

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

October 18, 1985

IE INFORMATION NOTICE NO. 85-82: DIESEL GENERATOR DIFFERENTIAL PROTECTION  
RELAY NOT SEISMICALLY QUALIFIED

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This information notice is provided to alert licensees of a potentially significant safety problem involving a General Electric (GE) Model 12CFD relay that is not seismically qualified for Class IE service when in the de-energized state of operation. The relay is used for protection of an emergency diesel generator (EDG) against phase-to-phase or phase-to-ground electrical faults (shorts) by both boiling water reactor (BWR) and pressurized water reactor (PWR) nuclear power generating stations.

It is suggested that recipients review this 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:

Licensees of BWR and PWR nuclear generating stations have reported using a high-speed differential protection relay that has been declared by the manufacturer to be not seismically qualified for the service intended. The relay, GE Model 12CFD, which is being used for emergency diesel generator protection against electrical shorts and grounds at the generator output, has not been seismically qualified to operate in the de-energized state for this application. Generally, the relay operates in the de-energized position before EDG operation. However, it then operates in the energized position whenever the EDG provides an electrical output to essential Class IE components. The safety concern of this issue involves an inadvertent activation of the normally de-energized relay from a seismic event. Momentary activation of the relay, in the circuits examined, blocks the automatic start feature of the EDG during certain emergency plant conditions through operation of another relay in the system.

On June 17, 1985, Kewaunee Nuclear Power Generating Station notified the NRC that the high-speed differential relay being used for diesel generator protection at their plant did not meet the seismic requirements for that application when the relay was in the de-energized mode. Kewaunee had discovered that the relay, GE 12CFD series, had earlier failed to meet seismic requirements under similar circumstances at the Arkansas Unit 1 Nuclear Generating Station in November 1981. The short term corrective measure taken by Kewaunee to resolve the issue was to defeat the relay trip function. The long term corrective measures are currently under review.

At Palisades, while finalizing the environmental qualification plan for the diesel generator control panel, the licensee discovered that the GE high-speed differential relays specified by design drawings would not meet the seismic requirements for the service intended at that plant when the relay was in the de-energized mode. The relay was identified as GE Model 12CFD and was being used in an application similar to that at the Kewaunee plant above. The licensee of Palisades has since replaced all deficient relays with relays seismically qualified for service in all modes of operation.

Background:

An event occurred at Arkansas Unit 1 plant on November 19, 1981, when the plant was operating at 90% of full power. An alarm sounded alerting operations personnel that the generator lockout relay, associated with the plant's No. 1 EDG, had tripped. The licensee's investigation of this occurrence revealed that the "C" phase differential relay (one relay is used for each phase of the three-phase system) had activated and caused a generator lockout relay to trip even though the affected EDG was not operating at the time. A walk through by persons in the EDG area revealed that the EDG exiter cubicle, which houses the differential relays, may have been opened and reclosed with sufficient force to cause spurious operation of the differential relay, GE Model 12CFD. Subsequent investigation by the licensee concluded that the relay did not meet the minimum seismic qualifications in that plant's design when the EDG is in the standby mode and the relay is in a de-energized state. A similar problem was identified with the same make and model differential relays at both Brunswick Unit 2 and at Salem Unit 1 in early 1982.

Arkansas Unit 1, Brunswick Unit 2, and Salem Unit 1 have since replaced the deficient relays with a relay that GE considers more suitable and seismically qualified for the application discussed above.

The NRC review of the above problems concluded that the relays should be seismically qualified in their energized and de-energized states to preclude their spurious activation during a seismic event. Additionally, review of GE's GER 3069 report, "Relay Protection of Class IE Systems," shows that the 12CFD differential relays were successfully tested for 3.5 g in the energized modes and only 0.75 g in the de-energized mode. The calculated required g-level capacity, including the effects of floor response, for this equipment at

Arkansas Unit 1 exceeded the qualified g level of the 12CFD relay in the de-energized mode by a factor of about three. Review of GE's GER 3069 report also revealed that GE type IJD differential relays do meet seismic requirements in all modes of operation mentioned above and is the GE recommendation for replacement of the differential relay in question.

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

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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
85-81	Problems Resulting In Erroneously High Reading With Panasonic 800 Series Thermoluminescent Dosimeters	10/17/85	All power reactor facilities holding an OL or CP and certain material and fuel cycle licensees
85-80	Timely Declaration Of An Emergency Class Implementation Of An Emergency Plan, And Emergency Notifications	10/15/85	All power reactor facilities holding an OL or CP
85-17 Sup. 1	Possible Sticking Of ASCO Solenoid Valves	10/1/85	All power reactor facilities holding an OL or CP
85-79	Inadequate Communications Between Maintenance, Operations, And Security Personnel	9/30/85	All power reactor facilities holding an OL or CP; research and nonpower reactor facilities; fuel fabrication and processing facilities
85-78	Event Notification	9/23/85	All power reactor facilities holding an OL or CP
85-77	Possible Loss Of Emergency Notification System Due To Loss Of AC Power	9/20/85	All power reactor facilities holding an OL or CP
85-76	Recent Water Hammer Events	9/19/85	All power reactor facilities holding an OL or CP
85-75	Improperly Installed Instrumentation, Inadequate Quality Control And Inadequate Post-modification Testing	8/30/85	All power reactor facilities holding an OL or CP

OL = Operating License  
CP = Construction Permit