



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

SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-282 AND 50-306
GENERIC LETTER 83-28
REACTOR TRIP BREAKER AUTOMATIC SHUNT TRIP
ITEMS 4.2.1 AND 4.2.2

INTRODUCTION

On July 8, 1983, the Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 83-28. This letter addressed intermediate-term actions to be taken by licensees and applicants aimed at assuring that a comprehensive program of preventive maintenance and surveillance testing is implemented for the reactor trip breakers (RTBs) in pressurized water reactors. In particular, Item 4.2 of the letter required the licensees and applicants to submit a description of their preventive maintenance and surveillance program to ensure reliable reactor trip breaker operation. The description of the submitted program was to include the following:

- GL, Item 4.2.1 A planned program of periodic maintenance, including lubrication, housekeeping, and other items recommended by the equipment supplier.
- GL, Item 4.2.2 Trending of parameters affecting operation and measured during testing to forecast degradation of operation.

Northern States Power Company, the licensee for Prairie Island Units 1 and 2, submitted responses to the Generic Letter on November 4, 1983, January 4, 1985, and September 11, 1985. This report presents an evaluation of the adequacy of those responses and of the licensee's preventive maintenance and surveillance programs for RTBs.

2. EVALUATION CRITERIA

2.1 Periodic Maintenance Program

The primary source for periodic maintenance program criteria is Westinghouse Maintenance Program for DB-50 Reactor Trip Switchgear, Rev. 0. This document is the breaker manufacturer's recommended maintenance program for the DB-50 breaker and provides specific direction with regard to schedule, inspection and testing, cleaning, lubrication, corrective maintenance and record keeping. The document was reviewed to identify those items that contribute to breaker trip reliability consistent with the generic letter. Those items identified for maintenance at 6 month intervals that should be included in the licensee's RTB maintenance program are:

1. Verification of trip bar freedom
2. Verification of operating mechanism alignment and freedom
3. Retaining ring verification
4. Verification of nut and bolt tightness
5. Verification of pole bases physical condition
6. Verification of arcing and main contacts physical condition
7. Verification of insulating link's physical condition
8. Verification of wiring insulation and termination physical condition
9. Verification of arc chute physical condition
10. Verification of breaker cleanliness
11. Undervoltage Trip Attachment (UVTA) dropout voltage test and lubrication
12. Shunt Trip Attachment (STA) operation verification
13. Verification of operation of auxiliary switches
14. Inspection of positioning lever condition
15. Functional test of the breaker prior to returning it to service .

The licensee's RTB periodic maintenance should also include, on a refueling interval basis:

16. Verification of cell interlock operation
17. Examination and cleaning of breaker enclosure
18. Measurement of trip force required
19. Functional test of the breaker prior to returning it to service
20. Breaker response time for undervoltage trip.

All of the items listed above are recommended by the manufacturer except Item 20. This item is the breaker trip response time measurement which is implied by the IEEE Standard 279-1971.

2.2 Trending of Parameters

Generic Letter Item 4.2.2 specifies that the licensee's preventative maintenance and surveillance program is to include trending of parameters affecting operation and measured during testing to forecast degradation of operation. The parameters measured during the maintenance program described above which are applicable for trending are undervoltage trip attachment dropout voltage, trip force, and breaker response time for undervoltage trip. The staff position is that the above three parameters in addition to the breaker insulation resistance are acceptable and recommended trending parameters to forecast breaker operation degradation or failure. If subsequent experience indicates that any of these parameters is not useful as a tool to anticipate failures or degradation, the licensee may, with justification and NRC acceptability, elect to remove that parameter from those to be tracked.

3. EVALUATION

3.1 Evaluation of the Licensee Position on Item 4.2.1

The licensee has stated that his RTB maintenance procedure is being revised and that the revised procedure will include all but one of the items recommended by the staff for performance on a 6-month basis and all but two of the items recommended by the staff for performance on a refueling interval basis. The licensee performs all of his preventative maintenance on an annual, refueling interval, basis.

The 6-month item which is not included in the revised procedure is inspection of the positioning lever condition; the licensee assesses the condition of the positioning lever during cell interlock testing and during their refueling interval general inspection of breaker condition. The staff finds this licensee commitment to be an acceptable alternate method.

The two refueling interval items which are not included in the revised procedure are breaker undervoltage trip response time testing and functional test prior to returning the breaker to service; the licensee performs these items during pre-startup surveillance testing. The staff finds this licensee commitment to be an acceptable alternate method.

The licensee estimates an average of 41 manual or automatic trips per year for the breakers, including 34 test trips, and states that no RTB has failed to operate on demand in 10 years of plant operation. This is adequate justification for the extended maintenance interval and therefore the staff finds the annual maintenance interval acceptable.

3.2 Evaluation of the Licensee's Position on Item 4.2.2

The licensee measures and records undervoltage trip dropout voltage, trip force and breaker response time as part of RTB surveillance and maintenance; he does not measure insulation resistance. The licensee does not currently trend these parameters. While the staff recommends that the licensee measures, records and trends all four of these parameters, measurement and recording of three of them is an acceptable alternative until such time as the effectiveness of one or more in predicting degradation has been established.

4. CONCLUSIONS

Based on a review of the licensee responses, the staff finds the licensee position on Items 4.2.1 and 4.2.2 of the Generic Letter acceptable.

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