

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

January 8, 1992

NRC INFORMATION NOTICE 92-05: POTENTIAL COIL INSULATION BREAKDOWN
IN ABB RXMH2 RELAYS

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to a potentially safety-significant problem involving the coil insulation breakdown in Asea Brown Boveri (ABB) RXMH2 relays. 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 August 12, 1991, United Controls Division of Hub, Incorporated, (United Controls) notified the NRC in accordance with Part 21 of Title 10 of the Code of Federal Regulations (10 CFR Part 21) concerning the failure of an ABB RXMH2 relay being used in the emergency diesel generator (EDG) bus load sequencing panels at the Florida Power & Light Company's Turkey Point Generating Station. The failed relay, one of approximately 300 ABB relays installed at Turkey Point, had failed to change state upon being energized during a preoperational test. United Controls purchased the relay from ABB as a commercial grade item and dedicated the relay for safety-related use as part of Turkey Point's EDG sequencing panels. On August 16, 1991, ABB also notified the NRC in accordance with 10 CFR Part 21 and provided further information concerning the failed relay.

Discussion

ABB conducted a failure analysis and found that the coil in the relay had suffered a short circuit of the windings at the point at which the beginning lead of the coil was crossed by the subsequent windings of each layer of wire as they were wound onto the coil spool. The beginning lead and the subsequent windings were to be separated by a piece of clear plastic adhesive tape placed over the beginning lead to hold it in a channel in the end flange of the coil spool. The separation tape would then hold the beginning lead in place and prevent abrasion from the subsequent windings during the winding process. However, upon examining the failed coil, ABB determined that during the winding

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process, the tape had been pulled back and dislocated away from the beginning lead it was supposed to hold in the end flange channel of the coil spool. Some of the varnish insulation on the beginning lead was then apparently abraded during the winding process, allowing the insulation breakdown which caused the relay to fail.

ABB inspected other relays, none of which had yet failed, to determine if the separation tape was adequately placed. The acceptance criterion established by ABB specified that the separation tape must cover the beginning lead with an overlap margin of 1.0 millimeter (mm) or greater. Although none of the relays had damaged or dislocated separation tape, ABB found that almost all of them had less than 1.0 mm of margin.

United Controls and ABB determined that the problem had generic implications but that the scope was limited to relays with the particular coil design in question (type RXMH2, Models RK223068-EA and RK223069-EA) manufactured from March 1989 through September 1990. ABB identified the root cause of the problem as the performance of one factory employee who had manufactured relays within the date codes cited above.

ABB has made a design change to reposition the separation tape on the end flange of the coil spool to more evenly cover the beginning lead and avoid conditions that could cause the separation tape to be dislocated during the winding process. ABB has also taken action to ensure that all pertinent drawings and procedures have been updated and corrected and that all affected employees have been trained on the changes.

The manufacturer, ABB, did not believe that field data indicated a reliability problem with the type RXMH2 relay but recommended that in applications in which a failure to operate could cause a substantial safety hazard, the relays be checked for coil insulation integrity.

The RXMH2 relays having the potential for insulation breakdown were manufactured from March 1989 to September 1990. The relays are marked in the upper right corner of the legend plate with the year and week of manufacture; the dates of concern indicated as 8909 up to, and including, 9036.

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


Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical contact: Bill Rogers, NRR
(301) 504-2986

Attachments:

1. ABB 10 CFR Part 21 Notification to the NRC
2. List of Recently Issued NRC Information Notices



August 16, 1991

Director, Office of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Notification of Potential Generic Defect
Per 10CFR Part 21

Notification By: ABB Power T&D Company Inc., Relay Divisions
4300 Coral Ridge Drive
Coral Springs, FL 33065
William H. Wallace
Manager Total Quality & Process Technology
(305) 752-6700

On August 12, 1991, United Controls Division of HUB Inc. submitted notification to the Director, Office of Nuclear Reactor Regulation of a potential generic component defect found during an inspection of ASEA/ABB Type RXMH2, Model RK223068-EA and RK223069-EA relays at Florida Power and Light's Turkey Point Units 3 and 4. ABB Power T&D Company, Inc. has marketing responsibility for this product in the United States. The product is manufactured in Sweden by an affiliate. ABB Power T&D Company Inc. also has responsibility for notifications, customer contacts and similar items, and it is in this capacity that this notification is made.

Additional investigation has confirmed that all type RXMH2 AC or DC voltage operated heavy duty auxiliary relays manufactured from March, 1989 until September, 1990, have the potential for coil insulation breakdown. This coil configuration is unique to the type RXMH2 relay. Investigation of sales records indicates that the type RXMH2 relay has been sold as a commercial grade component for protection and control systems to a wide variety to customers. Many of the RXMH2 relays are sold to original equipment manufacturers for incorporation into systems purchased by utility end users. Relay customers are being notified through the following message sent August 15, 1991, to all ABB Power T&D Field Sales offices for transmittal to original equipment manufacturers who may have purchased RXMH2 relays and to utility customers who may have these relays installed in nuclear facilities.

ABB Power T&D Company Inc.

Relay
Division

4300 Coral Ridge Drive
Coral Springs, FL 33065

Telephone: (305) 752-6700
Telefax: (305) 345-5329

August 16, 1991
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"ABB was recently notified of the failure of a type RXMH2 heavy duty auxiliary relay. The RXMH2 AC or DC voltage operated auxiliary relay is especially suited for protective relaying and industrial applications requiring electrically independent multiple contacts with high breaking capacity and are often applied in parallel with fast operating trip relays. Examination of the failed relay revealed insulation breakdown at the coil termination. This mode of failure will cause the relay to fail to operate under fault conditions. This problem is caused by the misplacement of insulating tape installed on the coil termination during assembly of the product. Examination of additional RXMH2 units at the same customer installation indicates that this condition may occur on other RXMH2 units. Further investigation has shown that this deviation in assembly procedure may have occurred in units manufactured from March, 1989 until September, 1990. Each relay is marked in the upper right corner of the legend plate with the year and week of manufacture (e.g. 9036). The relays that may have this problem are the type RXMH2 marked 8909 up to and including 9036.

Field data does not indicate a reliability problem with this component. However, ABB is aware of application of the RXMH2 auxiliary relays in protection and control systems of U.S. nuclear installations. RXMH2 relays in applications where a failure to operate could cause a substantial safety hazard should be checked for coil insulation integrity. Please contact your local ABB Field Sales office or John Wilson (305-752-6700) at the Coral Springs Relay Division Total Quality Department for further information."

Prepared By: William H. Wallace Date: 8/16/91
William H. Wallace
Manager Total Quality &
Process Technology

Reviewed By: Donald L. Jans Date: 8/16/91
Donald L. Jans
Vice President &
General Manager

WHW/lw

cc: Michael Charlton/United Controls
S. Franzone/FP&L

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LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
92-04	Potter & Brumfield Model MDR Rotary Relay Failures	01/06/92	All holders of OLs or CPs for nuclear power reactors.
92-03	Remote Trip Function Failures in General Electric F-Frame Molded-Case Circuit Breakers	01/06/92	All holders of OLs or CPs for nuclear power reactors.
92-02	Relap5/Mod3 Computer Code Error Associated with the Conservation of Energy Equation	01/03/92	All holders of OLs or CPs for nuclear power reactors.
92-01	Cable Damage Caused by Inadequate Cable Installation Procedures and Controls	01/03/92	All holders of OLs or CPs for nuclear power reactors.
91-87	Hydrogen Embrittlement of Raychem Cryofit Couplings	12/27/91	All holders of OLs or CPs for nuclear power reactors.
91-86	New Reporting Requirements for Contamination Events at Medical Facilities (10 CFR 30.50)	12/27/91	All licensees authorized to use byproduct materials for human use.
91-85	Potential Failures of Thermostatic Control Valves for Diesel Generator Jacket Cooling Water	12/26/91	All holders of OLs or CPs for nuclear power reactors.
91-84	Problems with Criticality Alarm Components/Systems	12/26/91	All Nuclear Regulatory Commission (NRC) fuel cycle licensees, interim spent fuel storage licensees, and critical mass licensees.
91-83	Solenoid-Operated Valve Failures Resulted in Turbine Overspeed	12/20/91	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
 CP = Construction Permit

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ABB inspected other relays, none of which had yet failed, to determine if the separation tape was adequately placed. The acceptance criterion established by ABB specified that the separation tape must cover the beginning lead with an overlap margin of 1.0 millimeter (mm) or greater. Although none of the relays had damaged or dislocated separation tape, ABB found that almost all of them had less than 1.0 mm of margin.

United Controls and ABB determined that the problem had generic implications but that the scope was limited to relays with the particular coil design in question (type RXMH2, Models RK223068-EA and RK223069-EA) manufactured from March 1989 through September 1990. ABB identified the root cause of the problem as the performance of one factory employee who had manufactured relays within the date codes cited above.

ABB has made a design change to reposition the separation tape on the end flange of the coil spool to more evenly cover the beginning lead and avoid conditions that could cause the separation tape to be dislocated during the winding process. ABB has also taken action to ensure that all pertinent drawings and procedures have been updated and corrected and that all affected employees have been trained on the changes.

The manufacturer, ABB, did not believe that field data indicated a reliability problem with the type RXMH2 relay but recommended that in applications in which a failure to operate could cause a substantial safety hazard, the relays be checked for coil insulation integrity.

The RXMH2 relays having the potential for insulation breakdown were manufactured from March 1989 to September 1990. The relays are marked in the upper right corner of the legend plate with the year and week of manufacture; the dates of concern indicated as 8909 up to, and including, 9036.

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Original Signed By
Charles E. Rossi

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical contact: Bill Rogers, NRR
(301) 504-2986

Attachments:

1. ABB 10 CFR Part 21 Notification to the NRC
2. List of Recently Issued NRC Information Notices

*SEE PREVIOUS CONCURRENCES Document Name: IN 92-05
DRIS:VIB DRIS:VIB DRIS:VIB DRIS:VIB
BROGERS CVANDENBURGH LNORRHOLM BGRIMES
12/12/91* 12/12/91* 12/12/91* 12/16/91*
NRR:OGCB NRR:DOEA
CBERLINGER CROSSI 2/92
12/27/91* 12/1/91

TECH ED :
JMAIN :
12/10/91*

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NAME	:BROGERS	:CVANDENBURGH	:LNORRHOLM	:BGRIMES	:JMAIN	:
DATE	:12/12/91*	:12/12/91*	:12/12/91*	:12/16/91*	:12/10/91*	:
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NAME	:CBERLINGER	:CROSSI <i>off</i>	:	:	:	:
DATE	:12/27/91	:12/ /91	:	:	:	:

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year and week of manufacture, the dates of concern indicated as 8909 up to, and including 9036.

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Division of Operational Events
Assessment
Office of Nuclear Reactor Regulation

Technical Contact: Bill Rogers, NRR
(301) 492-0986

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OFFICE	DRIS:VIB	DRIS:VIB	DRIS:VIB	DRIS:DD	TECHED
NAME	BROGERS <i>BR</i>	CVANDEMBURGH <i>CV</i>	LNORRHOELM <i>LN</i>	BGRIMES <i>BG</i>	*JMAIN
DATE	12/12/91	12/12/91	12/12/91	12/16/91	12/10/91

OFFICE	NRR:OGCB	NRR:DOEA
NAME	CBERLINGER	CROSSI
DATE	12/ /91	12/ /91

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NAME	BROGERS	CVANDENBURGH	LNORRHOLM	BGRIMES	^{OM} JMAIN
DATE	12/ /91	12/ /91	12/ /91	12/ /91	12/ ¹⁰ /91

OFFICE	NRR:OGCB	NRR:DOEA
NAME	CBERLINGER	CROSSI
DATE	12/ /91	12/ /91