

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: Seiden Street, Berlin, Connecticut

P.O. BOX 270

HARTFORD, CONNECTICUT 06141-0270

(203)665-5000

Re: 10CFR50.73(a)(2)(i)

January 21, 1992

MP-92-86

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 91-025-01


Gentlemen:

This letter forwards Licensee Event Report (LER) 91-025-01 which is being submitted to provide update information on LER 91-025-00. LER 91-025-00 was submitted pursuant to 10CFR50.73(a)(2)(i), any operation or condition prohibited by the plant's Technical Specifications.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: Stephen E. Scace
Director, Millstone Station

BY: 
Carl H. Clement
Millstone Unit 3 Director

SES/BNF:tjp

Attachment: LER 91-025-01

cc: T. T. Martin, Region I 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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LICENSEE EVENT REPORT (LER)

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) Millstone Nuclear Power Station Unit 3										DOCKET NUMBER (2) 0 5 0 0 0 4 2 3				PAGE (3) 1 OF 0 6					
TITLE (4) Failure To Verify De-energization of Solid State Protection Input Relays For Cold Overpressure Protection Due to Procedural Deficiency																			
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 NAMES										
0	9	1	0	9	1	0	1	2	0 5 0 0 0 0 0 0										
0	9	1	0	9	1	0	1	2	0 5 0 0 0 0 0 0										
OPERATING MODE (9)		THIS REPORT IS BEING SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following: (1))																	
5		20.402(b)				20.402(c)				50.73(a)(2)(iv)				73.71(b)					
POWER LEVEL (10)		20.405(a)(1)(i)				50.36(c)(1)				50.73(a)(2)(v)				73.71(c)					
0 0 0 0		20.405(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)					
		20.405(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(vii)(A)									
		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)(ix)									
LICENSEE CONTACT FOR THIS LER (12)																			
NAME Burtel N. Forrest, Engineer, x5442										TELEPHONE NUMBER AREA CODE 2 0 3 4 4 7 - 1 7 9 1									
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																			
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPDS
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)		MONTH DAY YEAR							
YF If yes, complete EXPECTED SUBMISSION DATE: X NO																			

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

A: 1300 hours on September 10, 1991, while in Mode 5 (cold shutdown), at 94 degrees Fahrenheit and atmospheric pressure, a procedure deficiency in the test for Solid State Protection System input relays resulted in an incomplete surveillance. Instrumentation and Controls (I&C) Department personnel reviewing the test methodology during a surveillance procedure re-write discovered that de-energization of the SSPS input relays for Cold Overpressure Protection (COPS) was not verified during overlap testing for channel calibration. Testing of this relay is required by Plant Technical Specification. No immediate operator action was required since the plant was shutdown.

The root cause of the event is a procedural deficiency. A non-standard circuit design is a contributing factor. The procedure associated with the Solid State Protection System does not verify that the COPS input relay has been de-energized. There is no main control board annunciator to verify that this relay is operational. The SSPS Operation Test Procedures were modified to verify the relay's operability. The relay was satisfactorily tested in the as-found condition.

A review of Solid State Protection System Loops and their associated surveillance procedures has been completed. Three deficiencies were identified and the applicable procedures have been modified.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Estimated burden for 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) Millstone Nuclear Power Station Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 4 2 3 9 1	LER NUMBER (3)			PAGE (3)	
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TEXT: If more space is required, use additional NRC Form 366A (6-89).

I. Description of Event

On September 10, 1991, at 1300 hours, while shutdown in Mode 5 (Cold Shutdown), at 94 degrees Fahrenheit and atmospheric pressure, a procedure deficiency in the test for Solid State Protection System (SSPS) input relays resulted in an incomplete surveillance. Instrumentation and Controls (I&C) Department personnel reviewing test methodology during a procedure re-write discovered that de-energization of the input relays for the Cold Overpressure Protection System (COPS) was not verified during channel calibration, as required by the Technical Specifications. The test procedure did not verify the operability of the input relays which process an actuation signal from Train A and Train B of the Westinghouse 7300 instrument racks, to the Solid State Protection System (SSPS).

Technical Specification 4.4.9.3.1.b requires a channel calibration be performed on the Power Operated Relief Valves (PORV) actuation channel, which includes COPS, at least once every 18 months. However, the applicable procedure for testing the COPS input relays from the Westinghouse 7300 instrument racks to the SSPS did not contain sufficient overlap to verify the operability of the relays. Two COPS channels can initiate a protective action which will cause the associated PORV to open. Each channel contains four temperature signals and two pressure signals.

II. Cause of Event

The root cause of the event is a procedural deficiency. The procedure was prepared from a standard generic Westinghouse test procedure. The procedure did not address the non-standard circuit design and contributed to the event.

The de-energize to actuate design of the COPS circuit does not provide annunciation which directly monitors relay status. The typical protection channel design places the channel in "trip" during testing and utilizes annunciators to provide indication of off-normal contact status. The COPS bistable annunciator is upstream of the input relay. This annunciation does not verify the SSPS input relay status. To verify de-energization of the input relays for COPS, a voltmeter must be placed across the associated SSPS contact output to verify continuity.

III. Analysis of Event

This event is reportable under 10CFR50.73(a)(2)(i) as a condition prohibited by the Technical Specifications. The procedure failed to test the Solid State Protection System Cold Overpressure Protection (COPS) input relays. Plant technical specification 4.4.9.3.1.b requires that a channel calibration be performed at least once every 18 months. As part of the channel calibration, overlap testing to verify the input relays de-energize is required. This requirement was never performed.

Operator actions would be available to mitigate any pressure transients which would have occurred prior to the system reaching the overpressure limits. During low-temperature and low-pressure operating conditions, the Cold Overpressure Protection System (COPS) is armed. The Main Control Board has two annunciators (one per Train) to warn operators that Reactor Coolant System (RCS) pressure has increased to within 20 psi of the COPS setpoint. The Main Control Board also has two annunciators (one per train) to warn the operators to arm COPS when wide range hot or cold leg temperature has decreased below 350 degrees Fahrenheit.

Although the Solid State Protection System input relays were not tested on the 18 month channel calibration frequency, the I&C department tested the relays in the as-found condition in response to the event. Relay operability was verified for each channel. PORVS provides only one of three methods to provide cold overpressure protection per Technical Specification 3.4.9.3. During much of the period that the relays remained unverified, a Residual Heat Removal suction relief or RCS vent was also available to provide over pressure protection. Based on these factors, the failure to verify continuity of the relays as part of the 18 month channel calibration did not result in any significant safety consequences.

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.

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TEXT: If more space is required, use additional NRC Form 366A (6-89).

IV. Corrective Action

The monthly Train A and Train B Solid State Protection System Operational Test procedures were modified to include a Cold Overpressure Protection Input Relay test. These procedures were changed vice the channel calibration procedures since they are performed on a more conservative frequency. The modified surveillance procedure was performed and the relays were tested satisfactorily in the as-found condition.

A review of Technical Specifications Surveillance requirements and their associated surveillance procedures for Protection Channel Instrument Loop Overlap Testing Verification for SSPS Input Relays has been completed. This report provides information on that review and its conclusions. Additional testing deficiencies were identified. The following items were found deficient:

1. SSPS Input Relays Not Fully Tested

- A. The SSPS Multiplexer Test switch was not placed into the A+B test position during bistable status lamp surveillances. The A+B position allows information to be transmitted from the two trains of SSPS to the main control board. In the A+B test position, a steady state status lamp would indicate that the input relays in both trains de-energized to actuate per system design. A flashing status lamp would indicate that one of the input relays in either of the two trains did not de-energize to actuate. This condition would warrant further investigation to determine which input relay did not de-energize. A review of the testing procedures has concluded that the following bistables were not properly tested in accordance with A+B position bistable status lamp testing:

- Steam Generator Pressure bistable from Westinghouse 7300 system
- Containment Pressure bistable from 7300
- Reactor Coolant Pump Low Shaft Speed bistables from 7300
- COPS bistables from 7300

The above listed input relays for the devices listed above are required to be tested during the monthly Analog Channel Operational Test and the refueling Channel Calibration Test. The Channel Calibration Test verifies that the bistable status lamps illuminate, but it does not place the SSPS Multiplexer test switch into the A+B test position. Therefore a failure of a single input relay would not be detected. These relays are properly tested in the Operational Test.

B. The following input relays are required to be tested:

- NIS Power Range bistables from NIS
- NIS Intermediate Range bistables from NIS

These input relays are required to be tested during initial start up, quarterly Analog Channel Operational Test and the Refuel Channel Calibration Test. The Operational Test verifies that the bistable status lamp illuminates, but does not place the SSPS Multiplexer Test switch into the A+B test position. Therefore the failure of a single input relay during Operational Testing would not be detected. However, these relays are properly tested during Channel Calibration Testing. Several front end electronic components in the NIS Power Range Drawer were not included in the Time Response Test. The Time Response Test is currently being revised to include the excluded components.

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 (2-830), U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503.

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

C. The following input relays are required to be tested:

- Turbine Stop Valve Limit switch inputs
- Turbine Oil Pressure switch inputs

These input relays are required to be tested during the refuel Channel Calibration Test. These inputs do not have Operational Test requirements. Channel Calibration testing does not place the SSPS Multiplexer Test switch into the A+B test position. Therefore a failure of a single input relay would not be detected.

Analog Channel Operational Test and Channel Calibration Test procedures have been updated to include placing the SSPS Multiplexer Test Switch into the A+B test position. This will preclude the recurrence of the existing testing deficiency.

2. Mainboard 5 Steamline Isolation switch not tested

The contact input from the Steamline Isolation switch on mainboard 5 was not properly tested during the required SSPS refuel Channel Calibration. There are two switches in parallel that provide the capability for a manual Steamline Isolation initiation signal to SSPS. One switch is located on mainboard 2 and the other switch is located on mainboard 5. The switch on mainboard 2 was properly tested. The switch on mainboard 5 was not tested under the refuel Channel Calibration Test. Plant Emergency Operating Procedures (EOP's) allow for the manual alignment of the system in the event that a Steamline Isolation does occur.

The Channel Calibration test procedures have been revised to include contact input testing of the mainboard 5 Steamline Isolation Switch.

3. Emergency Diesel Generator Load Sequencer Input Relays not tested

Loss of Power (LOP) and Emergency Diesel Generator (EDG) breaker relays are required to be time response tested. The A-Train and B-Train LOP and EDG inputs relays were omitted from the appropriate I&C surveillance procedure which is done during a refueling outage. The relays are functionally tested under another surveillance which would detect a gross error in the time response of the relays. Alternate trains of the EGLS are Time Response tested every refueling cycle. Both trains of the EGLS are functionally tested every refuel cycle.

I&C surveillance procedures have been updated to reflect the addition of time response testing of the Emergency Diesel Generator Load Sequencer Input Relays.

Corrective Action Conclusions

The four deficiencies identified were tested satisfactorily in the as-found condition. Upon compilation of the aforementioned deficiencies, an engineering evaluation was performed which concluded that the deficiencies were similar to the original LER incident and that each are reportable pursuant to 10CFR50.73(a)(2)(i), as violations of the Technical Specification requirements for overlap testing. The engineering evaluation also concluded that none of the additional findings pose significant safety considerations because of the redundancy and diversity built into the Reactor Protection System (RPS) and Engineered Safety Features Actuation System (ESFAS). Any failure that may have gone undetected as a result of these deficiencies could not have prevented the RPS or ESFAS from initiating a reactor trip or ESF actuation. Integrated I&SF and/or Loss of Power testing would reveal either failures of electronic components, or slow response of these components. Results of the testing indicate that the relays are reliable and would perform their intended function if exercised.

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 (3150-0154), Office of Management and Budget, Washington, DC 20503.

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

Based on a management review of the findings, it was also determined that each of the deficiencies were discovered greater than 30 days prior to submittal of this update LER. The additional findings were documented together as a compilation of instrument loop reviews which transpired for 3 months to resolve inadequate overlap testing concerns of the initiating LER event. Because the reviews were documented in a summary report without documenting each finding as individual, independent deficiencies, Millstone 3 recognizes that this approach may have resulted in a violation of the 30 day LER submittal rule. The instrument loop reviews were intended to be tracked as items pending resolution prior to restarting the plant.

V. Additional Information

Part of the corrective action for LER 87-042 "Missed Intermediate Range/Power Range Surveillance Due to Procedural Inadequacy", was the performance of a comprehensive review of all Technical Specifications against their applicable surveillance procedures. This was an administrative review to verify all Technical Specification surveillance requirements were implemented by a plant surveillance procedure and the acceptance criteria in plant surveillance procedures were the values in the current revision of Technical Specifications.

LER 91-022, "Failure to Adequately Perform Overlap Testing of the Containment Depressurization Actuation Loops Due to Management Deficiency", discusses a similar concern of inadequate overlap testing. A review of other protection channels was performed as part of the LER 91-022 corrective action. This review scope was directed at identifying protection channel configurations which utilize energize to actuate designs.

EIS CodesSystems

Solid State Protection System - JC

Cold Overpressure Protection System

Reactor Coolant System - AB

Components

Solid State Protection System Input Relays - RLY

An NPRDS query did not identify any relay failures which resulted in the inability of the solid state protection system to actuate a PORV.

This event is also being submitted on the INPO notepad.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUED

Estimated burden per response to comply with this information collection request: 60 minutes. Forward comments regarding burden estimate to the Records and Reports Management Branch (3150-0104), 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)

Millstone Nuclear Power Station
Unit 3

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LER NUMBER (3)

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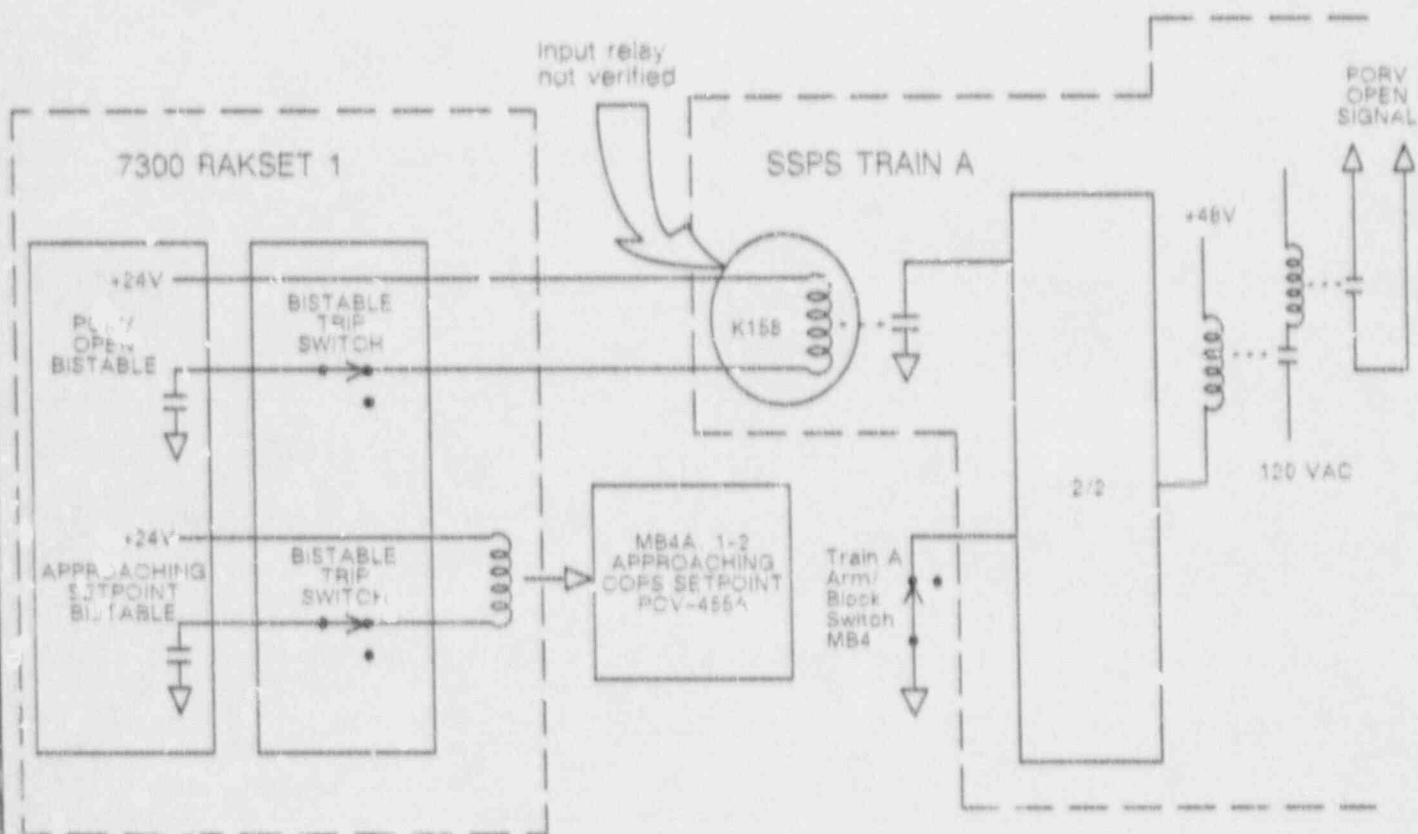
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TEXT (If more space is required, use additional NRC Form 206A-B) (17)

COPS Actuation Circuit (Simplified)

Train A Shown

Train B Functionally Identical



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 (R-830), U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (2150-0104), Office of Management and Budget, Washington, DC 20503.

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

COPS Actuation Circuit

(Simplified)

Train A Shown

Train B Functionally Identical

