

NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY
THE HARTFORD ELECTRIC LIGHT COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
MASSACHUSETTS WATER POWER COMPANY
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Mr. Richard C. DeYoung, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

July 15, 1983

MP-5244

Reference: Facility Operating License No. DPR-65, Docket No. 50-336

Dear Mr. DeYoung:

This letter forwards the Special Report required to be submitted within ninety days pursuant to Millstone Unit 2 Appendix A Technical Specifications, Section 6.9.2.e and 3.5.2.b, ECCS Actuation.

Plant Conditions Prior to the Event:

On April 21, 1983 at 1340 hours, Unit 2 was operating at 67% power, with 2 charging pumps operating and an 80 gallon per minute continuous dilution in progress. Earlier in the day, a dropped CEA caused a reduction of power to less than 70%. Xenon had not yet peaked, therefore it was still adding strong negative reactivity. An Instrumentation and Controls (I&C) technician had obtained permission to perform surveillance procedure SP 2403J Manual Test Insertion (MTI) surveillance on the Engineered Safeguards Actuation System (ESAS).

Event Description

The I&C technician had satisfactorily completed the preliminary tests of the MTI equipment and had begun to connect the box to the ESAS cabinets. He had connected the common and Vo leads to the Channel A Containment Pressure bistable and the common lead to the Channel C Containment Pressure bistable. As the Vo lead was connected, all of the actuation module lights came on. He immediately removed the lead and all lights went out, without having to push any reset buttons. The Containment Pressure bistable had not energized. At the instant the actuation modules energized, both facility I and II SIAS equipment energized. The operators immediately observed Pressurizer and Containment pressures and found them to be normal. The Shift Supervisor verified with the technician that it had been an inadvertent initiation as a result of the testing. The Control Operator (CO) secured the Boric Acid pumps and shut the Boric Acid Storage Tank gravity feed valves. The charging pump suction was restored to the Volume Control Tank (VCT). The Supervising Control Operator (SCO) reduced turbine load to match reactor power. The sudden reduction of reactor power from the boration prior to the turbine load reduction resulted in a slight cooldown (approx. 2°F on Tc) and a resultant RCS pressure drop of approximately 20 PSI. The CO and SCO immediately began restoration of equipment to normal operating condition. Operating Procedure 2394, Inadvertent ECCS Initiation, was obtained and equipment verified to be restored.

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Analysis of Event:

During the performance of OP 2394, it was discovered that all pumps and fans responded to the SIAS signal, throttle valves were found to be in a throttled position and some valves and dampers had not changed position. The initial determination of the event therefore, was that a random actuation of SIAS Actuation Modules had occurred since not all equipment responded. Subsequent investigation revealed that all valves which were found not to be in their accident position were air operated valves and the actuation modules associated with those valves had in fact fired since other equipment had gone to their accident position. Motor operated valves had gone to their accident position.

A test was performed on certain valves which were known to not have responded to the SIAS signal. When their associated actuation module energized, all valves responded and remained in their required position/mode until reset by the operator. Further checking of air operated valves showed that if the valve does not go full travel before the signal is removed the valve will return to its original position. Since the SIAS signal was immediately removed, all air operated valves were discovered in their original position. This also explains the "as found" position of the ventilation dampers.

A theory which could explain why the actuation occurred is that when the test gear was connected to the Containment Pressure bistable, it could have loaded or somehow reduced the 15 volt logic power supply such that the actuation modules associated with Containment Pressure/SIAS signal fired. As soon as the probe was removed, the actuation modules reset since they were not "locked-in" through the logic circuitry. The reason for the "crowbar circuit" is to short the 24 volt actuation module power supply if a voltage dip on the 15 volt logic power supply is sensed. The crowbar prevents random firing of the actuation modules. In this case the test probe was connected downstream of the voltage sensing device, therefore the crowbar protection was not available.

The intention of the MTI is to test the various logic combinations for actuation module response. This signal is of such a short duration (less than 2 milliseconds) that equipment actuation does not occur. In this event, the probe insertion was sufficient to result in equipment actuation.

A complete check was performed on the MTI test equipment and no inconsistencies or abnormalities were found. A check of the test circuit diagram also revealed no reason or means of causing the actuation. It should be noted that as a precautionary measure, the MTI box is always powered through an isolation transformer. This should have prevented the grounding/loading of the 15 volt supply as described above.

Consequences of Event:

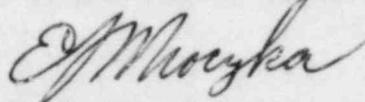
There were no consequences effecting plant operation as a result of the initiation other than a slight increase in RCS boron concentration (approximately 15 PPM) with its resultant power decrease of 7%. Since letdown flow had not isolated, the heating effect produced by the Regenerative Heat Exchanger was still present, therefore there was no thermal shock to the charging line nozzles or in the reactor coolant system in general.

Conclusions:

Though the exact cause of the inadvertent initiation is not known, all equipment responded as required. In the future, the MTI surveillance will be satisfied whenever possible by the Automatic Test Insertion (ATI) device which is in continuous operation and will verify proper ESAS operation. If the MTI is required to be performed, operators will be stationed to mitigate any potential problems or inadvertent actuation.

Yours truly,

NORTHEAST NUCLEAR ENERGY COMPANY



E. J. Mroczka
Station Superintendent
Millstone Nuclear Power Station

EJM/JGR:mno

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