

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

April 7, 1993

NRC INFORMATION NOTICE 93-26: 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 alert addressees to a problem with a 400-amp frame, 600 Vac 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 actuated at the Nine Mile Point Nuclear Station Unit 2 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 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 manually close circuit breaker CB-4 and restore the UPS loads. The UPS loads lost power for approximately 12 minutes during the event.

Discussion

Niagara Mohawk Power Corporation, the licensee for Nine Mile Point 2, determined that the cause of the failure of circuit breaker CB-4 to close was that the grease used at the pivot points inside the breaker had dried out and solidified. When the grease dried out, it caused increasing friction and gouging at the metal-to-metal contact areas. This 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.

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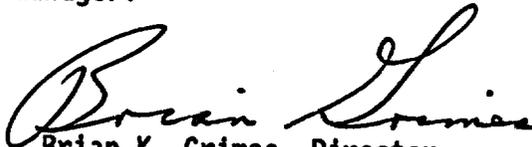
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GE has stated that all molded case circuit breakers manufactured prior to 1985 used a soap-based or clay-based grease that could solidify with age, and that they recommend field testing to identify such solidification. Since 1985, GE has replaced the soap-based and clay-based grease with a synthetic grease that does not dry out and solidify with age. However, it is possible that the older molded case circuit breakers using the clay-based and soap-based grease may still be used at other plants and could result in similar failures.

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

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
93-25	Electrical Penetration Assembly Degradation	04/01/93	All holders of OLs or CPs for nuclear power reactors.
93-24	Distribution of Revision 7 of NUREG-1021, "Operator Licensing Examiner Standards"	03/31/93	All holders of operator and senior operator licenses at nuclear power reactors.
93-23	Weschler Instruments Model 252 Switchboard Meters	03/31/93	All holders of OLs or CPs for nuclear power reactors.
93-22	Tripping of Klockner-Moeller Molded-Case Circuit Breakers due to Support Level Failure	03/26/93	All holders of OLs or CPs for nuclear power reactors.
93-21	Summary of NRC Staff Observations Compiled during Engineering Audits or Inspections of Licensee Erosion/Corrosion Programs	03/25/93	All holders of OLs or CPs for light water nuclear power reactors.
93-20	Thermal Fatigue Cracking of Feedwater Piping to Steam Generators	03/24/93	All holders of OLs or CPs for PWRs supplied by Westinghouse or Combustion Engineering.
93-19	Slab Hopper Bulging	03/17/92	All nuclear fuel cycle licensees.
93-18	Portable Moisture-Density Gauge User Responsibilities during Field Operations	03/10/93	All U.S. Nuclear Regulatory Commission licensees that possess moisture-density gauges.
93-17	Safety Systems Response to Loss of Coolant and Loss of Offsite Power	03/08/93	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
 CP = Construction Permit

GE has stated that all molded case circuit breakers manufactured prior to 1985 used a soap-based or clay-based grease that could solidify with age, and that they recommend field testing to identify such solidification. Since 1985, GE has replaced the soap-based and clay-based grease with a synthetic grease that does not dry out and solidify with age. However, it is possible that the older molded case circuit breakers using the clay-based and soap-based grease may still be used at other plants and could result in similar failures.

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Original signed by
Brian K. Grimes

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

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

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List of Recently Issued NRC Information Notices

***SEE PREVIOUS CONCURRENCES**

*EELB:DE:NRR MDPratt 03/18/93	*TECH ED 02/19/93	*SC:EELB:DE:NRR EWeiss 02/22/93	*C:EELB:DE:NRR CHBerlinger 02/25/93	*PDI-1:NRR JEManning 03/09/93
*OGCB:DORS:NRR NCampbell:mkm 03/29/93	*C:OGCB:DORS:NRR GHMarcus 03/29/93	<i>[Signature]</i> D:DORS:NRR BKGrimes 04/1 /93		

DOCUMENT NAME: 93-26.IN

scheduled to replace them. GE has stated that all molded case circuit breakers manufactured prior to 1985 used a soap-based or clay-based grease that could solidify with age, and that they recommend field testing to identify such solidification before it degrades performance. Since 1985, GE has replaced the soap-based and clay-based grease with a synthetic grease that does not dry out and solidify with age. However, it is possible that the older molded case circuit breakers using the clay-based and soap-based grease may still be used at other plants and could result in similar failures.

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OGCB:DORS:NRR NCampbell:mkm 03/29/93 J.E.G.	C:OGCB:DORS:NRR GHMarcusGHM 03/29/93	D:DORS:NRR BKGrimes 03/ /93 mkm
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DOCUMENT NAME: NMP21

breakers (MCCBs) manufactured prior to 1985, used a soap-based or clay-based grease that could solidify with age, if recommended maintenance and testing were not performed on the breaker. Since 1985, GE has replaced the soap-based and clay-based grease with a synthetic grease that does not dry out and solidify with age. However, it is possible that the older vintage MCCBs using the clay-based and soap-based grease may still be used at other plants and could result in a similar failure.

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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MDPratt
02/18/93

*TECH ED
02/19 /93

*SC:EELB:DE:NRR
EWeiss
02/22/93

*C:EELB:DE:NRR
CHBerlinger
02/25/93

PDI-1:NRR
JEManning
03/09/93

OGCB:DORS:NRR
NCampbell:mkm
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C:OGCB:DORS:NRR
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03/ /93

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03/ /93

DOCUMENT NAME: NMP21

EELB:DE:NRR
MDPratt *MOP*
02/18/93

TECH ED
Ray Sanders
02/19/93

SC: ~~EELB~~:DE:NRR
EW Weiss
02/22/93

CHB
C:EELB:DE:NRR
CHBerlinger
02/25/93

OGCB:DORS:NRR
NCampbell:mkm
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C:OGCB:DORS:NRR
GHMarcus
02/ /93

D:DORS:NRR
BKGrimes
02/ /93