



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO EVALUATION OF MOTOR CONTROL CENTER 5 AND 6 BREAKER

INTERRUPTING CAPACITY

CAROLINA POWER & LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261

BACKGROUND

A safety System Functional Inspection (SSFI) was conducted at the Carolina Power and Light (CP&L) Company's H. B. Robinson 2 (HBR-2) during March 9-27, 1987. The SSFI team found that not all the molded case circuit breakers (MCCB) on motor control centers (MCC) 5 and 6 are adequately sized to interrupt the worst case fault current. CP&L has submitted a special report titled "MCC 5/6 Breaker Interrupting Capacity Evaluation for H. B. Robinson, Unit 2, Calculation Set RN-107-E-41-F dated May 15, 1987, Rev. 1." The report concluded that the deficient breakers did not need to be replaced because the fault current interrupting capability of these breakers was sufficient to prevent catastrophic failure during fault clearing.

EVALUATION

In the report, the calculated maximum available fault current for MCC 5 bus fault is 15,753 amps symmetrical/18,620 amps asymmetrical. It occurs when the unit is in cold shutdown and emergency diesel generator (EDG) A is paralleled with the grid. Also, the calculated maximum available fault current for MCC 6 bus fault is 14,782 amps symmetrical/18,927 amps asymmetrical. It occurs when the unit is at full power and EDG B is paralleled with the grid. Although the short circuit rating of FA, FB, and EHB series MCCB on MCCs 5 and 6 has a UL-489 AIC rating of 14,000 amps symmetrical/15,000 amps asymmetrical, the licensee concluded that all breaker types used in those MCC have sufficient interrupting capability so long as maximum available fault current for the above MCCB does not exceed the "fail-safe" rating of 17,000 amps symmetrical/19,159 amps asymmetrical.

The licensee's conclusion was based on the "fail-safe" rating obtained by the Westinghouse Low Voltage Breaker Division under a proprietary test. This test allowed internal damage to the breaker which was beyond the Standard UL-489 test procedure. The Westinghouse letter to CP&L dated April 16, 1987 provided their test result which indicated 17,000 amps as the symmetrical interrupting rating while the asymmetrical rating of 19,159 amperes was derived by multiplying 1.127 times the symmetrical rating per UL-489 testing recommendation. On this basis, the licensee established 17,000 amps for symmetrical rating and 19,159 amps for asymmetrical rating for FA, FB, and EHB series MCCBs which had the lowest (limiting) short circuit rating.

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FINDINGS:

We found that the licensee's conclusion was solely based on a non-conventional "fail-safe" rating created for the Westinghouse proprietary test. Since we are not familiar with the test and it is not sanctioned by industry standards, we cannot accept the "fail-safe" rating. We have found that NEMA AB1-1986 "Molded Case Circuit Breaker and Molded Case Switches" is appropriate as it prescribes how the MCCB rating can be re-established through tests. Specifically, Section 4.3 "Rated Short Capacity Tests" outlines the selection of test sample and required sequence of tests. As a result, we found that the Westinghouse "fail-safe" rating was not appropriate to use. On this basis, we concluded that those breakers were not sized properly, thus requiring either replacement or requalification.

By letter from L. I. Loflin to NRC dated December 5, 1988, the licensee informed us that the existing Westinghouse type FA, FB and EHB series breakers on MCCs 5 and 6, which have a UL-489 AIC rating of 14,000 amps, will be replaced with Westinghouse FD 3000 series breakers which have a rating of 25,000 amps. The letter also stated that the modification has already commenced and is expected to be completed during the current refueling outage. We find the replacement of those breakers acceptable.

CONCLUSION

Based on our findings that the existing Westinghouse type FA, FB, and EHB series MCCB on MCC 5 and 6 have been replaced with higher rated breakers, we conclude that all the MCCB on MCC 5 and 6 are adequately sized to interrupt the worst case fault current.

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