Commonwealth Edison Company
Dresden Generating Station
6500 North Dresden Road
Morris, IL 60450
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PART 21

ComEd

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To NRC Operation Dept	From EL Carroll	
Co./Dept.	Co. ComEd-Dresden	
Phone # 301-816-5251	Phone # 815-942-2920	
Fax # 301-816-5151	Fax #	

June 18, 1996

JSPLTR 96-0094

U. S. Nuclear Regulatory Commission
Washington, D.C. 20555
ATTN: Document Control Desk

Subject: Commonwealth Edison Company
10 CFR Part 21 Final Report (File 9601)
Deficiency of Model 12HGA17S63 Relays Manufactured by General Electric Company.

The purpose of this letter is to notify the NRC Staff of concerns by Commonwealth Edison Company toward the failures of Model 12HGA17S63 relays manufactured by General Electric Company. The suspect relays were purchased from General Electric Supply, and qualified and dedicated for safety related use by Nutherm International Inc. These relays were installed in the reset logic for Primary Containment Isolation System (PCIS) at Dresden Station Units 2 and 3.

ComEd has determined that the difference in the inside face to face dimension of the phenolic contact finger carrier block made from mold number 1 is small and under certain conditions provides friction between it and the coil bracket at the pivot point. This friction is believed to be the cause of the relay's failure to open when de-energized.

Immediate Corrective Actions were to identify all defective relays on Unit 3 by removing all relays from the plant subjecting each to special testing at the corporate Materials Engineering test facility. Only relays which passed this test were reinstalled in the plant. Replacement relays were tested in a similar manner.

An operability evaluation was generated to document the acceptability of similar relays installed in Unit 2. This evaluation included compensatory measures of additional operator actions to ensure isolation valves would not open unexpectedly.

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The relays installed in Unit 2 have subsequently been tested and replaced as required.

Provided as an attachment to this letter is ComEd's notification in accordance with the requirements of 10 CFR Part 21.

As stated in the attached report, the defective component was identified only at ComEd Dresden Station. The Part 21 Notification has been forwarded to other ComEd stations for their review. If there are any questions regarding this notification, please direct them to Frank Spangenberg, Dresden Station Regulatory Assurance Manager, at (815) 942-2920, extension 3800.

Very Truly Yours,

J. Stephen Perry
Site Vice President
Dresden Station

Attachment

cc: H. J. Miller, Regional Administrator, Region III
P. L. Hiland, Branch Chief, Division of Reactor Projects, Region III
J. F. Stang, Project Manager, NRR (Unite 2/3)
C. L. Vanderniet, Senior Resident Inspector, Dresden
Office of Nuclear Facility Safety - IDNS
File: Numerical

COMMONWEALTH EDISON COMPANY
10CFR PART 21 NOTIFICATION

General Electric 12HGA17S63 Series Relays

Part 21 File Number 9601, June 12, 1996

Applicability:

This notification is submitted in accordance with the requirements of 10CFR Part 21, section 21.1(b), 21.3a(3), and 21.3d(4).

Identification of Facility and Component:

This notification concerns Model 12HGA17S63 relays manufactured by the General Electric Company. The suspect relays were purchased from General Electric Supply, and qualified and dedicated for safety related use by Nutherm International Inc. These relays were installed in the reset logic for Primary Containment Isolation System (PCIS) at Dresden Station Units 2 and 3.

A review of station stores data has indicated that Dresden is the only ComEd Station which uses this type of relay in similar applications. Notification of this event has been provided to other ComEd plants for use in final determination of usage.

Identification of Component and Manufacturer:

Purchased, Qualified and Dedicated by:
Nutherm International Inc.
501 South 11th Street
Mt. Vernon, IL 62864

Supplied by:
General Electric Supply
PO Box 1230
Fenton, MO 63026

Nature of Defect:

Relay part number 12HGA17S63 is a 15 cycle time delay relay with one single pole double throw and one normally closed contacts. It is a surface mounted front connect unit (S) with a unit rating of 115 VAC 25 or 60 Hz (63). The maximum pull in voltage for this unit is published as 46 VAC; the minimum drop out voltage, not published but measured during testing, is 6.3 VAC.

The General Electric 12HGA17S63 relay is derived from the 12HGA11 series relay with manufacturer installed modifications to achieve the nominal 15 cycle time delay. The 12HGA17S63 timing element is a thick copper tube which is inserted over the coil's core. This tube, in effect, is a single turn coil. When the coil is de-energized, the collapsing field induces a current in the tube which, in turn, develops a magnetic field. This field holds in the armature for the stated 15 cycle time delay on de-energization. The strength of the magnetic field developed by the copper tube is weak in comparison to the relay coil's field, therefore, armature return spring tension is reduced so as to not over compensate for the weak induced magnetic field. With only 6 volts required to hold the armature in, the

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copper tube is capable of providing a 15 cycle delay. This balanced armature design is very sensitive to any binding that may occur in the pivot area of the armature to the coil frame, the spring constant of the armature return spring, contact wear or any residual magnetism present in the coil assembly.

The armature assembly is made up of two contact fingers, one contact finger hold-down spring block and name plate, one contact finger carrier block, and the armature strike plate. One machine screw holds the assembly together. Binding has been noticed to occur when the contact finger carrier block rubs against the coil bracket that the armature assembly hinges on. Close examination revealed that the contact finger carrier block is molded from one of two molds. The dimension of the two inside faces of the mold that can come in contact with the coil bracket at the pivot point on relays with the identifier mold 1, is smaller than the same dimension taken from mold number 2.

ComEd has determined that the difference in the inside face to face dimension of the phenolic contact finger carrier block made from mold number 1 is small and under certain conditions provides friction between it and the coil bracket at the pivot point. This friction is believed to be the cause of the relay's failure to open when de-energized. This information has been provided to the relay manufacturer, General Electric and to Nutherm International Inc. who performed qualification testing on the relays at the time of installation.

Time of Discovery:

On May 15, 1996, two relays in the PCIS system on Dresden Station Unit 3 failed to reposition upon removing power from the relay coil. In response to this event, failure analysis testing was commenced.

On June 11, 1996, ComEd concluded that the failure of this relay was due to differences in dimensional tolerances which occurred during the manufacturing process.

On June 11, 1996, ComEd determined that although these relays were installed in the reset portion of the isolation circuitry, and the primary containment isolation would occur as designed, the failure could affect the ability of the operator to maintain control of containment isolation valves upon resetting an isolation signal. If this situation would have occurred with multiple concurrent relay failures, the result would have been the opening of multiple valves without operator intervention and thus could have complicated operator control of post accident evolutions. Therefore, ComEd concludes that this failure could result in a substantial safety hazard.

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Number and Location of Defective Components in Use:

All defective components have now been removed from Dresden Station Units 2 and 3. These components were originally installed in panels 902(3)-61 and 62 in the services listed below:

Relay	Associated Isolation Valve	
203-1AR2	203-1A	MSIV
203-1BR2	203-1B	MSIV
203-1CR2	203-1C	MSIV
203-1DR2	203-1D	MSIV
203-2AR2	203-2A	MSIV
203-2BR2	203-2B	MSIV
203-2CR2	203-2C	MSIV
203-2DR2	203-2D	MSIV
220-44R	220-44	Steam Line Drain
220-45R	220-45	Steam Line Drain
1301-17R	1301-17	Isolation Condenser Vent
1301-20R	1301-20	Isolation Condenser Vent

Corrective Actions:

Immediate Actions were to identify all defective relays on Unit 3 by removing all relays from the plant subjecting each to special testing at the corporate Materials Engineering test facility. Only relays which passed this test were reinstalled in the plant. Replacement relays were tested in a similar manner.

An operability evaluation was generated to document the acceptability of similar relays installed in unit 2. This evaluation included compensatory measures of additional operator actions to ensure isolation valves would not open unexpectedly.

The relays installed in Unit 2 have been subsequently tested and replaced as required.

Contacts:

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