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

January 31, 1994

NRC INFORMATION NOTICE 93-26, SUPPLEMENT 1: GREASE SOLIDIFICATION CAUSES MOLDED-CASE CIRCUIT BREAKER FAILURE TO CLOSE

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 supplement information regarding a problem with a 400-amp frame, 600-V ac molded-case circuit breaker manufactured by General Electric Corporation (GE) (Part No. TJK436Y400) which failed to close when required due to grease solidification. 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 March 26, 1992, an engineered safety feature (ESF) actuated at the Nine Mile Point Nuclear Station Unit 2 (NMP2) because of the loss of output power from an uninterruptible power supply (UPS) while the loads were being transferred from UPS power to the maintenance supply power. During the transfer, the maintenance supply output circuit breaker (CB-4) failed to close, causing a loss of power to the standby gas treatment system radiation monitoring cabinet, a false-high radiation signal, a group 9 (primary containment purge system) primary containment isolation, the loss of a control room fire panel annunciator, and a loss of communication between the radiation monitoring system computer and non-Class 1E radiation monitors. The operator immediately took corrective action to close circuit breaker CB-4 manually to restore the UPS loads. The UPS loads lost power for approximately 12 minutes during the event.

After Information Notice (IN) 93-26 was issued on April 7, 1993, additional information was obtained from GE and NMP2. The additional information in this supplement is intended to assist recipients in determining the significance of this potential failure mode at their facilities.

Discussion

Niagara Mohawk Power Corporation, the licensee for Nine Mile Point 2 (LER 92-007-00), and Wyle Laboratories (Report No. 42370-RCCB-1) determined that circuit breaker CB-4 had failed to close because the grease used at the pivot points inside the breaker had dried out and solidified. When the grease dried out, the metal-to-metal contact areas experienced increased friction and eventual gouging. The friction caused the breaker to become increasingly more difficult to close, until, finally, the breaker would not close at all. The licensee located all breakers of the same make, model, and year as the one that failed and scheduled their replacement.

Certain observations were made in the NMP2 analysis relative to these breakers:

1. The safety function of these breakers is both to open and close automatically. Normally, the only electrical safety function of a breaker is its ability to trip. None of the breakers of this type at Nine Mile Point 2 have failed to trip when required.

2. Due to the nature of the application of these molded-case switches, they were cycled extensively (approximately 200-400 times). This is more than a normal molded-case circuit breaker used in a distribution panel.

3. The breakers were in close proximity to the UPS transformers causing operation above normal ambient conditions, which may or may not have contributed to the solidification of the grease.

GE has stated that in early 1980 the soap-based and clay-based grease used in this style molded-case circuit breakers was replaced with a synthetic lubricant as a product enhancement. However, older molded-case circuit breakers using the clay-based and soap-based grease may still be in use at other plants, in similar applications.

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.

Brian K. Grimes, Director
Division of Operating Reactor Support
Office of Nuclear Reactor Regulation

Technical contact: Mark D. Pratt, NRR
(301) 504-2701

Attachment:
List of Recently Issued NRC Information Notices

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Original signed by
Brian K. Grimes

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Office of Nuclear Reactor Regulation

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EELB Concurrence obtained by M.D. Pratt

*EELB:DE:NRR	SC/EELB:DE:NRR	C/EELB:DE:NRR	*OGCB:DORS:NRR	*RPB:ADM
MDPratt	EWWeiss*	CHBerlinger*	NECampbell	Tech Ed
12/22/93			12/17/93	12/22/93

*D/DE	*C/OGCB:DORS:NRR	D/DORS:NRR
WHodges	GHMarcus	BKGrimes
01/12/94	12/22/93	01/26/94

DOCUMENT NAME: 93-26SP1.IN

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*EELB Concurrence obtained by M.D. Pratt MDP 12/22/93

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LIST OF RECENTLY ISSUED NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
94-07	Solubility Criteria for Liquid Effluent Releases to Sanitary Sewerage Under the Revised 10 CFR Part 20	01/28/94	All byproduct material and fuel cycle licensees with the exception of licensees authorized solely for sealed sources.
94-06	Potential Failure of Long-Term Emergency Nitrogen Supply for the Automatic Depressurization System Valves	01/28/94	All holders of OLs or CPs for boiling water reactors.
93-85, Rev. 1	Problems with X-Relays in DB- and DHP-Type Circuit Breakers Manufactured by Westinghouse	01/20/94	All holders of OLs or CPs for nuclear power reactors.
94-05	Potential Failure of Steam Generator Tubes with Kinetically Welded Sleeves	01/19/94	All holders of OLs or CPs for pressurized water reactors (PWRs).
94-04	Digital Integrated Circuit Sockets with Intermittent Contact	01/14/94	All NRC licensees except licensed operators.
94-03	Deficiencies Identified during Service Water System Operational Performance Inspections	01/11/94	All holders of OLs or CPs for nuclear power reactors.
94-02	Inoperability of General Electric Magne-Blast Breaker Because of Misalignment of Close-Latch Spring	01/07/94	All holders of OLs or CPs for nuclear power reactors.
94-01	Turbine Blade Failures Caused by Torsional Excitation from Electrical System Disturbance	01/07/94	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit