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IN 86-13, Supplement 1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, DC 20555

August 5, 1986

IE INFORMATION NOTICE NO. 86-13, SUPPLEMENT 1: STANDBY LIQUID CONTROL SQUIB VALVES FAILURE TO FIRE

Addressees:

All boiling water reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is to alert addressees to additional information regarding the causes of a generic problem with squib valves used in the standby liquid control system. 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:

Information Notice 86-13 stated that failure of the squibs to fire at Vermont Yankee was caused by two problems: a plant wiring change in the terminal box and incorrect wiring of the connector supplied with the squib valve primer charge. However the latest information regarding the event shows that the principal cause for the squib valve failures and the loss of the standby liquid control (SLC) system function was the incorrect wiring in the primer chamber supplied by the vendor in 1983 and initially installed in July 1984.

A secondary cause for the event was the failure to detect the manufacturing defect before using the parts in the plant. Although a squib valve from the vendor's same manufacturing lot was "bench" tested in the plant maintenance shop before installation, the bench test only verified the adequacy of the explosive material, but did not test the electrical wiring configuration. If a test had been conducted for a representative sample of the chambers installed in the SLC system in 1984, the loss of SLC system function could have been prevented. The error was identified by the licensee's staff in February 1986 while testing the installed valves at the end of the operating cycle.

The electrical wiring configuration in the plant gave an indication of circuit continuity in the control room but was incapable of firing the squib valves.

NRC inspection also found irregularities in the plant wiring in that the as-found firing circuit wiring differed from the design drawings. The differences occurred following a design change to the firing circuits in 1977 when difficulties encountered during the installation resulted in a needed field modification for the firing circuit. The adequacy of the modified circuit was demonstrated by the successful completion of the annual surveillance tests from 1977 to 1984 with primer chambers of the type supplied in 1977. The field modification did not go through the normal review process and therefore was not reflected in a change to the as-built drawing of the firing circuit. However, if the field modification had been reviewed in 1977 it would have been approved. Thus the primary cause for the SLC system failure remains the primer manufacturing error and the secondary cause is the failure to detect the error.

Discussion:

According to the NRC staff's understanding, there are two important lessons from the experience gained as a result of this event.

Bench testing of squib valves is not an absolute indication that the valves will function in the plant circuit. Testing in the plant circuit provides an added confidence that the plant circuit is capable of firing the valves.

Control room indication of circuit continuity may be achieved by an electrical pathway that is not the pathway of the firing circuit. Therefore, control room indication of SLC system continuity is not an absolute indication of the circuit's ability to fire the squib charge and activate the SLC system.

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

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

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

Attachment: List of Recently Issued IE Information Notices

Attachment 1
IN 86-13, Supplement 1
August 5, 1986

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-63	Loss Of Safety Injection Capability	8/5/86	All PWR facilities holding an OL or CP
86-62	Potential Problems In Westinghouse Molded Case Circuit Breakers Equipped With A Shunt Trip	7/31/86	All power reactor facilities holding an OL or CP
86-61	Failure Of Auxiliary Feedwater Manual Isolated Valve	7/28/86	All power reactor facilities holding a CP
86-60	Unanalyzed Post-LOCA Release Paths	7/28/86	All power reactor facilities holding an OL or CP
86-31 Sup. 1	Unauthorized Transfer And Loss Of Control Of Industrial Nuclear Gauges	7/14/86	All NRC general licensees that possess and use industrial nuclear gauges
86-59	Increased Monitoring Of Certain Patients With Implanted Coratomic, Inc. Model C-100 and C-101 Nuclear-Powered Cardiac Pacemakers	7/14/86	All NRC licensees authorized to use nuclear-powered cardiac pacemakers
86-58	Dropped Fuel Assembly	7/11/86	All power reactor facilities holding an OL or CP
86-57	Operating Problems With Solenoid Operated Valves At Nuclear Power Plants	7/11/86	All power reactor facilities holding an OL or CP
86-56	Reliability Of Main Steam Safety Valves	7/10/86	All PWR facilities holding an OL or CP

OL = Operating License
CP = Construction Permit