

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report No. 88-21
Docket No. 50-410
License No. NPF-69
Licensee: Niagara Mohawk Power Corporation
301 Plainfield Road
Syracuse, New York 13212
Facility: Nine Mile Point, Unit 2
Location: Scriba, New York
Dates: December 3, 1988 to December 21, 1988
Inspectors: W.A. Cook, Senior Resident Inspector
R.A. Laura, Resident Inspector
Approved by: Jon R. Johnson
J.R. Johnson, Chief, Reactor
Projects Section 2C, DRP

1/4/89
Date

INSPECTION SUMMARY

Areas Inspected: Special inspection by resident inspectors to review the events leading to Division 1 ADS being identified as inoperable since initial fuel load on November 2, 1986. This inspection involved 32 hours by the inspectors.

Results: The licensee had several opportunities to identify and correct the logic circuit wiring error causing Division I ADS inoperability, but failed to adequately investigate and resolve the surveillance test results. An apparent violation of Technical Specification 3.3.3 is discussed in Sections 2 and 3. An apparent violation of 10 CFR 50, Appendix B, Criterion XVI is discussed in Section 3.

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DETAILS

1. Purpose

The purpose of this special safety inspection was to review the circumstances leading to Division 1 Automatic Depressurization System (ADS) being inoperable since initial fuel load (November 2, 1986).

2. Event Followup (93702, 61726)

a. Background and Identification

On December 3, with the reactor in Cold Shutdown and the A Residual Heat Removal System (RHS) in Shutdown Cooling Mode of operation, I&C technicians performed procedure N2-ISP-ISC-M004 (Monthly Functional Test And Trip Calibration Of ECCS Actuation On Reactor Vessel Level One). While performing step 7.4 of the test, a Reactor Level One (LO LO LO) trip was dialed in and the technicians noticed while testing ADS Channel E, that an ADS initiation seal-in signal was not activated as evident by the unlit white indicating light on the control panel. Investigation by the technicians and the Station Shift Supervisor (SSS) also found that when the ADS inhibit switch was taken to the ON position, the ADS inhibit light did not illuminate; however, the annunciator did activate.

Further investigation by the licensee found that relay K70A (RHS A pump running permissive relay) failed to pick up causing the absence of an ADS initiation signal. The ADS inhibit circuit is supposed to be independent of the trip and permissive circuits. However, when the low water level signal was removed, the ADS inhibit light came on. These symptoms led the licensee to originally suspect that a potential wiring defect existed in the ADS Division I Channel E circuitry. An emergency Work Request (WR 148460) was generated to troubleshoot the potential wiring problem. The inspector noted that the SSS and I&C technicians possessed a questioning attitude in identifying the potential for wiring defects and this is considered to be a positive attribute. The licensee initiated a 50.73 reporting to the NRC.

During troubleshooting the licensee found a wiring error on relay B22C-K3E. Two leads were supposed to be landed on terminal M1; however, M1 only had one lead landed and terminal R1 (which should have been empty) had one lead landed. This was found when the as-built wiring scheme was compared to the relay termination drawing. The licensee speculates that the miswiring was a result of personnel error. The termination screws for the relay coil and auxiliary contacts are closely aligned at the relay base. The termination screw for M1 is adjacent to R1 and because the termination numbers are unreadable without a magnifying tool, the initial termination of the wire from the fuse to M1 may have been mistakenly landed on R1. The licensee commenced an evaluation on how the wiring error affected the ADS operability.



On December 8, it was determined by the licensee that all channels of Division I ADS were rendered inoperable since initial fuel loading on November 2, 1986. An ENS call was made to the NRC reporting the inoperability of Division I ADS due to the wiring error. This miswiring would have prevented the manual or automatic initiation function of Division I ADS, however the applicable Safety Relief Valves (SRVs) still could have been individually manually operated from the control room. The Division II ADS Trip System was not affected by the wiring error.

b. Testing

The inspector reviewed the licensee's methodology of testing the Division I ADS trip system circuitry during the Preoperational Testing Phase (final testing prior to initial fuel loading). The licensee used Procedure N2-POT-34 to test the circuit, and had it been performed as originally written the wiring error may have been detected. By the original procedure, the "boiler" level detectors were to be varied locally at the detector through the use of an externally applied test rig. This method of testing would have been the most conservative approach. The procedure was revised to trigger the Level I signal by installing a General Electric test switch in the circuit rather than direct stimulation locally at the detector. The test switch was installed in a less conservative manner than the previously intended method. The K3E relay is considered to be the boundary between the reactor level and ADS circuits. The licensee is reviewing other similar preoperational tests for a similar misapplication of the test switch where portions of a circuit may not be tested.

Surveillance procedure N2-ISP-ISC-R104 is performed on a refueling outage periodicity to verify the proper function of the entire ADS trip logic. This procedure was performed on July 16, 1986, May 6, 1988, and May 11, 1988. Each time this procedure was performed, step 7.8.3 identified a test anomaly associated with the wiring error. However, this anomaly was not properly resolved by the licensee. The inspectors determined that the technicians involved notified their first line supervisors of the surveillance test problem and annotated the problem in the test procedure.

On July 16, 1986 the licensee decided that further testing and investigation was not necessary to resolve the anomaly because the monthly surveillance test would verify this logic function. (This was an incorrect assumption by the reviewers.) On May 5, 1988 the performance of step 7.8.3 was "N/A'd" and deferred for further technical resolution. The procedure was reperformed on May 11 after the testing anomaly was addressed by a Temporary Change Notice (TCN) to the procedure to verify proper logic function via a different test method. This TCN unknowingly changed the intent of the surveillance test procedure. The inspector determined that this TCN was reviewed and approved by the Site Operations Review Committee.



3. Inspector Findings (93702, 61726)

- a. Operation of the unit in Modes 1,2 and 3 with Division I ADS inoperable is an apparent violation of Technical Specification 3.3.3. (50-410/88-21-01) The inspector noted that the licensee had two opportunities to properly identify the logic circuit wiring deficiency, but did not adequately pursue technical resolution of the problem. (A summary of the surveillance testing chronology is provided in Attachment 1.) Failure to take timely and appropriate corrective action to correct an identified condition adverse to quality is an apparent violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action". (50-410/88-21-02)
- b. A meeting was conducted with the licensee station management on December 20 to summarize the findings and concerns and the licensee stated the following issues will be evaluated as part of their corrective action:
 1. Investigate why the installation and preliminary testing did not identify the wiring error.
 2. Evaluate why the pre-operational test procedure did not adequately test this portion of the ADS logic function.
 3. Review of technical errors made in the review and analysis of surveillance test data including all last performed surveillance tests that contain Logic System Functional Tests (LSFTs).
 4. Establish policies and revise test procedures to include acceptance criteria specific to varying plant conditions.
 5. For interim corrective action, all surveillance test results containing LSFT will be reviewed by an independent member of the Technical Department Staff.

4. Persons Contacted

Dave Flood, Technical Department Staff
Rick Abbott, Unit 2 Superintendant
Jim Willis, General Superintendent Nuclear Generation
George Moyer, Station Shift Supervisor, Unit 2
Mike Falise, Site Superintendent Maintenance
Bob Smith, Operations Superintendent, Unit 2

5. Exit Meeting (30703)

At the conclusion of the inspection on December 21, 1988, a meeting was held with station management to discuss the scope and findings of this inspection.



Based on the NRC Region 1 review of this report and discussions held with licensee representatives, it was determined that this report does not contain Safeguards or 10 CFR 2.790 information.



ATTACHMENT 1

ADS WIRING PROBLEM CHRONOLOGY SUMMARY

A monthly surveillance test is performed regularly, which is in addition to the tests listed below. The monthly test is not intended to test the subject ADS circuitry.

Early 1986	Preliminary Testing, Control Circuit Verification
May 1986	Preoperational Testing
July 1986	Surveillance Test (performed on refuel outage periodicity)
May 6, 1988	Surveillance Test
May 11, 1988	Surveillance Test (performance ADS portion only)
December 3, 1988	Initial identification during Monthly Surveillance and a 50.73 Report was initiated. The licensee located and corrected the wiring error and began an investigation to determine the effects of the wiring error.
December 8, 1988	Determined the wiring error caused Division 1 ADS to be inoperable since initial fuel load. A four hour 50.72 notification was made to the NRC.

