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The Northeast Utilities System

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

Re: 10CFR50.73
June 2, 1994
MP-94-378

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 94-008-00

Gentlemen:

This letter forwards Licensee Event Report 94-008-00 required to be submitted within thirty (30) days pursuant to 10CFR50.73(a)(2)(i)(B).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

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

DBM/RLM:dlr

Attachment: LER 94-008-00

cc: T. T. Martin, Region I Administrator
P. D. Swetland, 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 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104
EXPIRES: 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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)	DOCKET NUMBER (2)	PAGE (3)
Millstone Nuclear Power Station Unit 3	05000423	1 OF 6

TITLE (4)
Westinghouse 7300 Process Control System Surveillance Deficiency Due to Program Failure

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
										05000
05	05	94	94	- 008 -	00	06	02	94	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS BEING SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	100%	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
		20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
		20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER	
		20.405(a)(1)(iii)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)	
		20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)			
		20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
William J. Temple, Site Licensing	(203) 437-5904

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 DATE (15)	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 May 5, 1994, with the plant in Mode 1 at 100% power, Instrumentation & Controls personnel identified a deficiency in surveillance testing for the bypass feature of Lead/Lag (NLL) relay cards in Westinghouse 7300 cabinets. The relay cards support the surveillance testing of lead/lag compensated channels by providing a bypass test feature. The normally closed relay card contacts were not verified to be closed when returning the bypass to the normal alignment in the channel surveillances and lead/lag surveillances.

The inadequate surveillance is reported as a condition prohibited by the Technical Specifications. The condition had low safety significance. Immediate evaluations determined that some circuits would be susceptible to undetectable failure modes. However, testing verified that all circuits with the lead/lag bypass feature were operable and capable of performing all credited safety functions.

The root cause of the condition was a program failure which resulted in a procedure deficiency. When a design improvement was made during plant construction, emphasis was placed on safely placing the channels into a test configuration. The possibility of a normally closed relay contact failure when returning the NLL bypass to the normal alignment was not considered. To prevent recurrence the surveillance procedures will be modified to verify bypass relay card contact closure.

APPROVED BY OMB NO. 3150-0104
EXPIRES: 5/31/95

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Millstone Nuclear Power Station Unit 3	05000423	94	— 008 —	00	02 OF 06

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

I. Description of Event

On May 5, 1994, with the plant in Mode 1 at 100% power, Instrumentation & Controls personnel identified a deficiency in surveillance testing for the bypass feature of Lead/Lag (NLL) relay cards in Westinghouse 7300 cabinets. The relay cards support the surveillance testing of lead/lag compensated channels by providing a bypass test feature. The normally closed relay card contacts were not verified to be closed when returning the bypass to the normal alignment in the channel surveillances and lead/lag surveillances.

During plant construction, I&C personnel recommended a change to the Westinghouse 7300 Process and Controls System test method for lead/lag compensated channels. The Westinghouse approved design provides a bypass of the lead/lag (NLL) cards, using a relay (Westinghouse NRC8 card) on both sides of the NLL card (see attached Figure 1). The design change improved the surveillance testing of the circuits by allowing the I&C technicians to bypass the NLL cards for dynamic testing to allow comparator trip testing. The NRC8 cards are enabled only when the instrument loop test logic is met. This prevents the possibility of inadvertently bypassing an NLL card in an operable instrument loop.

Forty NLL cards have bypass capability. Of these, twenty have detectable failure modes. Bistable setpoint trips provide indication of any abnormal channel conditions for the 12 Low Steam Pressure channels and the 4 Low Pressurizer Pressure Reactor Trip channels; but they do not directly monitor the status of the relay card contacts. Setpoint indicators provide indication of any abnormal channel conditions for the 4 Lead/Lag Compensated T-average to Over Temperature Delta T channels; but they do not directly monitor the status of the relay card contacts. To verify contact continuity of the relay cards, a voltmeter must be placed across the contacts to verify continuity after the channel is returned to an operable status. There are four utilized contacts on each relay card: two (normally open) contacts are used to bypass the NLL card and light the associated bistable when the switch is in test. Two (normally closed) contacts are used to provide a test channel for testing the NLL cards. The normally closed contacts are used in line with the Solid State Protection System (SSPS) input channels to provide an actuation signal while in normal operation. Since they employ different sets of auxiliary contacts, 20 of the 40 channels with NLL bypass capability did not have the capability to detect a failure of the relay card contacts.

The investigation of the condition determined that the channel surveillance procedures for six functions were not in full compliance with the requirements of the Technical Specifications. The six functions were:

Low Steam Pressure

Steam Pressure - High Negative Rate

Lead/Lag Compensated Delta-T to Bistables

High T-average Rate to Over Power Delta-T

Lead/Lag Compensated T-average to Over Temperature Delta-T

Low Pressurizer Pressure Reactor Trip

Technical Specification 4.3.2.1 requires that overlap testing be performed as part of a channel calibration at least once every 18 months. The channel calibration procedures did not verify closure of the normally closed relay contacts. These relay contacts are used to restore the bypassed NLL cards in the Westinghouse 7300 Process Protection sets, which provide input to the SSPS (see attached Figure 1).

II. Cause of Event

The root cause of the condition was a program failure which resulted in a procedure deficiency. When the Westinghouse approved design was made during plant construction, emphasis was placed on safely placing a lead/lag compensated circuit into test configuration. The possibility of a normally closed NRC8 contact failure when returning the NLL bypass to the normal alignment was not considered.

III. Analysis of Event

The inadequate surveillance is a condition that has historically existed since initial plant startup. The possibility of a normally closed relay card contact failure when returning the NLL bypass to the normal alignment, was not considered in the plant design for performing channel surveillance and NLL surveillance. It is reported under 10CFR50.73(a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications. Plant Technical Specification 4.3.2.1 requires that a channel calibration be performed at least once every 18 months. Overlap testing was not adequate to test the relay card contacts associated with the circuits that have NLL card bypass capability.

The protection channels monitor safety related functions and provide a signal to energize their respective SSPS 24-volt DC input relays once the setpoint is reached. If redundant channels indicate a setpoint is reached, a signal is processed by the SSPS to generate any required engineered safety feature actuation. The comparator trip switch provides a means of isolating the actuation signal to SSPS in order that the protection channel may be tested without generating a trip signal.

The design change improved the surveillance testing of the circuits by allowing the I&C technicians to bypass the NLL cards for dynamic testing to allow comparator trip testing. The NRC8 cards are enabled only when the instrument loop test logic is met. This prevents the possibility of inadvertently bypassing an NLL card in an operable instrument loop. Additionally, the bypass is conducted through normally open contacts on the NRC8 card. If a relay coil were to open, the channel would remain in a safe condition with the NLL cards operable.

Although the relay card contacts were not tested on the 18-month channel calibration frequency, the I&C Department, testing in response to the condition, verified that the relay card contacts for each channel were operable. Additionally, response time testing, which is performed at least once every 72 months for each channel, verifies continuity of these contacts. A review of plant historical information identified that there were two cases of contact failures in NRC8 cards, in 1990 and 1992. These failures occurred in circuits which had the NLL bypass design, and the failures were detectable at the time they occurred. In addition, a search of the Nuclear Plant Reliability Data System (NPRDS) showed that there was one other relay card contact failure at another plant out of an industry population of approximately 1225 relay cards since 1980. Based on these factors, the failure to verify continuity of the relay card contacts in the channels as part the 18-month channel calibration did not result in any significant safety consequences.

IV. Corrective Action

As initial corrective action, all suspected relay cards were tested, and an operability evaluation was performed which verified that all channels were operable and there was no loss of safety function. One channel in an NRC8 card in the Steam Generator #1 Low Pressure Steam Isolation (which is not required in Mode 1) exhibited minor degradation in contact resistance. The affected card was replaced and tested satisfactorily.

To prevent recurrence the surveillance procedures will be modified to verify bypass relay card contact closure. The quarterly analog channel operational test procedures and the 18-month channel calibration procedures will be modified to require continuity verification of the relay card contacts for the involved protection channels.

A review of other protection channel instrument loops did not identify any additional deficiencies. All manually operated circuit board switches within the Westinghouse 7300 protection cabinets were reviewed. This included all test logic, master test, and NLL bypass relay switches. A review of the work history on 7300 protection cabinets determined that there were no other modifications similar to the NLL bypass relay changes.

V. Additional Information

Previous LERs related to circuits that were not adequately tested due to inadequate surveillance procedures are listed below. Prior to LER 93-003, the deficiencies were addressed as individual items. A task force performed an integrated channel design review for resolution of LER 93-003. The integrated review identified the deficiencies reported in LER 93-003, LER 93-005, LER 93-010, and LER 93-017. The integrated review considered the interfaces between major functional systems and components, but did not include detailed evaluations of the specific relay card contacts used in the unique lead/ lag bypass feature in the 7300 cabinets.

LER 93-017, "Inadequate Response Time Testing."

LER 93-010, "Reactor Trip Due to Turbine Trip Interlock Not Adequately Tested."

LER 93-005, "Inadequate Overlap Testing."

LER 93-003, "Inadequate Testing of Slave Relays."

LER 93-001, "Failure to Verify Testing of NIS Inputs Into Westinghouse 7300 Process Control System Due to Procedural Deficiency."

LER 92-031, "Failure to Test High Pressure Output Relay for Power Operated Relief Valves Due to Procedural Deficiency."

LER 91-025, "Failure to Verify De-energization of Solid State Protection Input Relays for Cold Overpressure Protection Due to Procedural Deficiency."

LER 91-022, "Failure to Adequately Perform Overlap Testing of the Containment Depressurization Actuation Loops Due to Management Deficiency."

LER 90-007, "Inadequate Load Shed Verification."

LER 87-042, -"Missed Intermediate Range/Power Range Surveillance Due to Procedural Inadequacy." Part of the corrective action was a comprehensive review of all Technical Specification surveillance procedures. This review completed in 1988, would not have identified the event discussed in this LER because the review scope did not target a channel design review.

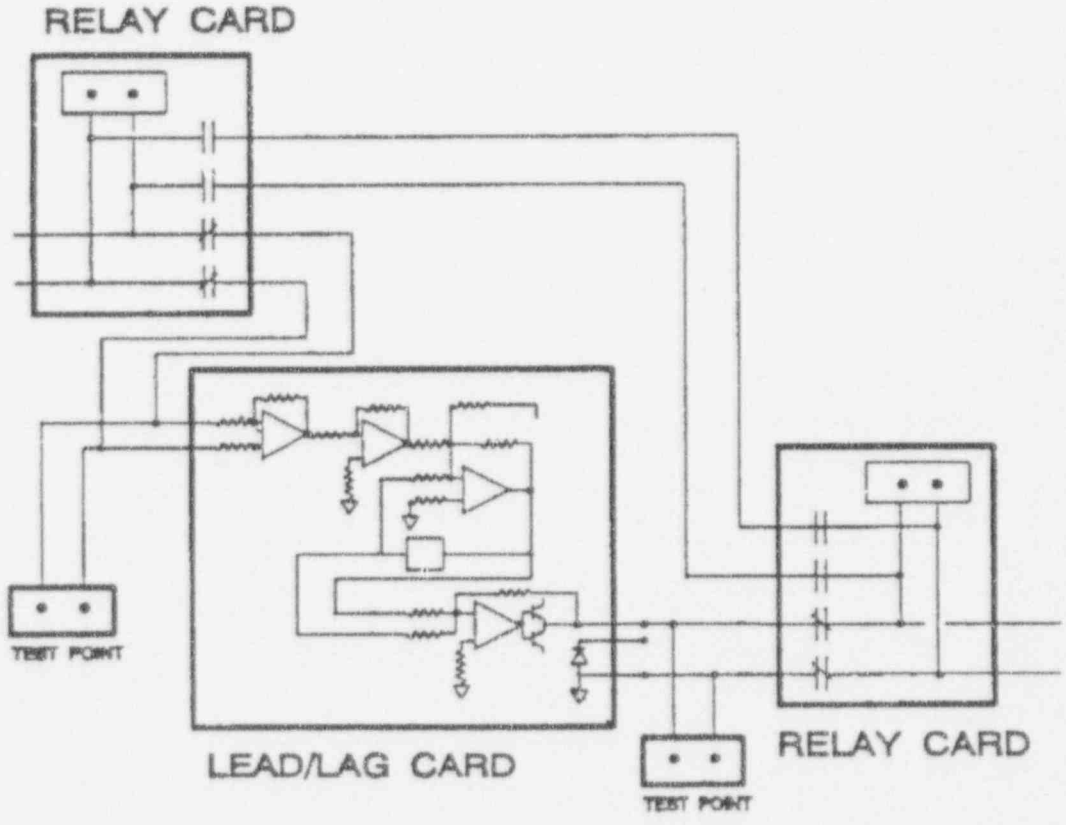
A Nuclear Plant Reliability Data System (NPRDS) query identified that there was one other relay card contact failure at another plant, out of an industry population of approximately 1225 relay cards since 1980. It appears from a review of the NPRDS data and from discussions with similar vintage plants that the NLL bypass design improvement is unique to Millstone 3. Westinghouse has been notified of this condition.

EIIS Codes

Systems
Solid State Protection System – JC
Engineered Safety Features Actuation System – JE

Components
Auxiliary Actuation Contact
Logic Card

The relay contact card is a Westinghouse Electric Corporation NRC8 style card, (reference no. 2837A87GO8).



NOTE: Closed Relay Contacts Indicate Lead/Lag Card In-Service

Figure 1
Lead/Lag Modification