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 VARGA, S.A. Operating Reactors Branch 1

SUBJECT: Forwards response to 841203 request for addl info to complete review of Generic Ltr 83-28, Item 4.2.1 re periodic maint program for reactor trip breakers & Item 4.2.2 re trending of reactor trip breaker parameter.

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Carolina Power & Light Company

SERIAL: NLS-85-071

MAR 07 1985

Director of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
United States Nuclear Regulatory Commission
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
ADDITIONAL INFORMATION REGARDING GENERIC LETTER 83-28,
ITEMS 4.2.1 AND 4.2.2 - PREVENTIVE MAINTENANCE PROGRAM FOR
REACTOR TRIP BREAKERS/MAINTENANCE AND TRENDING

Dear Mr. Varga:

Your letter of December 3, 1984 requested additional information required to complete your review with regard to Generic Letter 83-28, items 4.2.1 and 4.2.2. Carolina Power & Light Company's (CP&L) response to your request is enclosed.

Questions your staff may have regarding this matter may be referred to Mr. Steve Floyd at (919) 836-6901.

Yours very truly,

S. R. Zimmerman
Manager

Nuclear Licensing Section

DB/crs (1215NLU)

Enclosure

cc: Dr. J. Nelson Grace (NRC-RII)
Mr. G. Requa (NRC)
Mr. H. Krug (NRC Resident Inspector - RNP)

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ENCLOSURE

H. B. ROBINSON UNIT 2 REQUEST FOR ADDITIONAL INFORMATION GL 83-28, ITEMS 4.2.1 AND 4.2.2, TASK A6814

NRC Request

INTRODUCTION

Carolina Power & Light Company submitted their response to Generic Letter 83-28 on November 4, 1983. That submittal has been reviewed with respect to Items 4.2.1 and 4.2.2 of the Generic Letter. The licensee's response was not sufficiently detailed to permit an evaluation of the adequacy of the periodic maintenance and trending programs for the breakers. The following additional information is required to evaluate compliance with Items 4.2.1 and 4.2.2.

NRC Request

1. Item 4.2.1 - Periodic Maintenance Program for Reactor Trip Breakers.

1.1 Criteria for Evaluating Compliance with Item 4.2.1

The Robinson Unit 2 Reactor Trip System utilizes Westinghouse DB-50 circuit breakers. The primary criteria for an acceptable maintenance program for this breaker are contained in Maintenance Program for DB-50 Reactor Trip Switchgear, Rev. 0, dated October 14, 1983, by Westinghouse. The NRC Staff, Equipment Qualification Branch, has reviewed and endorsed the Westinghouse Maintenance Program for DB-50 Switchgear. Specifically, the criteria used to evaluate compliance include those items in the Westinghouse program that relate to the safety function of the breaker, supplemented by those measures that must be taken to accumulate data for trending.

1.2 Issues Relating to Item 4.2.1

The licensee response states that Robinson has an annual periodic test procedure which includes contact cleaning, undervoltage and shunt trip testing for the reactor trip breakers. The submittal also states that, upon receipt of a Westinghouse compilation of switchgear maintenance information, the licensee will include appropriate information "in a future revision of the Plant Procedures."

Does the Robinson Unit 2 periodic maintenance program for the reactor trip breakers include, on a six month basis:

1. Verification of trip bar freedom;
2. Verification of operating mechanism alignment and freedom, using the procedure identified in the Westinghouse program;
3. Retaining ring verification, 33 places;

4. Verification of nut and bolt tightness;
5. Verification of pole bases physical condition;
6. Verification of arcing and main contacts physical condition, using the procedure identified in the Westinghouse program;
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, using the procedure identified in the Westinghouse program;
12. Shunt Trip Attachment (STA) operation verification;
13. Verification of operation of auxiliary switches;
14. Inspection of positioning lever condition, using the procedure identified in Westinghouse program;
15. Functional test of the breaker prior to returning it to service, using the procedure identified in the Westinghouse program.

Does the Robinson Unit 2 periodic maintenance program for the reactor trip breakers include, on a refueling interval basis:

1. Verification of cell interlock operation;
2. Measurement of trip force required, using the procedure identified in the Westinghouse program;
3. Breaker response time for undervoltage trip;
4. Functional test of the breaker prior to returning it to service, using the procedure identified in the Westinghouse program.

The licensee is to confirm that the periodic maintenance program includes these 19 items at the specified intervals or commit to their inclusion.

CP&L Response

The periodic maintenance program for reactor trip breakers at Robinson is performed on a 12-month basis (or prior to startup if due during an outage) and is based upon the Westinghouse Program. The 12-month interval of the maintenance was selected based on operational usage and experience with the reactor trip breakers at Robinson.

The 12-month interval periodic maintenance program contains the following items for each reactor trip breaker:

1. Checks for free, non-binding movement of the trip bar.
2. Checks for freedom of movement and proper operating mechanism alignment.
3. Checks that visible retaining rings are secure in 33 places.
4. Checks visible bolts and nuts for tightness.
5. Checks physical condition of pole bases.
6. Checks arcing and main contacts for physical condition.
7. Checks physical condition of insulating link.
8. Checks for loose wiring and damaged insulation.
9. Checks physical condition of arc chutes.
10. Checks for cleanliness.
11. Checks physical condition and proper adjustment of UVTA, lubricates UVTA. See the response regarding UVTA dropout voltage testing exception included in Section 4.2.2 response item 1.
12. Checks STA operation and physical condition.
13. Checks physical condition and contact engagement of auxiliary switches.
14. Checks physical condition of positioning lever.
15. Functionally tests breakers prior to placing them in service.
16. Checks cell interlock operation.

The refueling interval periodic maintenance on reactor trip breakers contains the following items:

1. Breaker response time measurement for undervoltage trip.
2. Functionally tests breakers prior to placing them in service.
3. See the response regarding breaker trip force testing exception included in Section 4.2.2 response item 2.

NRC Request

2. Item 4.2.2 - Trending of Reactor Trip Breaker Parameters to Forecast Degradation of Operability

2.1 Criteria for Evaluating Compliance with Items 4.2.2

Four parameters have been identified as trendable and are included in the criteria for evaluation. These are (1) undervoltage trip attachment dropout voltage, (2) trip force, (3) breaker response time for undervoltage trip, and (4) breaker insulation resistance.

2.2 Issues Relating to Item 4.2.2

The license submittal states the licensee "will trend breaker opening response time for each Reactor Trip Breaker. This program is currently under development with estimated completion date of March 1984." It is not clear whether the response time is for a shunt or undervoltage trip.

The licensee is to commit to inclusion of trip force, breaker response time and dropout voltage for undervoltage trip and breaker insulation resistance as trending parameters. The licensee should also identify the organization which will perform trend analysis, how often the analysis will be performed and how the information derived from the analysis will be used to affect periodic maintenance.

CP&L Response

(1) UVTA dropout voltage is not routinely measured.

The reason for measuring and trending the UVTA dropout voltage is to detect degradation that may lead to failure so that corrective action may be taken prior to the failure. Since the UVTA is routinely replaced every 5 years (with a fully certified & tested UVTA from Westinghouse), we need only to have a method to detect UVTA degradation that may lead to failure between the routine replacements. This is satisfied by our breaker trip response time test and trending.

The breaker response time test detects degradation in other parts of the breaker in addition to detecting degradation in the UVTA. The response time test provides more information than the dropout voltage test and is a better indicator of overall breaker performance. Once a slow breaker response time is measured or when a slowing trend is noted, corrective action is taken to identify the deficient component and to correct the condition. The response time test is performed every refueling. Each UVTA will nominally have this test performed 3 times during its installed lifetime. Currently, response times are running around 50% of the response time limit and are steady.

In addition to response time testing, proper operation of UVTA is routinely verified at the following intervals:

- Prior to startup
- Monthly (while critical)
- 10 times annually during inspection and testing
- During response time testing every refueling
- 10 times following routine UVTA replacement every 5 years
- Following any corrective breaker maintenance
- 10 times following any corrective maintenance on the UVTA

Since response time testing is presently performed, since response time testing identifies degradation in the UVTA as well as in other components that affect tripping, and since low voltage dropout measurements provide redundant information only on the UVTA, it is not necessary to perform UVTA low voltage dropout measurements on a routine basis.

(2) The mechanical trip force of the trip bar and UVTA is not routinely measured.

This test checks that the UVTA operating force exceeds the force necessary to trip the breaker by a specified amount. This test is performed to detect degradation in the trip mechanism and UVTA prior to a failure.

This test is performed in two segments. The first part is performed by measuring the force it takes to move the trip bar and the trip breaker. The second part checks that the UVTA can still trip the breaker with an added weight suspended from the trip bar. Test results are very sensitive to the technique used to measure and apply the force/weights to the trip bar, and the results are prone to errors. Westinghouse has stated that new, fully certified UVTAs may not even pass this force test. In this case, they say you may have to go ahead and install the device as long as the device still trips the breaker. Therefore, the test is inconclusive.

The present RT breaker test and maintenance activities can adequately detect degradation without performing this test. Smooth, free movement of the trip bar is checked during the annual inspection. UVTAs are replaced with fully certified UVTAs

from Westinghouse at 5-year intervals. These UVTAs have passed Westinghouse's extensive qualification program prior to receipt at HBR. Trip response time testing will detect degradation in both the UVTA and the trip mechanism. Proper operation of the UVTA to trip the breaker is tested periodically as follows:

- Prior to startup
- Monthly (while critical)
- 10 times annually during inspection and testing
- During response time testing every refueling
- 10 times following routine UVTA replacement every 5 years
- Following any corrective breaker maintenance
- 10 times following any corrective maintenance on the UVTA

Performing the Westinghouse recommended force test is inconclusive and is considered not to be a meaningful measure of UVTA operability. Therefore, adding this test to the existing maintenance activities is not necessary.

- (3) The breaker opening time due to undervoltage trip is measured and trended on a refueling interval by maintenance personnel. Appropriate corrective action is taken whenever adverse results are identified by trending analyses.
- (4) Breaker insulation resistance is not trended since it is not a part of the Westinghouse Maintenance Program for DB-50 Reactor Trip Switchgear.

Life cycle testing of the shunt trip attachment and the undervoltage trip attachment (UVTA) of the reactor trip switchgear is being conducted by Westinghouse for the WOG. This program is aimed toward establishing the service life of these devices, and substantiating periodic test requirements with proper maintenance, replacement and qualification programs. In addition, the WOG has undertaken an effort to review the plant-specific histories of reactor trip switchgear performance and perform a reliability assessment of the data obtained. The HBR2 staff will review the results of the above study and testing and will make appropriate revisions to the plant maintenance program as necessary.