

NORTHEAST UTILITIES



The Connecticut Light and Power Company
Western Mass. Light and Electric Company
Holyoke Water Works Company
Northeast Utilities Service Company
Northeast Nuclear Energy Company

General Offices: Seiden Street, Berlin, Connecticut

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Re: 10CFR50.73

April 1, 1992

MP-92-346

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 92-006-00

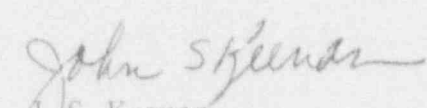
Gentlemen:

This letter forwards Licensee Event Report 92-006-00 required to be submitted within thirty (30) days 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: 
J. S. Keenan
Millstone Unit 2 Director

SES/AE:dlr

Attachment: LER 92-006-00

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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LICENSEE EVENT REPORT (LER)

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-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 1 OF 0 4 PAGE (3) 1

TITLE (4) Intermediate Range Power Above Permissive (P6) Bistable Incorrect Calibration due to Technical Error

| 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 | | | | | | | | | | | | | | | | |
| 1 | 0 | 3 | 1 | 8 | 5 | 9 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 4 | 0 | 1 | 2 | 0 | 5 | 0 | 0 | 0 | 0 | 1 | 1 |

| OPERATING MODE (9) | | THIS REPORT IS BEING SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11) | | | | | | | | | | | | | | | |
|--------------------|---|---|--|------------------|--|---------------------|--|--|--|--|--|--|--|--|--|--|--|
| 1 | 1 | 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) | | | | | | | | | |
| 11010 | | 20.405(a)(1)(ii) | | 50.36(c)(2) | | 50.73(a)(2)(vi) | | OTHER (Specify in Abstract below and in Text, NRC Form 308A) | | | | | | | | | |
| | | 20.405(a)(1)(iii) | | 50.73(a)(2)(ii) | | 50.73(a)(2)(vii)(A) | | | | | | | | | | | |
| | | 20.405(a)(1)(iv) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(vii)(B) | | | | | | | | | | | |
| | | 20.405(a)(1)(v) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(ix) | | | | | | | | | | | |

LICENSEE CONTACT FOR THIS LER (12)

NAME A. L. Elms, Senior Engineering Technician, Ext. 5288 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 NRC | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC |
|-------|--------|-----------|--------------|-------------------|-------|--------|-----------|--------------|-------------------|
| | | | | | | | | | |
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SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) X NO EXPECTED SUBMISSION DATE (15) MONTH DAY YEAR

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

On March 6, 1992, at 1524, while in Mode 1 with reactor power at 100% and the Reactor Coolant System operating at 387 degrees and 2250 psia, Instrument and Control Technicians performing a biennial procedure review discovered that the Intermediate Range Power Above Permissive (P6) bistable was calibrated lower than the Trip Setpoint specified by Technical Specifications. The bistable was calibrated within the Technical Specification Allowable Value. The bistable had been incorrectly calibrated since October 31, 1985. Operations personnel immediately determined that the permissive annunciator window was lit as required for the operating mode at the time. No further immediate Operator actions were required. Neither the P6 permissive nor the source range power reactor trip is credited in the Safety Analysis. Therefore, safety functions were maintained at all times.

The root cause of this event is procedural deficiency due to a technical error. The intermediate range drawer span was incorrectly determined as part of the calculation for the P6 bistable calibration. All other intermediate range setpoints were correctly calibrated. The calculation and procedure that calibrated P6 was corrected and the P6 permissive was calibrated within the Trip Setpoint.

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 (n-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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|---------------------------------|-------------------|----------------|-------------------|-----------------|----------|--------|
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| Millstone Nuclear Power Station | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | |
| Unit 3 | | | | | | |
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TEXT (If more space is required, use additional NRC Form 366A-s) (17)

1. Description of Event

On March 6, 1992, at 1524, while in Mode 1 with reactor power at 100% and the Reactor Coolant System operating at 587 degrees and 2250 psia, Instrument and Control Technicians performing a biennial procedure review discovered that the Intermediate Range Power Above Permissive (P6) bistable was calibrated lower than the Trip Setpoint specified by Technical Specifications. The bistable was calibrated within the Technical Specification Allowable Value. The bistable had been incorrectly calibrated since October 31, 1985.

The overpower protection provided by the out of core nuclear instrumentation consists of three discrete, but overlapping ranges. Continuation of startup operation or power increase requires a permissive signal from the higher range instrumentation channels before the lower range level trips can be manually blocked by the operator. One of two intermediate range permissive signals (P-6) is required prior to source range trip blocking and detector high voltage cutoff. Source range, trips are automatically reactivated and high voltage restored when both intermediate range channels are below the permissive (P-6) setpoint.

The output signal of the log current amplifier is used to calibrate the intermediate range (IR) level meter and to set the P6 permissive. The IR detector current signal input is converted to a voltage through the log current amplifier. This voltage is approximately linear to the log of the current signal. The log current amplifier injects an idling current of 1×10^{-11} amps so that, when there is no detector signal, the output of the log current amplifier is a voltage equivalent to 1×10^{-11} amps. Therefore, the meter indicates 1×10^{-11} amps when the input to the log current amplifier is 0 amps. Any detector signal is added to this idling current to produce a summed voltage output. Therefore, with a detector signal equal to 1×10^{-11} amps, the output of the log current amplifier is 2×10^{-11} amps. Consequently, the P6 bistable, the intermediate range meter, and the test point connection at the output of the log current amplifier see a signal that is a combination of the detector current signal and the idling current.

The equation to correlate the log current amplifier voltage output to the amplifier's input current is:

$$E_{out} = 8.75 + 1.25 \log_{10} \frac{I_{in} + I_{id}}{I_{ref}} \quad (1)$$

where: I_{in} = the log current amplifier input, that is, the detector signal;

I_{id} = the idling current internally introduced by the log current amplifier (1×10^{-11} amps);

I_{ref} = the reference current internally introduced by the log current amplifier (1×10^{-4} amps).

Therefore, the output of the log current amplifier should be corrected for I_{id} .

During the biennial review of the Intermediate Range Channel Calibration procedure (SP 3441A02), Instrument and Control Technicians found that the supporting calculation for the P6 permissive setpoint did not include the idling current (I_{id}). The exclusion of I_{id} from the calculation incorrectly resulted in a strictly log-linear correlation that was used to determine the P6 setpoint.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Estimated burden per response to comply with this information collection request: 80.3 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 (20-0104), Office of Management and Budget, Washington, DC 20503.

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

The equation to correlate the log current amplifier voltage output to the amplifier's input current was a strictly linear relationship between the input current and the output voltage. The incorrect equation used was:

$$E_{out} = (\log_{10} I_{in} + 11) \times 1.25 \quad (2)$$

where: I_{in} = the log current amplifier input, that is, the detector signal.

As such, the P6 permissive setpoint, as measured at the output of the log current amplifier, should be 1.302 volts (equation 1). P6 was calibrated, as measured at the output of the log current amplifier, to be equal to 1.25 volts (equation 2). This means that the setpoint should have been 1×10^{-10} amps (current equivalent to 1.302 volts) but was actually set at 9×10^{-11} amps (current equivalent to 1.250 volts). The actual setpoint was less than that of the Technical Specification Trip Setpoint (greater than or equal to 1×10^{-10} amps).

When the problem was discovered, Operations personnel determined that the permiss annunciator window was lit as required for the operating mode at the time. Instrument and Control Technicians recalculated and recalibrated the new P6 setpoint.

II. Cause of Event

The root cause of this event is procedural deficiency due to a technical error. A contributing factor to this event is inadequate verification of inputs to a technical calculation. The original P6 setpoint was established based on incorrect information and the review process at the time did not reveal the problem.

III. Analysis of Event

This event is reportable under 10CFR50.73(a)(2)(i), as a condition prohibited by the plant's Technical Specifications. Performance of the surveillance incorrectly adjusted the Trip Setpoint of the P6 bistable. The P6 bistable was adjusted within the Allowable Value, and investigation revealed that the bistable setpoint never drifted to a value less conservative than the Allowable Value. The P6 bistable provides for sufficient overlap between the source and intermediate range channels during a reactor startup. The current reactor startup procedure contains a NOTE to observe one decade of overlap between the source and intermediate range level indication, along with observing consistent startup rate indication between the source and intermediate ranges of the nuclear instrumentation prior to transferring recorder signals to the intermediate range detectors and prior to blocking the source range high flux reactor trip. The minor difference would have no effect on an operator's ability to control reactivity and would not increase the challenge to the power range high reactor trip setpoints. Based on these factors, the incorrect calibration of the P6 bistable did not result in any significant safety consequence.

IV. Corrective Action

The P6 bistable was recalibrated to a value more conservative than the Technical Specifications Trip Setpoint. The calculation and procedure that calibrated P6 was corrected. The biennial review process revealed this error as is one of the review process's functions. Discovery of this event is the result of personnel diligence towards the company's procedural compliance position. Therefore, the biennial review process functioned as designed and no further action on the part of the biennial review process is necessary. The nuclear instrumentation system components were reviewed for similar unaccounted internal adjustments to the indicated signal and none were found. All the other Intermediate Range detector setpoint calculations were reviewed and all the equations for the calculations were correct. This problem was discussed between the Millstone Units 1, 2 and 3, and Connecticut Yankee I&C Managers.

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 NR Form 366A-a) (17)

V. Additional Information

The following LERs discuss events which are similar to procedural deficiencies and inadequate verification of setpoints.

LER 86-024-00 P8 Protective Interlock Setpoint High

LER 87-042-01 Missed Intermediate Range/Power Range Surveillance Due to Procedural Inadequacy

LER 88-010-00 Improper Nuclear Instrument Calibration Due to Low Leakage Core

LER 88-018-00 Incorrect Control Building Isolation Trip Setpoint

LER 89-021-00 Miscalculation of Engineered Safety Features Response Time Due to Procedural Inadequacy

LER 90-012-00 Non-Conservative Blowdown Radiation Monitor Setpoint Due to Administrative Deficiency

None of the above root cause failures were due to incorrect determination of a protective setpoint due to incorrect information incorporated into a setpoint calculation. In LER 86-024-00, the root cause was administrative. The bistable was not calibrated after finalization of protective interlock setpoints to conform with plant Technical Specifications. In LER 87-042-01, the root cause was inadequate administrative review of the Surveillance Procedures written to implement the required Technical Specification. In LER 88-010-00, the root cause was personnel error. The effects of the plant modification were not properly accounted. In LER 88-018-00, the root cause was administrative error. The vendor installed default setpoints for the radiation monitors were not updated when the final Technical Specifications were finalized. In LER 89-021-00, the root cause was procedural inadequacy. Slave relay response times were not included in the overall series of ESF time response procedures. In LER 90-012-00, the root cause was administrative deficiency in that two conflicting high radiation alarm setpoints were provided by different references. In LER 91-028-01, the root causes were improper work practices, technical error and written communications. In the first event, personnel did not correctly follow the procedure for performing the power range analog channel operational test. In the second event, the technical error comprised improper selection of the response time test point. In the third event, the plant modification did not adequately detail all the procedures needed to satisfy Technical Specifications after installation of the component.

VI. EHS CodesSystems

Incore/Excore Monitoring System - IG

Components

P6 Permissive Bistable - Special Control - XC