

**DRAFT**

SAFETY EVALUATION REPORT  
CATAWBA NUCLEAR STATION  
REACTOR TRIP SYSTEM RELIABILITY  
ITEMS 4.1, 4.2.1 AND 4.2.2 OF GENERIC LETTER 83-28

1. 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 4.1 of the letter required licensees and applicants to verify that all vendor-recommended reactor trip breaker modifications have been implemented. Item 4.2 required them 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 4.1            Confirmation that all vendor-recommended reactor trip breaker modifications have been reviewed and that either: each modification has, in fact, been implemented,  
or  
a written evaluation of the technical reasons for not implementing a modification exists and has been provided for review.
- 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.

Duke Power Company, the licensee for Catawba, submitted responses to the Generic Letter on November 4, 1983, and June 24, 1985. This report presents an evaluation of the adequacy of the licensee's responses and of his 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 Manual for DS-416 Reactor Trip Circuit Breakers, Rev. 0. This document was prepared for the Westinghouse Owners Group and is the breaker manufacturer's recommended maintenance program for the DS-416 breaker. It 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 six month intervals (or when 500 breaker operations have been counted, whichever comes first) that should be included in the licensee's RTB maintenance program are:

1. General inspection to include checking of breaker's cleanliness, all bolts and nuts, pole bases, arc chutes, insulating link, wiring and auxiliary switches;
2. Retaining rings inspection, including those on the undervoltage trip attachment (UVTA);
3. Arcing and main contacts inspection as specified by the Westinghouse Maintenance Manual;
4. UVTA check as specified by the Westinghouse Maintenance Manual, including replacement of UVTA if dropout voltage is greater than 60% or less than 30% of rated UVTA coil voltage;

5. Shunt Trip Attachment (STA) check as specified by the Westinghouse Maintenance Manual;
6. Lubrication as specified by the Westinghouse Maintenance Manual;
7. Functional check of the breaker's operation prior to returning it to service.

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

1. Pre-cleaning insulation resistance measurement and recording;
2. RTB dusting and cleaning;
3. Post-cleaning insulation resistance measurement and recording, as specified by the Westinghouse Maintenance Manual;
4. Inspection of main and secondary disconnecting contacts, bolt tightness, secondary wiring, mechanical parts, cell switches, instruments, relays and other panel mounted devices;
5. UVTA trip force and breaker load check as specified by the Westinghouse Maintenance Manual;
6. Measurement and recording of RTB response time for the undervoltage trip;
7. Functional test of the breaker prior to returning to service as specified by the Westinghouse Maintenance Manual.

## 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, response time for undervoltage trip and breaker insulation resistance. The staff position is that the above parameters 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 or applicant may, with justification and NRC approval, elect to remove that parameter from those to be tracked.

### 3. EVALUATION

#### 3.1 Evaluation of the Licensee's Position on Item 4.1

The licensee states that all vendor-related modifications have been incorporated in the RTBs at Catawba. The staff finds the licensee position on Item 4.1 to be acceptable.

#### 3.2 Evaluation of the Licensee's Position on Item 4.2.1

The licensee states that his periodic maintenance program for RTBs includes those six-month interval items listed above, but does not specify whether they are performed at six-month intervals or during refueling outages, nor does he provide any justification for an interval longer than six months.

The responses also indicate that the licensee performs UVTA trip force and breaker load check, RTB response time for undervoltage trip and functional test on at least a refueling interval basis. However, the applicant's periodic maintenance program does not include pre-cleaning insulation resistance measurement, RTB cleaning and dusting, post-cleaning insulation resistance measurement, or inspection of main and secondary contacts. The licensee contends that these items are not related to the safety function of the breaker and that Westinghouse "may consider

revising" their maintenance manual for the DS-416 RTBs to "reflect the clarifications provided" by the applicant. The staff finds the licensee's justification inadequate in view of the lack of substantiation and concurrence by Westinghouse.

The staff considers the licensee position on Item 4.2.1 to be unacceptable. The licensee must specify the frequency with which he performs that maintenance recommended for six-month intervals, and provide justification if that interval is greater than six months. The licensee must also include pre- and post-cleaning insulation resistance measurements, RTB cleaning and dusting, and inspection of main and secondary contacts in his maintenance program. The licensee must provide written technical justification for any position which does not meet the manufacturer's criteria identified in Section 2.1 of this SER.

### 3.3 Evaluation of the Licensee's Position on Item 4.2.2

The licensee has stated that Catawba currently records data for (a) undervoltage trip dropout voltage, (b) trip force, and (c) breaker response time for undervoltage trip. Catawba does not measure or record insulation resistance. The licensee has not identified the organization which will perform trend analysis, how often it will be performed or how the information derived from the analysis will be used to affect periodic maintenance. Rather, the licensee has taken the position that a formal trending program of the RTB parameters is not necessary or beneficial to predict degradation of operation. This position is based on operating and maintenance experience at McGuire and the results of life cycle tests soon to be released by the Westinghouse Owners Group.

The staff finds the licensee position on Item 4.2.2 to be unacceptable without additional justification. The licensee must implement a formal trending program as described in Section 2.2 of this SER and provide the staff with a description of his trending program. Alternatively, the licensee must demonstrate that a parametric trending program is of no value in predicting degradation of failure of RTBs due to both aspects of component life, cycling and aging.

#### 4. CONCLUSIONS

Based on a review of the licensee responses, the staff finds the licensee position on Item 4.1 of Generic Letter 83-28 to be acceptable, and the licensee positions on Items 4.2.1 and 4.2.2 of the Generic Letter to be unacceptable.