

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

January 11, 1985

IE INFORMATION NOTICE NO. 85-02: IMPROPER INSTALLATION AND TESTING OF
DIFFERENTIAL PRESSURE TRANSMITTERS

Addressees:

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

Purpose:

This information notice provides notification of a potentially significant problem pertaining to the improper installation and inadequate functional testing of differential pressure transmitters. Such conditions occurred at the McGuire Nuclear Station, Unit 1, when the Barton differential pressure switches utilized to control the isolation valves of the upper head injection (UHI) system were replaced with Rosemont differential pressure transmitters. 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:

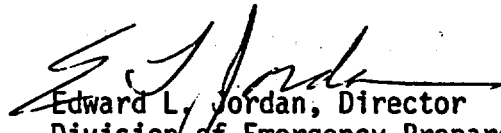
On November 1, 1984, Duke Power Company informed the NRC that the UHI isolation valves failed to close when the UHI water accumulator was drained at its McGuire Nuclear Station, Unit 1. At that time, the plant was shut down because the nitrogen content of the water in the UHI accumulator exceeded the limit permitted by its technical specifications. Subsequent investigations revealed that the four differential pressure transmitters used to sense the level of water in the UHI accumulator and initiate automatic closure of the isolation valves on a predetermined level had been improperly installed. As a result, the isolation valves did not automatically close when the water level in the UHI accumulator reached the set point.

The McGuire UHI system design includes a separate nitrogen accumulator that supplies pressurized nitrogen to force the water from the UHI water accumulator into the reactor vessel during the initial phase of a design-basis loss-of-coolant accident (LOCA). Thus, if the UHI isolation valves fail to close during the course of a design-basis LOCA, nitrogen could be injected into the reactor vessel. To prevent such an event, the differential pressure transmitters are designed to initiate automatic closure of the UHI isolation valves when the water in the UHI accumulator reaches a predetermined level.

During April of 1984, the McGuire Nuclear Station, Unit 1, Barton reverse-acting differential pressure switches were replaced with Rosemont direct-acting differential pressure transmitters to improve the accuracy and repeatability of the UHI water accumulator level sensing system. However, the Rosemont differential pressure transmitters were not properly installed in that the impulse lines were not connected to the appropriate transmitter ports. Several factors contributed to the improper installation, including inadequate installation instructions. The major contributor was inadequate functional testing of the UHI system after it had been modified in that the post-modification tests were limited to calibration tests of the differential pressure transmitters. These calibration tests were performed with the transmitters isolated from the impulse lines. Consequently, the tests only verified that the transmitters would provide the required output signal for a given differential pressure, but they did not demonstrate that the transmitters sensed the differential pressures associated with water level changes in the UHI water accumulator. Thus, the differential pressure transmitters were not only improperly installed, but the error was not detected until this event. If a design-basis LOCA had occurred during this period, the UHI system would have been actuated, but the UHI isolation valves would not have closed when the water in the UHI water accumulator had been depleted and nitrogen gas could have been injected into the reactor vessel during the course of the LOCA.

Similar installation errors have been addressed in IE Information Notice No. 84-45, "~~Reversed Differential Pressure Instrument Lines.~~" However, the majority of events described in that information notice occurred in boiling water reactors during plant construction and were detected by functional tests performed before commencing power operation. In contrast, the event described in this information notice occurred at a pressurized water reactor and was undetected during approximately 5 months of power operation.

No specific action or written response is required by this information notice; however, if you have any question 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 Contact: I. Villalva, IE
(301) 492-9007

F. R. McCoy, RII
(404) 221-2689

Attachment:
List of Recently Issued IE Information Notices

Attachment
IN 85-02
January 11, 1985

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-01	Continuous Supervision of Irradiators	1/10/85	All material licensees possessing irradiators that are not self-shielded and contain more than 10,000 curies of radioactive material
84-94	Reconcentration Of Radionuclides Involving Discharges Into Sanitary Sewage Systems Permitted Under 10 CFR 20.303	12/21/84	All NRC materials licensees other than licensees that use sealed sources only
84-93	Potential For Loss Of Water From The Refueling Cavity	12/17/84	All power reactor facilities holding an OL or CP
84-92	Cracking of Flywheel on Cummins Fire Pump Diesel Engines	12/17/84	All power reactor facilities holding an OL or CP
84-91	Quality Control Problem Of Meteorological Measurements Problems	12/10/84	All power reactor facilities holding an OL or CP
84-90	Main Steam Line Break Effect On Environmental Qualification Of Equipment	12/7/84	All pressurized water reactor and gas cooled power facilities holding an OL or CP
84-89	Stress Corrosion Cracking In Nonsensitized 316 Stainless Steel	12/7/84	All boiling water reactor facilities holding an OL or CP
84-88	Standby Gas Treatment System Problems	12/3/84	All boiling water reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit