

James A. FitzPatrick
Nuclear Power Plant
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New York Power
Authority

Harry P. Salmon, Jr.
Resident Manager

April 21, 1993
JAEP-93-0235

United States Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

SUBJECT: DOCKET NO. 50-333
LICENSEE EVENT REPORT: 93-007-00 - Average Power Range
Monitor Thermal Trip Unit
Testing Incomplete Due to
Procedural Deficiency

Dear Sir:

This report is submitted in accordance with 10CFR50.73(a)(2)(v).

Questions concerning this report may be addressed to
Mr. Donald Simpson at (315) 349-6361.

Very truly yours,



HARRY P. SALMON, JR.

HPS:tld
Enclosure

cc: USNRC, Region 1
USNRC Resident Inspector
INPO Records Center

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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 (PB30), 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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DOCKET NUMBER (2)

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TITLE (4) Average Power Range Monitor Thermal Trip Unit Testing Incomplete
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 | DOCKET NUMBER(S) |
| 03 | 22 | 93 | | 007 | 000 | 04 | 21 | 93 | | 050000 |
| THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11) | | | | | | | | | | |
| OPERATING MODE (8) | | N | | 20.402(b) | | 20.405(c) | | 50.731(a)(2)(iv) | | 73.71(b) |
| POWER LEVEL (10) | | 0.08 | | 20.405(a)(1)(ii) | | 50.36(c)(1) | | 50.731(a)(2)(v) | | 73.71(c) |
| | | | | 20.405(a)(1)(iii) | | 50.36(c)(2) | | 50.731(a)(2)(vi) | | OTHER (Specify in Abstract below and in Text, NRC Form 366A) |
| | | | | 20.405(a)(1)(iii) | | 50.731(a)(2)(ii) | | 50.731(a)(2)(vii)(A) | | |
| | | | | 20.405(a)(1)(iv) | | 50.731(a)(2)(ii) | | 50.731(a)(2)(vii)(B) | | |
| | | | | 20.405(a)(1)(iv) | | 50.731(a)(2)(iii) | | 50.731(a)(2)(ix) | | |

LICENSEE CONTACT FOR THIS LER (12)

NAME

Donald F. Simpson, Senior Licensing Engineer

TELEPHONE NUMBER

AREA CODE

3 153 491-6361

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)

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

☐ YES (If yes, complete EXPECTED SUBMISSION DATE)☒ NO

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

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On 3/22/93, during a review of surveillance testing, it was determined that the thermal power trip function of the Average Power Range Monitor (APRM) [IG] was not being tested to completion because testing was performed with the instrument channel input to the Reactor Protection System (RPS) [JC] bypassed which blocked the initiation of a scram signal. The plant was in the startup/hot standby mode of operation at approximately 8 percent power. Although no surveillance requirement identified in the Technical Specification was missed or violated, this event is considered reportable under the broad definition of operable which requires that systems, structures or components be shown to be capable of performing all of the intended safety functions (10CFR50.73). Procedure changes were made and testing completed prior to changing reactor mode of operation. Other neutron monitoring surveillance tests were reviewed to verify that the deficiency was an isolated event. The event was not safety significant because the Final Safety Analysis Report considered an APRM channel trip to be initiated from either the non-flow referenced neutron flux trip unit or the thermal power trip unit. The trip function of the non-flow referenced APRM trip units had been routinely tested and were operable. LER-89-008, 90-007, 90-015 and 92-032 described similar events.

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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's) (17)

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Description

On March 22, 1993, the plant had shifted the reactor mode switch to run at 0323 hours in preparation for increasing power during conduct of a plant startup. Reactor power was approximately 8 percent. At 0817 hours the reactor mode switch was returned to startup/hot standby upon finding Average Power Range Monitor (APRM) [IG] trip setpoints outside of procedural tolerances as stated in Surveillance Test 5B. A review of other APRM Surveillance Test Procedures was initiated. As a result of the procedure review, it was determined that the Average Power Range Monitor (APRM) [IG] flow referenced thermal power trip function did not test through the circuit and was declared inoperable due to incomplete surveillance (calibration and functional testing). This trip function was not required while in the startup mode of operation, but was required to be operable in the run mode.

The surveillance review indicated that the APRM flow referenced upscale thermal power trip function was not verified to actually result in an APRM scram signal to the Reactor Protection System (RPS) [JC] logic because the testing was done with the APRM instrument channel bypassed. The surveillance procedure deficiency had existed for approximately 15 years since the APRM thermal power trip monitor was installed under plant modification 78-023 in November, 1978.

Plant staff were directed to revise surveillance procedures ISP-20A and ISP-20B to include initiation of a Reactor Protection System scram signal for each APRM thermal power trip function. The procedure revisions and testing were satisfactorily completed as required by Technical Specification Table 3.1-1 prior to shifting the reactor mode of operation back to run and increasing reactor power.

Cause

The event was caused by a procedure deficiency stemming from failure to initiate a change to plant surveillance procedures following modification to the APRM system (Cause Code D). The Technical Specification Table 4.1-1 (Reactor Protection System (SCRAM) instrument functional test) entry for the APRM thermal power trip function requires calibration of the flow bias signal. The surveillance procedures, although in compliance with Technical Specification Table 4.1-1, perform the testing with the instrument channel under test in the bypassed condition which inhibits verification of the trip function. The surveillance procedures did not satisfy functional testing requirements necessary to declare the APRM thermal power trip function operable.

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Analysis

The APRM thermal power trip monitor was installed under modification 78-023 approximately 15 years ago. No specific changes to Technical Specifications were made to reflect the modification because the transient and accident analysis described in the Final Safety Analysis Report does not take credit for this trip function in the mitigation of any specific transient or accident. The Technical Specification Table 4.1-1 entry for the APRM flow biased trip states "calibrate flow bias signal" monthly. Surveillance procedures for this requirement were written to calibrate the APRM thermal power trip monitor with the channel being testing in the bypassed condition in order to prevent spurious trips during testing. The surveillance requirement for the APRM thermal power trip monitor should have been revised to require functional testing consistent with the Technical Specification Section 4.0.D requirement for operability.

Since no surveillance procedure demonstrated that the APRM thermal power trip (scram) function would cause an actual trip, the APRM thermal trip function could not be considered operable and the event was determined to be reportable under 10CFR 50.73(a)(2)(v) since this procedural inadequacy had existed through several operating cycles.

The APRM flux scram trip consists of a flow referenced thermal power scram setpoint and a fixed high neutron flux scram setpoint. The flow referenced neutron flux signal is passed through an electronic network with a time constant which is representative of the fuel thermal time constant. This provides a flow referenced signal that approximates the average heat flux that is developed in the core during transient or steady state conditions. This avoids scrams as a result of short duration thermal power transients that are shorter than the time constant of the thermal power time constant and are also less than the fixed high neutron flux setpoint.

The setting of the flow referenced trip setpoint, which is less than the fixed high neutron flux setpoint, will result in an earlier scram during slow transients. The lower flow referenced scram setpoint decreases the severity of the transient resulting from the scram.

The APRM fixed high neutron flux signal does not incorporate the time constant, but responds directly to instantaneous neutron flux. This function scrams the reactor during fast power increases and also serves to scram the reactor during a slow power increase if credit is not taken for the flow referenced scram.

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The Final Safety Analysis Report describes the APRM trip function as being initiated from either the non-flow referenced neutron flux trip unit or the flow referenced thermal power trip unit. The flow referenced thermal power trip function assists in the avoidance of spurious high flux scrams through the use of neutron flux signal conditioning which more closely approximates the fuel thermal performance.

Corrective Actions

1. Surveillance test procedures ISP-20A and ISP-20B were revised to functionally test the APRM flow referenced thermal trip unit including initiation of the RPS scram signal.
2. The revised surveillance procedures were completed satisfactorily prior to increasing reactor power and transitioning to the run mode of operation.
3. Other neutron monitoring (APRM and Intermediate Range Monitor (IRM) surveillance requirements and related tests were reviewed to determine/verify that the APRM surveillance test procedure discrepancy was an isolated case.

Additional Information

Failed Components: None

Previous Similar Events: LER-89-008, 90-007, 90-015 and 92-032 describe similar events in which procedure deficiencies resulted in incomplete surveillance testing.