**NORTHEAST UTILITIES**

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

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Re: 10CFR50.73(a)(2)(i)
March 31, 1992
MP-92-339

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 91-028-01

Gentlemen:

This letter forwards supplemental Licensee Event Report (LER) 91-028-01, in accordance with LER 91-028-00. LER 91-028-00 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: John S. Keenan
Millstone Unit 2 Director

SES/AE:ljs

Attachment: LER 91-028-01

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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NRC Form 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

# LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

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) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Millstone Nuclear Power Station Unit 3 | 0 5 0 0 0 4 2 3 | 1 OF 0 7 |

TITLE (4)
Improper Power Range Trip Rate Decay Time Trip Setpoint Due to Improper Work Practices

| 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 1 | 2 3 | 8 6 | 9 1 | - 0 2 8 | - 0 1 | | 0 3 | 3 1 | 9 2 | | 0 5 0 0 0 |
| | | | | | | | | | | | 0 5 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 | 20.402(b) | 20.405(a)(1)(i) | 50.73(a)(2)(iv) | 73.71(b) |
| | | 20.405(a)(1)(ii) | 50.36(c)(1) | 50.73(a)(2)(v) | 73.71(c) |
| | | 20.405(a)(1)(iii) | 50.36(c)(2) | 50.73(a)(2)(vii) | OTHER (Specify in Abstract below and in Text, NRC Form 366A) |
| | | 20.405(a)(1)(iv) | X 50.73(a)(2)(i) | 50.73(a)(2)(viii)(A) | |
| | | 20.405(a)(1)(v) | 50.73(a)(2)(ii) | 50.73(a)(2)(viii)(B) | |
| | | | 50.73(a)(2)(iii) | 50.73(a)(2)(x) | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER |
|---|---|
| A. L. Elms, Senior Engineering Technician, Ext. 5388 | 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 NPRDS | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | |
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| 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 fifteen single-space typewritten lines) (16)

On October 18, 1991, at 1100 hours while in Cold Shutdown, at 93 degrees and atmospheric pressure, Instrument and Control technicians discovered that the power range analog channel operational test was performed incorrectly. The test had been performed incorrectly since December 15, 1990. The neutron flux power range high rate trip was not calibrated within the technical specification Trip Setpoint. It was calibrated within the technical specification Allowable Value. There were no immediate operator actions required. The calibrated values were always within the values credited in the safety analysis. Therefore, safety functions were maintained at all times. Additionally, while investigating this event, it was discovered that the power range response time test did not encompass the entire power range circuit. Nor were the power range drawers time response tested after the digital meter modification.

The root causes of these events are improper work practices, technical error, and incomplete written communications. A full test to Westinghouse specification has been performed. The procedures were modified to include a more detailed description of the rate trip decay time calibration and the proper response time test points. The company's position on procedural compliance had been emphasized to all plant personnel and discovery of this event is the result of diligence towards the compliance position.

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Millstone Nuclear Power Station Unit 3 | 0 5 0 0 0 4 2 3 | 9 1 | — 0 2 8 | — 0 1 | 0 2 OF 0 7 |

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

1. Description of Event

On October 18, 1991, at 1100 hours while in Mode 5 (Cold Shutdown), at 93 degrees Fahrenheit and atmospheric pressure, it was discovered that the power range analog channel operational test was performed incorrectly. Instrument and Controls (I&C) Department personnel discovered the problem while performing the procedure. When performing the power range analog channel operational test, a five percent power step jump signal is fed to the circuit and a subsequent response is obtained on a trace recorder. A time constant is determined from the peak of the output signal to 37% of the peak voltage. Instead, the time constant was being incorrectly determined from the initiation of the event. This incorrect determination of the peak voltage time had occurred on this test since December 15, 1990. A modification to replace the analog readout meters with digital readout meters was performed in December 1990. This caused a lag of 0.2 seconds between the initiation time and the peak voltage value. Based on review of the completed surveillances, one channel was improperly calibrated on December 15, 1990. Two additional channels were improperly calibrated in March, 1991. However, all four channels were functional and within the allowable limits of the safety analysis.

Technical Specification 2.2.1 states that for modes 1 and 2 the Trip Setpoint for the neutron flux power range high rate trip should be less than or equal to 5% of rated thermal power (RTP) with a time constant greater than or equal to 2 seconds (sec). The Allowable Value for the neutron flux power range high rate trip should be less than or equal to 6.3% of rated thermal power (RTP) with a time constant greater than or equal to 2 sec. This test is performed at least once every 92 days on a staggered test basis. The time constant was incorrectly calculated 0.2 sec low.

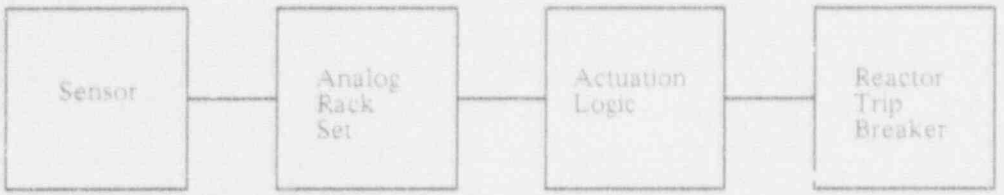
This surveillance has been performed for the past five years with the initiation time the same as the peak time. As such, the I&C technicians established a routine where the trace data was analyzed from the initiation time. When the test was done with the new/digital readout meters installed, the initiation time was no longer the same as the peak time. Several different I&C technicians performed the test and all the technicians habitually selected the initiation time for the start point of the decay time determination.

The I&C technicians performing the October 18, 1991 surveillance questioned the determination of the decay time as stated by the procedure when compared with the way the decay time was previously determined. The technicians then stopped and discussed this discrepancy with I&C supervisory personnel. After the discrepancy was investigated, it was determined that the setpoints had been calibrated incorrectly since December 15, 1990.

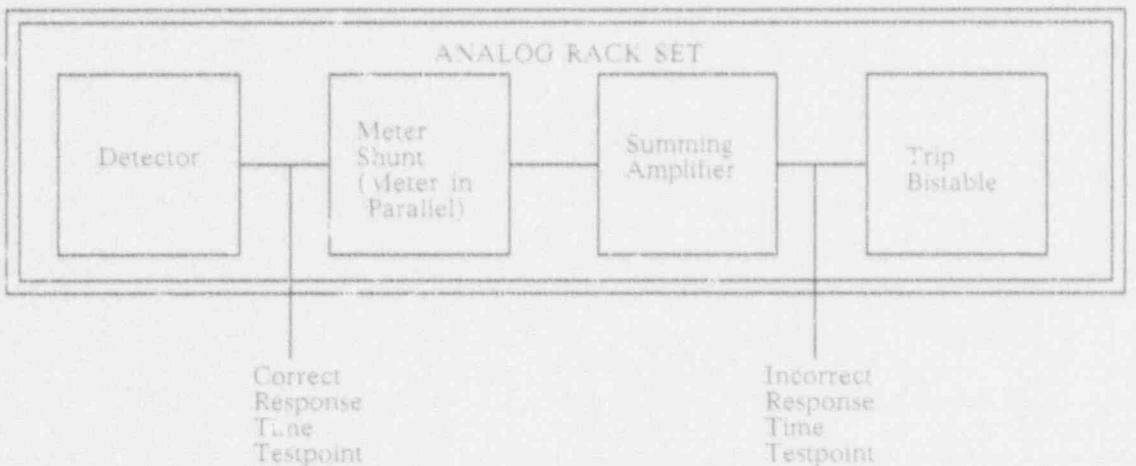
While investigating this event, it was found that the power range response time test did not encompass the entire power range circuit. Technical Specification 3.3.1 states that for the Power Range, Neutron Flux, the Response Time should be less than or equal to 0.5 seconds as measured from the detector output or the input of the first electronic component in the channel.

The Time Response Surveillance procedure incorrectly specified using the output of the summing and level amplifier as the test point location. The author of the Time Response Surveillances requested assistance from the Nuclear Instrumentation System (NIS) expert to identify the test method and test point location. The system expert knew nothing about Response Time Testing requirements and, therefore, provided the surveillance author with the Reactor Power test point. This test point is commonly used throughout the NIS surveillances that do not require a specific test point location since it is the first place to read Reactor Power. The procedure review process did not discover this error.

Response time testing incorporates the components shown in the following block diagram:




The component that was not fully incorporated in the Time Response testing was the Analog Rack Set. The Analog Rack Set incorporates the subcomponents shown in the following block diagram:




While investigating this event, it was also discovered that none of the Power Range Drawers were Time Response tested during the retest phase upon completion of the previously discussed Digital Meter installation Plant Design Change (PDCR). Further review of the PDCR revealed that a set of Power Range Drawers were removed from the warehouse, upgraded as per the PDCR, and installed in the NIS without being time response tested.

No immediate corrective actions were required since the plant was shutdown.

II. Cause of Event

The root cause of the incorrect performance of the power range analog channel operational test is improper work practices. Personnel did not correctly follow the procedure. For the surveillances performed on a monthly basis for the past 5 years, the test initiation time and the Decay Constant Peak time were essentially the same. When the digital readout meters were installed, the event initiation time and the decay curve peak values had an offset. The procedure did not address the different times. Technicians incorrectly interpreted the start point for measuring the decay time and adjusted the channels with the wrong value.

The root cause of the incorrect test point used to record the response time of the NIS power range event is technical error. The procedure did not use the first electronic component in the Power Range drawer as specified by Technical Specification. The review process did not discover this error.

The root cause of the NIS Power Range Drawers not Time Response tested after the digital meter modification event was written communications. The PDCR should have clearly defined all the procedures needed to satisfy Technical Specifications and the retest requirements. The Operational Testing section of the PDCR stated "Perform all surveillance testing to satisfy current Technical Specifications." Although tests were performed to verify the operability of the Power Range drawers and calibrated the drawers prior to placing them in service, the Time Response Surveillance was not performed because this testing is under the auspices of a separate I&C group. This separate group was not involved with the PDCR.

III. Analysis of Event

The incorrect performance of the power range analog channel operational test is reportable under 10CFR50.73(a)(2)(i) as a condition prohibited by a Technical Specification. Performance of the surveillance inadequately set the time constant of the neutron flux power range high rate trip. The design change to install digital readout meters resulted in a delay of the decay curve peak value by 0.2 seconds. The use of the initiation time instead of the peak time resulted in a non-conservative time constant setting of less than the Trip Setpoint. Technical Specifications directs adjusting the value to the trip setpoint if found in the allowable range. This maintains the setpoint drift within that considered in the safety analysis. Analysis of both the as found and the as left data showed the setpoint was within the Allowable Limit. The setpoints were always within the values credited in the safety analysis. Safety functions were maintained at all times.

Additionally, the Power Range Positive Rate trip provides protection against uncontrolled rod cluster control assembly bank withdrawal from a subcritical or low power startup condition. Specifically, this trip complements the Power Range Neutron Flux High and Low trips to ensure that the criteria are met for this particular uncontrolled withdrawal. The Power Range Neutron Flux High and Low trips were fully functional during the period the rate trips were improperly calibrated.

The incorrect test point used to record the response time of the NIS power range event is also reportable under 10CFR50.73(a)(2)(i) as a condition prohibited by Technical Specifications. Performance of this surveillance used the incorrect test point for response time testing. Review of Response Time test with an allowance for the components not included in the response time shows all Acceptance Criteria were met.

The NIS Power Range Drawers not Time Response tested after the digital meter modification event is also reportable under 10CFR50.73(a)(2)(i) as a condition prohibited by Technical Specifications. This surveillance was performed on one of the NIS Power Range Drawers as a normally scheduled surveillance. Response Time Testing was not performed on the other three drawers after the component change out. Upon discovery of this event, all NIS Power Range Drawers were Response Time Tested and analysis determined that all the Response Times were within the Technical Specifications requirements since the last performance of the Time Response Surveillance for each channel.

IV. Corrective Action

Power range channels have been calibrated so their decay time is within the Trip Setpoint. All personnel that are qualified to perform the applicable surveillance procedures have been informed of the problems and instructed how to perform the surveillances correctly. The I&C Supervisors have been informed about the potential problems that may exist when performing calibrations or taking data using new equipment. The Millstone Units 1, 2, and 3 I&C Managers discussed this event, its root cause and corrective actions. Although Units 1 and 2 do not have the negative and positive rate trips, potential problem that may exist when performing calibrations or taking data using new equipment was discussed. The power range analog operational tests for all the power range channels have been revised to include a more detailed description of the decay time calibration. The refuel surveillance for all the power range channels will be revised prior to the next scheduled calibration to include a more detailed description of the decay time calibration.

Additionally, the NIS Time Response Surveillances have been revised to measure the time response starting at the input to the first electronic component. The Response Time of each NIS Power Range Channel has been completed using the revised method and the old response time tests have been reviewed to verify that all Acceptance Criteria have been met. A full test to Westinghouse specifications of the functional circuit has been performed. I&C has developed a comprehensive review policy that designated what a reviewer looks for when performing a Technical Specification review, Final Safety Analysis Report review, Vendor procedure review, Overlap Testing review, and a Setpoint review. Also, an "Evaluation of Retest Requirements for PDCR Closeout" form has been developed by I&C.

V. Additional Information

The following LERs discuss events which are considered similar since the underlying concern is the issue of procedural compliance. LER 89-034 is considered a special case in that a Containment Depressurization Actuation occurred due to a cognitive failure while an operator was performing a step in the procedure which required the completion of three specific actions.

| LER Number | LER Title |
|---|---|
| 86-025 | Control Building Inlet Ventilation Radiation Monitor Inoperability |
| 86-033 | Violation of Technical Specification 3.3.3.9 |
| 86-044 | Bypassed Liquid Discharge Valve Without Double Valve Lineup Verification |
| 89-013 | "A" Train Loss of Power Signal Due to Personnel Error |
| 89-034 | Partial Containment Depressurization Actuation Signal Due to Operator Error |
| 90-015 | Feedwater Isolation When Opening Main Steam Isolation Valves Due to Incorrect Procedure Use |
| 90-017 | Loss of Both Trains of High Pressure Safety Injection Due to Personnel Error |
| 90-021 | Unlocked and Open Manual Containment Isolation Valve Due to Personnel Error |
| 91-007 | Incomplete Implementation of Technical Specification Action Statement Due to Procedural Noncompliance |
| 91-026 | Inadvertent Control Building Isolation Due to Procedural Non-Compliance |

As discussed in LER 91-026, the company's philosophy, as well as the importance of procedural compliance, has been stressed to all personnel. This event was identified as the result of the serious commitment plant personnel have towards implementation of the procedural compliance position.

The following LERs discussed events which are considered similar to inadequate or incorrect testing of equipment.

| | |
|---|---|
| LER 86-024-00 | P8 Protective Interlock Setpoint High |
| LER 86-057-00 | Incorrect Reactor System Flow Setpoints due to Administrative Error |

| LER Number | LER Title |
|---|---|
| LER 87-041-11 | Inadequate Testing of Containment Penetration Circuit Breakers |
| LER 88-010-00 | Improper Nuclear Instrument Calibration Due to Low Leakage Core |
| LER 89-018-01 | Inoperable Waste Neutralization Sump Effluent Radiation Monitor due to Personnel Error |
| LER 91-001-00 | Inadequate Surveillance Procedures for Radiation Detector Beta Scintillation Source Check |

None of the above root cause failures were due to an improperly selected calibration test point due to a technical error. In LER 86-024-00, the root cause was administrative. The bistable was not calibrated after finalization of protective interlock setpoints to conform with the final plant Technical Specifications. In LER 86-057-00, the root cause was administrative. Incorrect resistance temperature conversion charts were used to evaluate loop temperatures. In LER 87-041-11, the root cause was a failure to review initial circuit breaker test data against the finalized Technical Specification requirements. The breakers were installed prior to finalization of the final Technical Specifications. In LER 88-010-00, the root cause was personnel error not properly accounting for the effects of the plant modification for the low leakage reactor core. In LER 89-018-01 the root cause was personnel error due to engineering and administrative oversight while identifying the system requirements when upgrading the current system from a temporary to a permanent status. This process did not include installation of new equipment. In LER 91-001-00, the root cause was procedural inadequacy. A manufacturer recommended procedure was modified to perform the detector operability requirements of Technical Specifications. This manufacturer recommended procedure did not encompass the requirements of Technical Specifications.

The following LERs discussed events which are considered similar to inadequate implementation of Technical Specification requirements following a plant modification or design change.

| LER Number | LER Title |
|---|---|
| LER 88-010-00 | Improper Nuclear Instrument Calibration Due to Low Leakage Core |
| LER 88-018-00 | Incorrect Control Building Isolation Trip Setpoint |
| LER 89-006-00 | Missed Fire Detector Surveillance on Six Fire Detectors Due to Administrative Error |
| LER 89-029-00 | Missed Axial Flux Difference Technical Specification Surveillance Due to Procedural Inadequacy |

None of the above LERs was caused by the failure of a plant modification to delineate the specific test procedures required for implementation of the plant modification. LER 88-010-00 has already been discussed. In LER 88-018-00, the root cause was administrative error. The vendor installed default setpoints for the radiation monitors was not updated when the final Technical Specifications were finalized. When the monitors were deenergized for a software change and subsequently reenergized, the default vendor setpoints were reestablished. In LER 89-006-00, the root cause was administrative error. A plant modification that added 6 smoke detectors prior to finalization of plant Technical Specifications was not incorporated in the surveillance procedure. In LER 89-029-00, the root cause was procedural inadequacy. The software modification procedure did not specify adequate implementation or restoration guidelines.

EIIS Codes

Systems

Solid State Protection System - JC

Components

Rate Circuit - Special Control - XC