SSINS No: 6835
IN 85-23

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

March 22, 1985

IE INFORMATION NOTICE NO. 85-23: INADEQUATE SURVEILLANCE AND POSTMAINTENANCE AND POSTMODIFICATION SYSTEM TESTING

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This information notice is to alert addressees of several instances pertaining to improper system modifications, inadequate postmodification system testing, and inadequate surveillance testing recently detected at the McGuire nuclear power facility.

It is expected that recipients will review the information contained in this notice for applicability to their facilities and consider actions, if appropriate, to preclude similar problems from occurring at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On November 1, 1984, Duke Power Company (DPC) informed the NRC that the four Rosemont differential pressure transmitters that control the closing of four isolation valves of the upper-head injection (UHI) system at McGuire Unit 1 were improperly installed (i.e., the impulse lines were reversed when the original Barton reverse-acting differential pressure switches were replaced with Rosemont direct-acting differential pressure transmitters during April of 1984). As a result, the UHI isolation valves failed to close during draining of the accumulator when the water level in the UHI accumulator reached the set point. In addition to the improper installation, the postmodification testing was limited to a dry calibration method that does not use the actual reference leg of the accumulator; therefore, the installation error was not detected by the postmodification test. Consequently, the plant was operated for approximately five months with the UHI isolation valves inoperable.

The McGuire UHI system design includes a separate nitrogen accumulator that supplies pressurized nitrogen to force the water from the UHI accumulator into the reactor vessel during the initial phase of a design-basis loss-of-coolant accident (LOCA). Thus, if a design-basis LOCA had occurred while the UHI isolation valves were inoperable, the UHI system would have been actuated; however, the UHI isolation valves would not have closed when the water in the

UHI accumulator had been depleted. As a result, nitrogen gas could have been injected into the reactor vessel during the course of a design-basis LOCA. Under such conditions, and using Appendix K assumptions, DPC's analysis indicated that the peak cladding temperature of 2200°F most likely would have been exceeded and that the worst-case increase in containment pressure could have resulted in exceeding the design pressure by 2 psi.

A related but separate event involved the establishing of the set points for closing the UHI isolation valves. On February 14, 1984, DPC approved the use of a dry calibration method, which would establish the trip set point for closing the UHI isolation valves relative to the bottom of the UHI water accumulator tank. However, a 24-inch nonconservative error in the trip set point occurred at McGuire Units 1 and 2 when the responsible instrument engineer misinterpreted the tank measurements made by instrument technicians. Because the dry calibration method does not use the actual process leg of the UHI accumulator, this error was left undetected at both units for several months. The calibration error was finally detected on November 2, 1984, while DPC personnel were taking "as-found" data in response to the previous error involving the incorrect installation of the differential pressure transmitters. The consequences of this event would be the early isolation of the UHI water accumulator during a design-basis LOCA, resulting in less water being delivered to the vessel than assumed in the analysis.

A completely unrelated event involved the inoperability of two of the four overpower delta temperature reactor protection channels at McGuire Unit 2. This defect was discovered on November 26, 1984, by a DPC engineer while performing a posttrip review of a reactor scram in which signals of the two affected channels responded contrary to that expected. This event was caused because an electrical jumper was not installed on two of the four overpower delta temperature input logic cards. The purpose of the jumper is to ensure that the overpower delta temperature system provides protection for decreasing temperature, as might be expected on a steam line break. DPC's surveillance tests only verified that protection would be provided for increasing temperature, but not for decreasing temperature. This defect was left undetected for an unknown period of time, but most likely it had existed since initial plant startup. Subsequent investigations revealed that in addition to inadequate testing, there was an absence of instructions and descriptions of the required jumpers.

The above examples illustrate the need for thorough reviews and detailed attention to plant surveillance and postmaintenance and postmodification tests, to ensure that they accomplish the required verification of system function.

No specific action or written response is required by this information notice; however, if you have any questions regarding this notice, please contact the Regional Administrator of the appropriate NRC regional office or the technical contact listed below.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contacts: I. Villalva, IE
(301) 492-9007

H. Dance, RII
(404) 221-5533

Attachment: List of Recently Issued IE Information Notices

Attachment 1
IN 85-23
March 22, 1985

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-22	Failure Of Limitorque Motor-Operated Valves Resulting From Incorrect Installation Of Pinon Gear	3/21/85	All power reactor facilities holding an OL or CP
85-21	Main Steam Isolation Valve Closure Logic	3/18/85	All PWR facilities holding an OL or CP
85-20	Motor-Operated Valve Failures Due To Hammering Effect	3/12/85	All power reactor facilities holding an OL or CP
85-19	Alleged Falsification Of Certifications And Alteration Of Markings On Piping, Valves And Fittings	3/11/85	All power reactor facilities holding an OL or CP
85-10 Sup. 1	Posstensioned Containment Tendon Anchor Head Failure	3/8/85	All power reactor facilities holding an OL or CP
84-18	Failures Of Undervoltage Output Circuit Boards In The Westinghouse-Designed Solid State Protection System	3/7/85	All Westinghouse PWR facilities holding an OL or CP
83-70 Sup. 1	Vibration-Induced Valve Failures	3/4/85	All power reactor facilities holding an OL or CP
85-17	Possible Sticking Of ASCO Solenoid Valves	3/1/85	All power reactor facilities holding an OL or CP
85-16	Time/Current Trip Curve Discrepancy Of ITE/Siemens-Allis Molded Case Circuit Breaker	2/27/85	All power reactor facilities holding an OL or CP
85-15	Nonconforming Structural Steel For Safety-Related Use	2/22/85	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit