SSINS No.: 6835
IN 85-75

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

August 30, 1985

IE INFORMATION NOTICE NO. 85-75: IMPROPERLY INSTALLED INSTRUMENTATION, INADEQUATE QUALITY CONTROL AND INADEQUATE POSTMODIFICATION 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 two recent instances of improper system modifications, inadequate quality control and inadequate post-modification testing following installation of environmentally qualified equipment. Recipients are expected to review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

LaSalle Unit 2

On June 10, 1985, at 11:30 a.m., the licensee informed the NRC Resident Inspector that for approximately 5 days LaSalle Unit 2 had been without the capability of automatic actuation of emergency core cooling (ECCS) and that for approximately 3 days during this period the plant had been without secondary containment integrity. The major cause of this condition was improper installation (the variable and reference legs were reversed) of the two reactor vessel level actuation switches which control Division I automatic depressurization system (ADS), low pressure core spray (LPCS), and reactor core isolation cooling (RCIC).

Unit 2 was shut down in February 1985 for an outage that included installation of environmentally qualified electrical equipment. LaSalle has three divisions of ECCS equipment. In March 1985, ECCS Division III was taken out of service for maintenance. On June 5, 1985, ECCS Division II was taken out of service for modifications. On June 3, 1985, secondary containment was declared inoperable for maintenance on the reactor building ventilation system. The result of these scheduled actions was that two of three ECCS divisions and secondary containment were inoperable, leaving ECCS Division I available for use. Subsequently, it was discovered that the variable and reference legs to the

reactor vessel level actuation switches for ECCS Division I had been accidentally reversed since June 3, 1985; thus leaving the plant with no ECCS automatic actuation and no secondary containment.

The cause of the piping reversal was initially the result of incorrect design drawings which were released to the contractor on April 1, 1985. The licensee's site personnel recognized the error on April 4, 1985, and issued a Field Change Request to correct it. However, the isometric drawings being used at the location of the modification activities were not corrected. Therefore, the contractor proceeded to connect piping in the reverse order from the correct configuration. Figure 1 shows the correct configuration and Figure 2 shows the reversal. This error was not identified by the Quality Control (QC) Program because the contractor's QC did not assign inspection hold points for either the electrical or mechanical piping connections for any of the 22 instruments replaced by the modification. Consequently, the installation adequacy was not verified against the design drawings, which did include the field change and, therefore, which could reasonably be expected to have revealed the error in the two instruments that were piped backwards.

Subsequent postmodification testing failed to detect the error because (as shown in Figure 3) the test shut the instrument block isolation valves and injected a test pressure source through the installed test connections downstream from the instrument. This test method isolated the portion of the piping where the reversal occurred from the test because it was upstream of the shut valves.

The error was found as a result of a fortuitous observation by an instrument technician who was performing an unrelated test. If this technician had not noticed the error, there was a significant possibility that the plant would have operated with one division of ECCS unavailable.

The safety significance of these events was reduced because the plant was in a cold shutdown condition. However, no ECCS equipment was available for automatic operation in the event of low reactor vessel level. In addition, secondary containment was allowed to be relaxed because the licensee believed ECCS Division I was operable. Primary containment also was open. Consequently, had a leak occurred, no ECCS systems would have functioned automatically and secondary containment would not have been available either. Technical specifications required the operability of some ECCS equipment during the time that the plant was shutdown, and upon loss of ECCS, secondary containment integrity was subsequently required.

Trojan

On July 20, 1985, the Trojan Nuclear Power Plant tripped from 100% power because of a turbine trip that was caused by the loss of the unit auxiliary transformer. All systems functioned normally except that low suction pressure caused one auxiliary feedwater pump to trip and then the other auxiliary feedwater pump to trip after restart of the first auxiliary feedwater pump.

The cause of the trips of the auxiliary feedwater pumps can be traced back to improper postmodification adjustment and inadequate postmodification testing following retrofit of environmentally qualified controllers for the auxiliary feedwater system. The auxiliary feedwater pump trips on low suction pressure were caused by excessive combined flow from the two auxiliary feedwater pumps that draw from a single header from the condensate storage tank. The flow control valves were open farther than required after new environmentally qualified controllers had been installed during a recent refueling outage.

When the flow control valves were adjusted following the modification of the controllers, only one auxiliary feedwater pump was run at a time and used to adjust the control valve limit switch settings. Consequently, when both pumps were started following the reactor trip on July 20, 1985, the combined flow was excessive.

Discussion:

Information Notice 85-23, "Inadequate Surveillance and Postmaintenance and Postmodification System Testing," described a series of events occurring at McGuire in November of 1984, where improper system modifications and inadequate postmodification testing also were involved.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

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

Technical Contacts: Eric Weiss, IE
(301) 492-9005

M. Jordan, SRI, LaSalle
(815) 357-8611

Robert Dodds, Region V
(415) 943-3720

Attachments:
1. Figures Illustrating LaSalle Level Instrument Problems
2. List of Recently Issued IE Information Notices

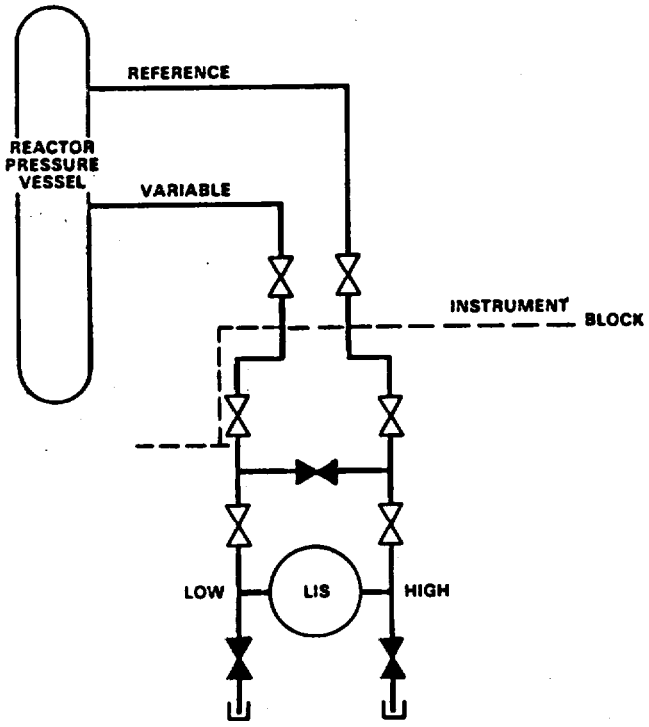

Figure 1

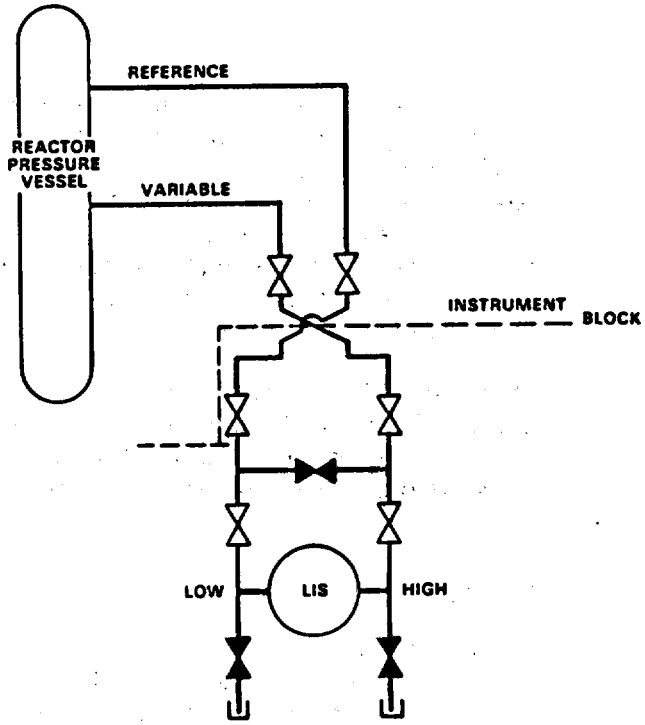

Figure 2

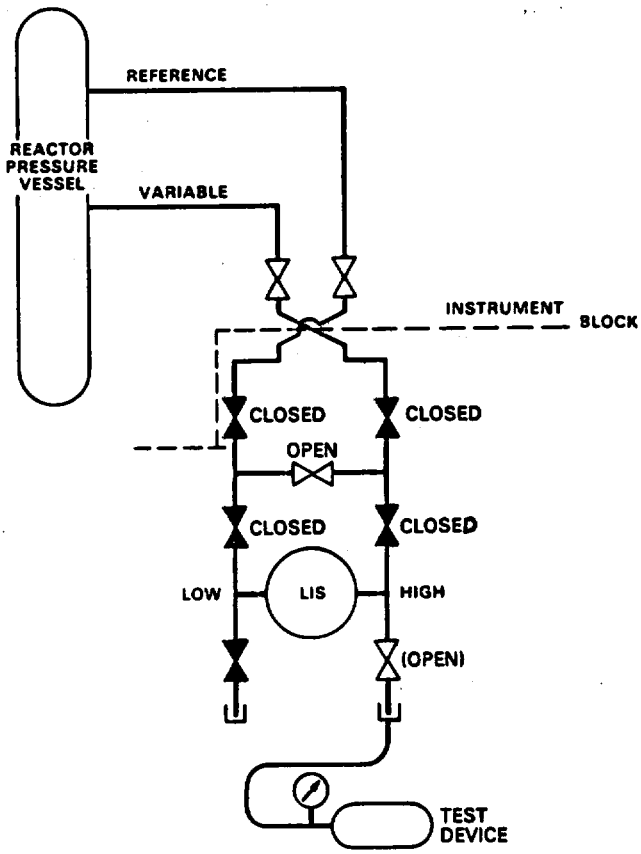

Figure 3

Attachment 2
IN 85-75
August 30, 1985

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-74	Station Battery Problems	8/29/85	All power reactor facilities holding an OL or CP
84-70 Sup. 1	Reliance On Water Level Instrumentation With A Common Reference Leg	8/26/85	All power reactor facilities holding an OL or CP
85-73	Emergency Diesel Generator Control Circuit Logic Design Error	8/23/85	All power reactor facilities holding an OL or CP
85-72	Uncontrolled Leakage Of Reactor Coolant Outside Containment	8/22/85	All power reactor facilities holding an OL or CP
85-71	Containment Integrated Leak Rate Tests	8/22/85	All power reactor facilities holding an OL or CP
85-70	Teletherapy Unit Full Calibration And Qualified Expert Requirements (10 CFR 35.23 And 10 CFR 35.24)	8/15/85	All material licensees
85-69	Recent Felony Conviction For Cheating On Reactor Operator Requalification Tests	8/15/85	All power reactor facilities holding an OL or CP
85-68	Diesel Generator Failure At Calvert Cliffs Nuclear Station Unit 1	8/14/85	All power reactor facilities holding an OL or CP
85-42 Rev. 1	Loose Phosphor In Panasonic 800 Series Badge Thermo-luminescent Dosimeter (TLD) Elements	8/12/85	Materials and fuel cycle licensees
85-67	Valve-Shaft-To-Actuator Key May Fall Out Of Place When Mounted Below Horizontal Axis	8/8/85	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit