

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555 - 0001

September 19, 1997

NRC INFORMATION NOTICE 97-69: REACTOR TRIP BREAKERS AND SURVEILLANCE TESTING OF AUXILIARY CONTACTS

Addressees

All holders of operating licenses for pressurized water reactors (PWRs) except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees that three licensees have recently identified potential problems regarding Westinghouse Type DB50 reactor trip breaker (RTB) maintenance or surveillance testing or both. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

On September 19, 1996, with Sequoyah Unit 2 at 100 percent power, the Unit 2 "B" RTB was removed from service for routine preventive maintenance and was replaced with a spare RTB. After the preventive maintenance and the post-maintenance surveillance testing was completed, the spare RTB was removed and replaced by the refurbished RTB. When the refurbished RTB was returned to service, the control room operators reported an unanticipated annunciator. An investigation indicated a malfunction of the RTB auxiliary contacts. Subsequent inspection of the refurbished RTB by the licensee determined that the linkage control to the auxiliary contacts had not been reconnected during the breaker refurbishment activities. As a result, the refurbished RTB had been in service with the auxiliary contacts inoperable for approximately nine hours, which exceeded the technical specifications limiting conditions for operations (LCO) action time of six hours for the reactor trip system interlock (P-4). Inadequate post-maintenance testing permitted the RTB to be returned to service with an inoperable P-4 interlock. This was first reported as an unresolved item in NRC Inspection Report (IR) 50-327/328-97-01 (Accession No. 9704010175) and later identified as a Severity Level IV violation in IR 50-327/328-97-03 (Accession No. 9705190286).

On January 13, 1997, with Watts Bar Unit 1 operating in Mode 1 at 100 percent power, the licensee determined that because of a misinterpretation of technical specifications, the

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surveillance testing requirements for the RTB auxiliary contacts, which provide a turbine trip signal on reactor trip (P-4 interlock), were not being performed. On February 10, 1997, the licensee reported this in Licensee Event Report (LER) 50-390/97-001, (Accession No. 9702180273).

On January 22, 1997, with Vogtle Unit 1 operating in Mode 1 at 100 percent power, the licensee discovered that a portion of the RTB auxiliary contacts, which produce the turbine trip signal on reactor trip (P-4 interlock), were not being tested as required by technical specifications. On February 20, 1997, the licensee reported this in LER 50-424/97-002 (Accession No. 9702240448).

Discussion

The Westinghouse Type DB50 RTB assembly has three auxiliary relays that are mechanically connected to the breaker by linkages. The relays are arranged in a vertical stack. The bottom relay is connected to the breaker by an inertia latch linkage, with a separate linkage connecting the bottom relay to the two upper relays.

Bench inspection of the failed Sequoyah RTB revealed that the linkage necessary to operate the two upper sets of auxiliary relays was not connected which rendered the contacts associated with those two relays inoperable. The contacts provide a portion of the P-4 interlock. With the reactor trip breakers open, the interlock, among other things, causes a feedwater isolation with low Tave and a turbine trip. Before the refurbished RTB was installed, the breaker had been opened and closed several times by maintenance personnel who did not notice the disconnected linkage which was in a location that was difficult to see. Visual inspections of the refurbished RTB, performed with the breaker in service, also did not reveal any discrepancies.

The Westinghouse vendor manual contained instructions for RTB refurbishment, including steps to test the auxiliary contacts and lubricate the linkages. The vendor instructions were written in sequence to first verify proper auxiliary relay operation, then lubricate the inertia latch linkages using a spray lubricant. Since the use of the spray lubricant did not require disassembly, no instructions for disassembly or reassembly were included in the vendor procedure. In addition, the contact verification steps, performed before the lubrication process, were not repeated following the lubrication steps. The licensee's original maintenance procedure for RTB refurbishment was prepared using these vendor recommended details and sequence.

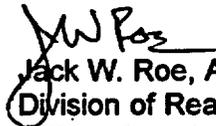
In 1994 a problem with an inertia latch resulted in the failure of the RTB to close on demand. Investigation revealed that a loss of plating on the inertia latch had subjected the parts to corrosion and had resulted in binding of the latch linkage. As a corrective action, the licensee revised their procedure to add requirements to disassemble the breaker in order to inspect and lubricate the inertia latch linkages. At that time it was not recognized that the linkage from the bottom relay to the two upper relays could become disengaged when the adjacent linkage was removed for lubrication. Therefore, the steps necessary to verify proper

operation of the auxiliary contacts were left in the original sequence, i.e., they were performed before the disassembly of the linkage for lubrication. The procedure should have been revised to ensure proper operation of the auxiliary contacts was verified after re-assembly.

The technical specifications require the turbine trip contacts and the engineered safety feature actuation system contacts (P-4 interlock) of an RTB to be operable. Westinghouse has recommended testing the proper operation of the P-4 contacts following breaker refurbishment or maintenance activities, and following breaker operation. The testing should verify that the RTB P-4 contacts are in the correct position with the breaker opened and with the breakers closed.

Licensees may wish to review RTB surveillance and post-maintenance test procedures to ensure adequate verification of auxiliary contact operation for both the opened and closed breaker positions.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) Project Manager.


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97-66	Failure to Provide Special Lenses for Operators Using Respirator or Self-Contained Breathing Apparatus During Emergency Operations	08/20/97	All holders of operating licenses or construction permits for nuclear power and non-power reactors and all licensed reactor operators and senior operators
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97-64	Potential Problems Associated with Loss of Electrical Power in Certain Teletherapy Units	08/13/97	All U.S. Nuclear Regulatory Commission medical teletherapy licensees

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and following breaker operation. The testing should verify that the RTB P-4 contacts are in the correct position with the breaker opened and with the breakers closed.

On September 19, 1996, Sequoyah Unit 2 replaced an RTB with a refurbished breaker and returned the RTB to service without having tested to verify correct contact position for both the opened and closed breaker positions. As a result, the refurbished RTB was in service, with the auxiliary contacts inoperable, for approximately nine hours, which exceeded LCO action time.

On January 13, 1997, Watts Bar Unit 1 reported in Licensee Event Report (LER) 50-424/97-001, that because of a misinterpretation of technical specifications, the surveillance testing requirements for the RTB auxiliary contacts, which provide a turbine trip signal on reactor trip (P-4 interlock), were not being performed.

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