P.O. BOX 3100 MIAMI, FLORIDA 33101

FLORIDA POWER & LIGHT COMPANY

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Mr. John F. O'Leary, Director
Directorate of Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

TURKEY POINT UNIT NO. 3
DOCKET NUMBER 50-250
SUPPLEMENT TO ABNORMAL OCCURRENCE NO. 3-73-2
FAILURE OF NO. 3A COMPONENT COOLING WATER PUMP
MOTOR TO AUTOMATICALLY START

Dear Mr. O'Leary:

I. INTRODUCTION

On March 19, 1973, Abnormal Occurrence Report No. 3-73-2, which concerned the failure of No. 3A Component Cooling Water Pump Motor to automatically start, was submitted in accordance with Technical Specification 6.6.2.a for Turkey Point Unit No. 3, Operating License No. DPR-31.

This supplemental report presents the results and evaluation of tests performed to provide assurance that the cause of the failure of No. 3A Component Cooling Water Pump to automatically start was determined and corrected.

II. PROBLEM AND INVESTIGATIVE ACTION

BACKGROUND:

During the performance of a functional test which intentionally de-energized both No. 3A and 3B, 4160 volt buses, No. 3A Component Cooling Water Pump Motor failed to automatically start. Investigation by plant personnel revealed that a set of contacts in the emergency load sequencer relay were "welded" together in the closed position. An interlock feature associated with No. 3A Component Cooling Water Pump Motor circuit breaker closing circuit, prevented this circuit breaker from closing as long as these relay contacts were "welded" together in the closed position. This resulted in the failure of No. 3A Component Cooling Water Pump Motor to automatically start during the functional test involving the loss of voltage to both Nos. 3A and 3B, 4160 volt buses.

TEST METHOD AND RESULTS:

1. The circuit involving the "welded" relay contacts was changed to use a spare set of contacts in the same emergency load sequencer relay. No. 3A Component Cooling Water Pump Motor circuit breaker was then tested and performed satisfactorily. This test demonstrated that the cause of the failure of No. 3A Component Cooling Water Pump Motor to automatically start was caused by the "welded" contacts in the emergency load sequencer relay.

2. A Spare circuit breaker of the same type as No. 3A Component Cooling Water Pump Motor circuit breaker was placed in the installed 4160 volt circuit breaker test stand. A test circuit was established to operate the breaker in the test stand using a spare set of contacts in the emergency load sequencer relay. The Spare breaker was closed and opened about 100 times while using the test circuit and observing the performance of the relay contacts. Visual inspection of the relay contacts at the conclusion of the test showed no signs of arcing, overheating, or other abnormalities.

3. No. 3A Component Cooling Water Pump Motor breaker was then tested under the identical test conditions described above. After about five cycles of circuit breaker operation, the relay contacts were observed to be arcing or flashing over. While continuing to test this breaker, the tips of the relay contacts showed signs of significant overheating. This test was concluded when the relay contacts "welded" closed and the circuit breaker would not operate. This same test was rerun using another spare set of relay contacts and identical results were obtained. This second set of relay contacts "welded" closed and the breaker would not operate.

   A review and evaluation of both of the above tests concluded that components within the No. 3A Component Cooling Water Pump Motor circuit breaker were causing the emergency load sequencer relay contacts to be "welded" closed.

4. An investigation was made of the components installed in the closing circuit of No. 3A Component Cooling Water Pump Motor circuit breaker during the test which caused the "welding" of emergency load sequencer relay 34Y/3A3b contacts. This inspection revealed no indications of problems with the limit switches, connections, or indications of overheating. Accordingly, the installed circuit breaker closing coil was removed and replaced with a new closing coil. No. 3A Component Cooling Water Pump circuit breaker was tested under the idential test conditions described above. Visual observation of the relay during about 100 cycles of operation showed no signs of arcing, overheating or other abnormalities. Review and evaluation of the results of this test concluded that the closing coil was the component which caused the emergency

load sequencer relay contacts to be "welded" together in the closed position.

5. The closing coil, which was removed from No. 3A Component Cooling Water Pump Motor circuit breaker, was meggered and the insulation was found to be satisfactory. The resistance of this closing coil was then measured and compared with the resistance of a new closing coil. This comparison showed that the resistance of this closing coil was within expected tolerances. This closing coil was then disassembled for a visual inspection for any abnormal conditions. The varnish insulation was found to be satisfactory and no abnormalities were found.

   Although a review of results of inspections of the closing coil indicated no significant differences between measured values of electrical characteristics of the closing coil and those of a new closing coil, evaluation of the results of performance tests with the closing coil and a new closing coil concluded that the closing coil was breaking down under load and became defective during operation of the circuit breaker. This was demonstrated during repeated operation of the circuit breaker which resulted in excessive current flow in the closing coil circuit and the emergency load sequencer relay contacts were welded together.

III. DISCUSSION

A review and analysis of the results of these tests, inspections, and checks performed on the emergency load sequencer relay and the circuit breakers concluded that the failure of No. 3A Component Cooling Water Pump Motor to automatically start was caused by the emergency load sequencer relay contacts being welded together in the closed position.

Additional tests showed that the components installed within the No. 3A Component Cooling Water Pump Motor circuit breaker closing circuit caused arcing, overheating and welding of the relay contacts. Removal and replacement of the installed closing coil with a new closing coil in the No. 3A Component Cooling Water Pump Motor circuit breaker eliminated the problem of arcing, overheating and welding of the emergency load sequencer relay contacts.

IV. CORRECTIVE ACTION TO PREVENT RECURRENCE

Installation of a new closing coil in the No. 3A Component Cooling Water Pump Motor circuit breaker has corrected the problem of arcing, overheating and welding relay contacts associated with emergency load sequencer relay 34Y/3A3b. This was demonstrated by operating this breaker through about 100 cycles with no visual indications of arcing, overheating or damage to relay contacts.

V. CONCLUSIONS

a. A review and evaluation of test results presented above concluded that the failure of No. 3A Component Cooling Water Pump Motor to automatically start was caused by emergency load sequencer relay contacts being welded together in the closed position.

b. Tests demonstrated that the components installed within the No. 3A Component Cooling Water Pump Motor circuit breaker caused arcing, overheating and welding of the relay contacts in the emergency load sequencer relay, and were unique to No. 3A Component Cooling Water Pump Motor circuit breaker.

c. Although a review and evaluation of the results of inspections and electrical tests of the closing coil installed in the 3A Component Cooling Water Pump motor circuit breaker did not indicate any significant defects in the closing coil, it was concluded that the closing coil was breaking down under load and caused excessive current flow in the closing coil circuits during operation of the circuit breaker.

d. Review of operation and maintenance records for Unit Nos. 3 and 4 revealed that a similar incident involving No. 3A Component Cooling Water Pump motor breaker occurred on August 17, 1972. In view of the analysis and evaluation presented above, it may now be concluded that this failure of No. 3A Component Cooling Water Pump motor breaker to close was caused by emergency load sequencer relay contacts being welded together as a result of excessive current flow in the closing coil circuits during operation of the circuit breaker.

e. Installation of a new closing coil in No. 3A Component Cooling Water Pump motor circuit breaker closing circuit corrected the problem of arcing, overheating and welding of emergency load sequencer relay contacts. This corrective action should prevent the recurrence of this and similar incidents.

Very truly yours,

A. D. Schmidt
Director of Power Resources

ADS/JKH/DWJ/VTC/mlw

cc: Mr. Norman C. Moseley, Director
Region II, Directorate of Regulatory Operations
U.S. Atomic Energy Commission
Suite 818, 230 Peachtree Street, N.W.
Atlanta, Georgia 30303