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

August 15, 1986

IE INFORMATION NOTICE NO. 86-68: STUCK CONTROL ROD

Addressees:

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

Purpose:

This notice alerts addressees to the potential for a stuck control rod and damaged control rod drive as a result of closed manual isolation valves on the hydraulic control unit. 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:

During a full scram preoperational test (before fuel loading) on April 29, 1986, the Clinton nuclear power plant found that rod 08-25 was stuck at position 06. Attempts to move the rod by gradually increasing drive water pressure were unsuccessful.

Investigation revealed that the 112 valve (scram discharge riser manual isolation) on the hydraulic control unit was in the closed position despite verification that the valve was in the proper (open) position. The closed 112 valve caused a very high pressure to develop in the control rod drive, crushing the cylinder tube. Because the surface area above the piston is smaller than that below the piston, a closed 112 valve can cause pressures above the piston to be several times as large as the 1850 psi applied at the bottom of the piston by the scram accumulators. The above-the-piston water surrounds the cylinder and can partially crush the cylinder. The crushed cylinder tube caused interference with the movement of the piston and thus the stuck rod.

Subsequent unsuccessful attempts were made to insert the partially withdrawn control rod into its drive by removing temporary blade guide assemblies and applying force from above with a specially constructed tool. The rod was ultimately removed by cutting the index tube into two pieces and removing it from the drained reactor vessel.

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The licensee has adopted a number of corrective measures. The manual isolation valves are locked open once they are verified to be in the proper position. The personnel access control to the hydraulic control units has been tightened. In addition to the normal independent verification of valve position, the start-up organization has instituted a temporary measure of having management personnel make additional random checks.

Discussion:

Although not always causing damage to the control rod drive as occurred at Clinton, there have been several instances of manual isolation valves on the hydraulic control units causing failure to scram of individual control rods. Among the other instances when problems with the manual isolation valves on the hydraulic control unit have prevented a rod from scraming are:

Date	Plant	Event-Failure to Scram One Rod
October 20, 1984	Dresden Unit 3	Manual isolation valve disc separated from valve stem
October 24, 1984	Quad Cities Unit 2	Scram inlet isolation valve closed
April 11, 1985	Perry	Inadvertently closed 112 valve - CRDM damaged, index tube cut to remove

There are other valves on the hydraulic control unit that could prevent a scram or cause damage to the control rod drive mechanism. Some of these valves could be discovered by problems with normal rod movement before a scram. However, a closed 112 valve does not cause problems with normal rod movement. Because larger pressures are applied to the control rod drive during the scram, damage caused by closed valves on the hydraulic control unit is most likely to occur during the scram.

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
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Attachment: List of Recently Issued IE Information Notices

LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-67	Portable Moisture/Density Gauges: Recent Incidents And Common Violations Of Requirements For Use, Transportation, And Storage	8/15/86	All NRC licensees authorized to possess, use, transport, and store sealed sources
86-66	Potential For Failure Of Replacement AC Coils Supplied By The Westinghouse Electric Corporation For Use In Class 1E Motor Starters And Contractors	8/15/86	All power reactor facilities holding an OL or CP
86-65	Malfunctions Of ITT Barton Model 580 Series Switches During Requalification Testing	8/14/86	All power reactor facilities holding an OL or CP
86-64	Deficiencies In Upgrade Programs For Plant Emergency Operating Procedures	8/14/86	All power reactor facilities holding an OL or CP
86-63	Loss Of Safety Injection Capability	8/6/86	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

OL = Operating License
CP = Construction Permit