

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

November 19, 1985

IE INFORMATION NOTICE NO. 85-58, SUPPLEMENT 1: FAILURE OF A GENERAL ELECTRIC
TYPE AK-2-25 REACTOR TRIP
BREAKER

Addressees:

All nuclear power reactor facilities designed by Babcock and Wilcox (B&W) and Combustion Engineering (CE) and holding an operating license (OL) or a construction permit (CP).

Purpose:

IE Information Notice 85-58, "Failure of a General Electric Type AK-2-25 Reactor Trip Breaker," described the failure of a refurbished reactor trip breaker (RTB) at the Rancho Seco Nuclear Power Generating Station. This supplement to the notice provides information on other recent failures of General Electric (GE) AK-2-25 type RTBs. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems at their facilities. However, suggestions contained in this supplement do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances and Discussion:

Calvert Cliffs Nuclear Power Plant

Recently, there have been two failures of undervoltage (UV) trip devices in the GE AK-2-25 type RTBs at Calvert Cliffs. The first failure was discovered in February 1985 when the response time of an UV trip device measured 628 milliseconds, well above the licensee's acceptance criteria. This UV trip device was installed in October 1984. The analysis of the failure revealed that several laminated sections that are part of the armature had slipped down and effectively eliminated the air gap between the movable armature and the pole face. By design, there must be an air gap between the laminations and the pole face. The physical contact between the laminations and pole face allowed the armature to be held down by residual magnetism after dc power was removed, resulting in the slow response time.

The second failure was discovered during preventive maintenance of an RTB in July 1985. In this case, laminations had moved down only slightly to make the air gap below tolerance. This did not affect the response time. However, it did affect the pickup and dropout voltages of the UV trip device causing them to be low.

The licensee's corrective actions included replacing the UV trip devices and instituting a program to measure the air gap between the laminations and pole face on a yearly basis. It was pointed out by the licensee that the air gap measurement is not part of the checks recommended in the GE Service Advice Letter. Therefore, it is likely that this is not being performed in the industry.

Oconee Nuclear Station

On July 22, 1985, at the Oconee Nuclear Station Unit 1, one of the GE AK-2-25 dc RTBs failed its trip response time during on-line testing of a reactor protection system channel while the unit was operating at 100% power. The trip response time of the breaker was 1738 milliseconds, well over the licensee's acceptance criteria.

On July 23, 1985, the licensee exercised the failed breaker numerous times, but no failure occurred. However, a detailed inspection of the breaker showed a metal burr on the head of one of the mounting studs for the UV trip device. The licensee concluded that the probable cause of the failure was the armature of the UV device touching the stud as it moved toward the trip position.


The failed UV trip device was a new device installed on the breaker. It was discovered that the mounting stud heads of the new devices had square edges rather than round ones like the old devices. According to the licensee, the possible reduced clearance between the armature and the heads of the mounting bracket studs could have caused the contact and, thus, the slow RTB response time. The licensee's corrective actions included the replacement of the failed RTB with an operable spare RTB, and the on-line testing and operability verification of all RTBs.

The licensee's review of previous RTB failures has indicated that a new UV device installed in the same breaker had failed once before on April 29, 1985 because of mechanical binding. The cause of the previous failure, which also resulted in a slow trip response time, was thought to be some particles, possibly paint chips or metal shavings, stuck in the pivot point of the UV device. The licensee's corrective actions included the replacement of the failed RTB with an operable spare RTB, and the revision of the RTB inspection and maintenance procedure to include detailed inspections of the UV and shunt devices and other binding points.

In addition to the RTB failures discussed above, GE notified the NRC and affected facilities on September 13, 1985 of certain defects in the UV trip devices supplied for use on AK and AKR type low-voltage power circuit breakers. Subsequently, GE issued Service Advice Letter No. 300 on September 26, 1985 that outlines the actions to be taken with respect to those defects. One of the defects addressed by GE involved insufficient clearance between the armature and mounting stud, similar to the Oconee problem. The other defect involved improper painting of the mating surfaces of the armature and pole pieces in ac powered UV devices.

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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.


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Attachments: List of Recently Issued Information Notices

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
85-90	Use Of Sealing Compounds In An Operating System	11/19/85	All power reactor facilities holding an OL or CP
85-89	Potential Loss Of Solid-State Instrumentation Following Failure Of Control Room Cooling	11/19/85	All power reactor facilities holding an OL or CP
85-88	Licensee Control Of Contracted Services Providing Training	11/18/85	All power reactor facilities holding an OL or CP
85-87	Hazards Of Inerting Atmospheres	11/18/85	All power reactor facilities holding an OL or CP; and fuel facilities
85-86	Lightning Strikes At Nuclear Power Generating Stations	11/5/85	All power reactor facilities holding an OL or CP
85-85	Systems Interaction Event Resulting In Reactor System Safety Relief Valve Opening Following A Fire-Protection Deluge System Malfunction	10/31/85	All power reactor facilities holding an OL or CP
85-84	Inadequate Inservice Testing Of Main Steam Isolation Valves	10/30/85	All power reactor facilities holding an OL or CP
85-83	Potential Failures Of General Electric PK-2 Test Blocks	10/30/85	All power reactor facilities holding an OL or CP
85-82	Diesel Generator Differential Protection Relay Not Seismically Qualified	10/18/85	All power reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit