. The loss of the SPEC 200 equipment affects the flow transmitter which provides indication and auto control for the mini-flow recirc valve. The pump flow indicated on the main control board would be failed, low or high, out of the normal range. The motor operated minimum flow recirc valves could be operated and valve position indication would be correct.

IV. Corrective Action

No immediate action had to be taken with the plant in cold shutdown, Mode 5, for maintenance. Dummy modules were inspected and missing modules inventoried. Because of the missing dummy modules an Engineering reportability evaluation was initiated and inspections were initiated for missing cards guides and bumper assemblies. The Foxboro SPEC 200 rail guides and bumper assembly repairs were coordinated with the card inspections to minimize the impact on the plants equipment. Card inspections required equipment and train outages.

Millstone 3 has installed dummy modules, rail guides and bumper assemblies in all the seismically qualified safety related racks in accordance with Foxboro requirements. Millstone 3 is in compliance with the Foxboro qualification report.

A review was performed on the Foxboro SPEC 200 Technical Manuals. The deficiencies found with the Foxboro technical manuals in the Stations Technical Information Center are being corrected. The Document Control and Millstone 3 Engineering departments are reviewing other equipment specification files to eliminate any other technical manual problems.

A Vendor Interface program was implemented in November 1991, prior to this incident, by the corporate Procurement Engineering Group. The purpose of the program is to contact equipment vendors who provided or manufactured equipment significant to the safety of the plant on a routine basis. An element of the program is to find out what changes have been made to the equipment technical manuals. This program should eliminate future problems with not having up-to-date vendor information.

Per discussion with Westinghouse, the NSSS, there are no known similar seismic qualification problems with the safety related instrument and control equipment supplied by them. There are several other pieces of equipment being reviewed to ensure seismic requirements have been maintained over the years. This review will be completed by April 1, 1992.

V. Additional Information

This report is very similar in nature to the NRC information Notice 91-70, "Improper Installation of Instrumentation Modules," which documented a similar problem reported at the Arkansas Nuclear One Facility in August, 1991.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Estimated burden per response to comply with this information collection request: 50.0 hrs. Forward comments regarding burden estimate to the Records and Reports Management Branch (p-530), U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503.

FACILITY NAME (1)

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Millstone Nuclear Power Station
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

LER 86-043, "Incorrect Main Steam Relief Valve Blowdown Ring Setting," reported the improper blowdown settings of the main steam relief valves. The issue was found as a result of information obtained in research of an NRC IE Information Notice No. 86-05. This event is only similar to the present issue being reported in that the investigation was triggered from outside notification.

LER 90-005, "Manual Reactor Trip After Main Feedwater Pump Coupling Failure Due to Loss Of Coupling Bolt Preload," reported the catastrophic failure of the feedwater turbine/pump coupling due to personnel and procedural inadequacy. This events found the vendor technical manuals were procedurally inadequate. The corrective action for LER 90-005-00 was event specific and would not have prevent the occurrence of the event described in this LER.

LER 91-022, "Failure To Adequately Perform Overlap Testing Of The Containment Depressurization Actuation Loops Due to Management Deficiency," reported a situation where all aspects of an instrument loop was not adequately tested. The events are only similar with the respects to a potential program breakdowns. This event missed vendor recommended testing requirements which were adequately documented. The event being reported in this LER documents a breakdown or weakness of the document control program for not updating or maintaining vendor technical manuals current.

LER 88-010, "Improper Nuclear Instrument Calibration Due To Low Leakage Core," discussed an event where a design change was not taken into account prior to implementation of the design. Specifically, the nuclear instrumentation negative and positive rate reactor trips had been set non-conservatively because personnel failed to properly account for the effect of low leakage core on the plant's excore nuclear instrumentation. As a contributing factor, the fuel vendor did not properly forward all information concerning adjustments of NIs for low leakage core to Millstone 3. As action to prevent recurrence, the fuel vendor notified Northeast Utilities that it has made changes to its internal control procedures to ensure that information related to core design change effects on NI post refueling alignment is forwarded to customers. This event is considered similar in that it identifies problems generated due to a lack of adequate vendor technical information. The corrective action for LER 88-010 was event specific and would not have prevent the occurrence of the event described in this LER.

Millstone 3 has reviewed this incident with the other Northeast Utilities nuclear units (i.e., Millstone 1, Millstone 2 and Connecticut Yankee). The units are reviewing their equipment and any discrepancies will be independently reported.

EIIS CodesSystem

Instrumentation and Monitoring System Group
Performance Monitoring System - IO
Auxiliary Feedwater System - BA
Containment Recirculation Spray System - BE

Components

Cabinet - CAB