Central File
50-261

CP&L

Carolina Power & Light Company

May 4, 1976

File: NG-3513 (R) Serial: NG-76-652

Mr. Norman C. Moseley, Director
U. S. Nuclear Regulatory Commission
Region II, Suite 818
230 Peachtree Street, N.W.
Atlanta, Georgia 30303

Dear Mr. Moseley:

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET 50-261
LICENSE DPR-29
RESPONSE TO IE BULLETIN 76-05

In response to your Bulletin 76-05 regarding Westinghouse BFD relay failure, we wish to report the actions to mitigate the recurrence of the relay failure which occurred at H. B. Robinson.

Subsequent to the relay failures, procurement of sufficient replacement relays with newer coil style (1259C71G19) was initiated. Measurements were made of the drop-out times of all normally energized relays performing reactor trip or safeguards initiation functions. As a result of these measurements, one additional relay was replaced. Its drop-out time exceeded the vendor design value by three milliseconds. Temperature measurements were performed inside the relay cabinets and at the coil surfaces and the information was forwarded to Westinghouse for their evaluation. The maximum coil temperature recorded during these measurements was 202°F. Additionally, equalizing battery charges, performed before relay replacement, were restricted to that frequency required by plant Technical Specifications with a duration administratively limited to twenty-four hours.

Prior to receipt of the new relays, an equalizing battery charge was performed as described above. Subsequent to the charge, drop-out times were again measured. This second measurement revealed no apparent change to the operating characteristics of the relays as a result of the battery charge.

In anticipation of a replacement of all BFD relays, approximately two hundred units were ordered. Since the normally energized application was of a more immediate concern, these relays were replaced first. By March 15, 1976, all normally energized BFD relays in the Reactor Protection and Reactor Safeguards Systems were replaced by relays with the new coil style (1259C71G19).

336 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

Disassembly and inspection of an older style normally deenergized BFD relay revealed no unusual deterioration or discoloration. These results notwithstanding, it was intended to replace these relays with the newer style coil as well. However, due to the potential for spurious trips associated with relay replacement during power operation and considering the present condition of these relays, this installation has been rescheduled for the next refueling outage.

It is believed that the replacement of the older style coil with the more reliable coil described in the Westinghouse service letter is adequate to effectively resolve the relay problem. Therefore, no additional action regarding IE Bulletin 76-05 is considered necessary at this time.

Yours very truly,

E. E. Utley
Vice President
Bulk Power Supply

CSB:jwk

cc: Messrs. W. G. McDonald
E. Volgenan

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
230 PEACHTREE STREET, N. W. SUITE 818
ATLANTA, GEORGIA 30303

APR 5 1976

In Reply Refer To:
IE:II:NCM
50-325
50-324
50-261

Carolina Power and Light Company
ATTN: Mr. J. A. Jones
Executive Vice President
Engineering, Construction and
Operation
336 Fayetteville Street
Raleigh, North Carolina 27602

Gentlemen:

Enclosed is IE Bulletin No. 76-05 which requires action by you with regard to your power reactor facility(ies) with an operating license or a construction permit.

Should you have questions regarding this Bulletin or the actions required of you, please contact this office.

Sincerely,

Norman C. Moseley
Director

Enclosure:
IE Bulletin No. 76-05

NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D. C. 20555

IE Bulletin No. 76-05
Date: April 5, 1976

RELAY FAILURES - WESTINGHOUSE BFD RELAYS

DESCRIPTION OF CIRCUMSTANCES:

Three defective Westinghouse (W) type BFD relays were identified during recent testing of the Reactor Protection System at the H. B. Robinson Unit 2 facility. One relay had an open circuit failure and the others had excessive opening times. The relays which failed were (W) type BFD with coil style 503C428G21 rated for 125/130 volts dc (plus or minus 10%). These relays are normally energized from the 125 volt dc bus and, therefore, will be subject to 140 volts dc during battery charging operations.

The relay manufacturer has determined that the three relay failures were caused by overheating of the relay coils. It was found that the overheating may result in coil insulation breakdown or melting of the coil solder joints, either of which may lead to an open circuit failure. Also, the overheating may result in deformation of the nylon coil sleeve in which the plunger travels, and this may adversely affect the relay opening time.

The defective coil style 503C428G21 may be identified by its varnished cloth outer cover. Manufacture of relays with these coils was discontinued in 1973, and they have been superseded by coil style 1259C71G19. This later coil style may be identified by its molded outer form. Portions of a (W) service letter containing information about these relays is attached to this bulletin. Further instructions regarding this relay problem can be obtained from Westinghouse Nuclear Service Division, Pittsburgh, Pennsylvania 15230.

ACTION TO BE TAKEN BY LICENSEES AND PERMIT HOLDERS

FOR ALL POWER REACTOR FACILITIES WITH AN OPERATING LICENSE OR CONSTRUCTION PERMIT:

1. If you have received the attached (W) service letter, describe the actions taken regarding corrective measures to resolve the relay problem as discussed in the attached (W) service letter.

2. If you have not received the attached (W) service letter, describe the actions planned if relays of the type and style described in the attached (W) service letter are in use or planned for use in safety related systems at your facility.

3. With regard to Item 2 of the attached (W) service letter, if the opening time of any older style BFD relay exceeds 30 milliseconds, the component should be modified or replaced promptly with a relay which is more suitable for the application.

4. With regard to Item 3 of the attached (W) service letter, if the temperature of the relay coil is found to exceed 212 degrees F during operation, provide a means for reducing this temperature. In the report submitted describe the means for maintaining steady state temperature below 212 degrees F.

Reports for facilities with operating licenses should be submitted within 30 days after receipt of this bulletin, and reports for facilities with construction permits should be submitted within 60 days after receipt of this bulletin. Your report should include the date when the above actions were or will be completed.

Reports should be submitted to the Director of the NRC Regional Office and a copy should be forwarded to the NRC Office of Inspection and Enforcement, Division of Reactor Inspection Programs, Washington, D. C. 20555.

Approval of NRC requirements for reports concerning possible generic problems has been obtained under 44 U.S.C 3512 from the U. S. General Accounting Office. (GAO Approval B-180255(R0072), expires 7/31/77)

ATTACHMENT:
Extract from Westinghouse service letter:
BFD RELAYS

EXTRACT FROM WESTINGHOUSE SERVICE LETTER:

BFD RELAYS

During recent periodic testing at an operating nuclear power plant, three defective BFD (dc) relays were detected during testing of Reactor Protection logic circuits. One relay coil had failed open and the other two demonstrated abnormally long drop-out times. These failures appeared to be due to overheating of the relay coils, resulting in coil insulation breakdown, or sufficient heat-induced deformation to adversely affect relay drop-out characteristics.

The relays which failed are Westinghouse type BFD, (deleted), with style 503C428G21 coils. These coils are visually identifiable by their varnished cloth cover outer layer (as opposed to molded coils). These control relays are used in dc application only. Type BF (ac) relays, and AR or ARD relays are not involved.

Even though the relay coils are rated at 125-130 volts dc $\pm$ 10%, and suitable for application where occasional battery equalization charging condition of 140 volts appear on the dc bus, a design review has confirmed that the elevated temperature developed during elevated voltage operation is sufficient to cause accelerated aging of the relay, and can result in coil degradation.

Manufacture of these relays was discontinued in late 1973, and they were superseded by BFD style 5069A95, with style 1259C71G19 coils. These new coils are visually identifiable by the molded outer form.

The new relay can be used to replace the old, with all operational characteristic being equal to, or better than the old. In addition, the new coil, having a different class insulation should provide a higher level of reliability through less susceptibility to overtemperature degradation. The new coils are dimensionally not suitable for mounting on the old relay. Therefore, replacement of the entire relay is required. Additional testing is being initiated to reaffirm a higher level of reliability of this new relay.

In order for Westinghouse to complete our investigation of this matter and establish a final recommendation, all operating plants are requested to provide the following information as soon as possible.

1. Advise normal dc bus voltage; bus voltage during battery equalizing charge; normal duration of equalizing charge; and normal frequency of equalizing charge.

2. Conduct relay drop-out time measurements (in milliseconds) of all BFD relays which provide reactor trip functions or safeguards initiation, and which are energized during normal operation on the dc bus which is subjected to battery equalizing potential.

3. Advise ambient temperatures of relay racks housing the relays in question.

4. Testing of relay drop-out times should be repeated if equalizing charging is required within the next 30 days.

5. Westinghouse recommends that equalizing charging on the dc bus should not exceed 140 volts, and 24 hours duration.