

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

February 2, 1987

IE INFORMATION NO. 87-05: MISWIRING IN A WESTINGHOUSE ROD CONTROL SYSTEM

Addressees:

All Westinghouse nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is to alert addressees to the miswiring of circuit card interconnections in the Westinghouse-supplied rod control system of a Westinghouse reactor. It is suggested that recipients 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:

Beaver Valley Unit 1

On December 1, 1986, with the plant at full power, the bank selector switch in manual, and all rods fully withdrawn, the operator inserted control rods consistent with a minor power reduction. Although control bank 'D' rods were expected to move, the operator observed that control bank 'A' rods inserted two steps.

Subsequent investigation revealed that two circuit boards in the bank overlap unit (BOU) of the rod control system had been wired together improperly. This miswiring was determined to have existed since initial installation of the rod control system when the plant was new. Rod control systems of this design have been supplied for approximately 60 other Westinghouse nuclear units.

Discussion:

With the rod control system in manual or automatic, the BOU automatically selects the sequence and overlap of the control banks. To keep track of the process, each in or out step of the control banks is recorded by a counter in the BOU. The BOU count increases from 000 to 999 as control bank rods are stepped out. Shutdown bank motion does not affect BOU count. To support special evolutions such as troubleshooting and repair, the BOU is fitted with "+1", "-1" and "reset" push buttons which permit advancing, retarding, or zeroing, respectively, the BOU count. Depressing any of these buttons does not

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automatic, any demand for rod motion would result in movement of bank 'A' rods, as was observed in this case. Placing the plant in a potentially significant unanalyzed condition might therefore result from this problem, especially if the rod control system were in automatic and plant conditions demanded significant rod motion.

After testing eliminated the possibility of a failed BOU electronics card, it was concluded that the BOU counter had been zeroed by unauthorized operation of the BOU +1 button. In a properly wired BOU, depressing the +1 and -1 buttons an equal number of times would have no net effect on BOU count, i.e., the final count would be the same as it had been prior to button manipulation. In the miswired configuration, the BOU count used to supervise rod motion was reduced to 000. It is important to note, however, that the BOU count displayed at the push button station was not affected by the miswiring, and responded properly to use of the +1 and -1 buttons. In addition, had the unit experienced a scram with BOU count out of alignment, this problem would have gone undetected, since BOU count automatically resets to 000 when a scram is received.

This problem was rectified at Beaver Valley Unit 1 by rewiring the BOU circuit board interconnections in the correct configuration. The unit remained at power during repairs. The Beaver Valley Unit 2 rod control system was inspected and found not to be affected.

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 Contact: Kevin Wolley, IE
(301) 492-9428

Attachment: List of Recently Issued IE Information Notices

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12/24/86

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12/29/86

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01/6/87

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01/5/87

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RBAer
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01/16/87

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Information Notice No.	Subject	Date of Issue	Issued to
87-04	Diesel Generator Fails Test Because of Degraded Fuel	1/16/87	All power reactor facilities holding an OL or CP
87-03	Segregation of Hazardous	1/15/87	All NRC licensees
87-02	Inadequate Seismic Qualification of Diaphragm Valves by Mathematical Modeling and Analysis	1/15/87	All power reactor facilities holding an OL or CP
87-01	RHR Valve Misalignment Causes Degradation of ECCS in PWRs	1/6/87	All PWR facilities holding an OL or CP
86-110	Anomalous Behavior of Recirculation Loop Flow in Jet Pump BWR Plants	12/31/86	All BWR facilities holding an OL or CP
86-109	Diaphragm Failure In Scram Outlet Valve Causing Rod Insertion	12/29/86	All BWR facilities holding an OL or CP
86-108	Degradation Of Reactor Coolant System Pressure Boundary Resulting From Boric Acid Corrosion	12/29/86	All PWR facilities holding an OL or CP
86-107	Entry Into PWR Cavity With Retractable Incore Detector Thimbles Withdrawn	12/29/86	All power reactor facilities holding an OL or CP
86-106	Feedwater Line Break	12/16/86	All power reactor facilities holding an OL or CP
86-105	Potential For Loss Of Reactor Trip Capability At Intermediate Power Levels	12/19/86	All holders of OL or CP for PWR or BWR

OL = Operating License
CP = Construction Permit

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