



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
NORTHEAST NUCLEAR ENERGY COMPANY, EL AL.
MILLSTONE NUCLEAR POWER STATION, UNIT 2
DOCKET NO. 50-336
REACTOR TRIP SYSTEM RELIABILITY
ITEMS 4.2.1. AND 4.2.2 of GENERIC LETTER 83-28

1.0 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.

Northeast Utilities, the licensee for Millstone Nuclear Power Station Unit 2, submitted responses to the Generic Letter on November 8, 1983, and June 25, 1985. This report presents an evaluation of the adequacy of those responses and of the licensee's preventive maintenance and surveillance programs for RTBs.

2.0. EVALUATION CRITERIA

2.1 Periodic Maintenance Program

The primary criteria for an acceptable periodic maintenance program are contained in Maintenance Instruction GEI-50299EI, "Power Circuit Breakers, Types AK-2/2A-15, AK-2/3/2A/3A-25, AKU-2/3/2A/3A/-25," and Service Advice 175-9.35 and 175-9.20, by General Electric, and NRC IE Information Notice No. 85-58. The NRC staff has reviewed these items and endorsed the maintenance program they describe. The criteria include those items in the General Electric instructions and advisories that relate to the safety function of the breaker, supplemented by those measurements which must be taken to accumulate data for trending. Those items identified for maintenance at 6 month intervals that should be included in the licensee's RTB maintenance program are:

- a. Verification of breaker cleanliness and insulation structure; all foreign materials, such as paint, dust, or oil should be removed to prevent electrical breakdown between points of different potential;
- b. Verification of breaker physical condition, including wiring insulation and termination, all retaining rings, pole bases, arc quencher, stationary and movable contacts, and tightness of nuts and bolts;
- c. Verification of proper manual operation of the breaker, including checks for excessive friction, trip bar freedom, latch engagement, operating mechanism alignment and freedom, and undervoltage trip (UVT) device armature freedom;
- d. Verification of the optimum freedom of the armature;
- e. Verification of proper trip latch engagement as specified in Service Advice 175-9.3S, Item #S2.
- f. Verification of undervoltage pick-up setting, as specified in Service Advice 175-9.3S, Item #S3, and dropout voltage;
- g. Verification that the trip torque required on the trip shaft is less than 1.5 pound-inches, as specified in Service Advice 175-9.3S, Item #S4; "Before" and "After" maintenance torque values should be recorded;
- h. Verification of positive tripping by checking the adjustment between the UVT device and trip paddle as specified in Service Advice 175-9.3S, Item #S5;
- i. Verification of proper trip response time as specified in Service Advice 175-9.3S, Item #S6;
- j. Shunt Trip Attachment (STA) operation verification;
- k. Examination and cleaning of breaker enclosure;
- l. Functional test of the breaker prior to returning it to service.

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 to forecast degradation of operation. The parameters to be measured during the maintenance program described above which are applicable for trending are undervoltage trip attachment dropout voltage, trip torque, 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 in forecasting breaker operation degradation. If subsequent experience indicates that any of these parameters are not useful as a tool to anticipate failures or degradation, the licensee may, with justification and NRC approval, elect to remove that parameter from those to be tracked.

3.0 EVALUATION

3.1 Evaluation of the Licensee Position on Item 4.2.1

The licensee's response of June 25, 1985 indicates that his maintenance program includes or will include all of the maintenance items delineated in Paragraph 2.1 of this report to the extent described in Attachment 2 of the licensee response.

The licensee takes exception to the 6-month maintenance frequency of Items a, b, c, d, e, f, h, and k (Paragraph 2.1 of this report), performing them during each refueling outage instead. The average operating cycle at Millstone 2 is approximately 13 months. Items g, i, j, and l will be performed on the recommended 6-month basis. The licensee states that there have been no failures of the Millstone 2 reactor trip breakers. The service duty of the reactor trip breakers is stated to be significantly less than their design capability. The reactor trip breakers are located in a clean and dry environment. The licensee has replaced all trip shaft and latch roller bearings with Mobil 28 lubricated bearings.

The staff finds that the licensee's extended maintenance interval is acceptable. This acceptance is based on GE's recommendation that maintenance on RTBs located in mild environments should be performed annually. The vendor recommendation that RTBs located in harsh environments or experiencing severe load conditions be maintained more frequently is not applicable to these RTBs because of their location in a mild environment and reduced service duty at Millstone 2 (less than 200 RTB cycles annually).

The staff finds that the licensee's maintenance procedures meet the criteria defined in Paragraph 2.1 of this report, provided the licensee confirms that:

- a) The UVT device roller rivet-armature clearance is measured with the UVT armature down in the energized position, as recommended in IE Notice No. 85-58; and
- b) Check and adjustment of the trip latch engagement is performed as specified in Item S2 of the Service Advice 175-9.35. That is, the check and adjustment can only be performed by the method described in the applicable GE instruction manual; visual estimation of the latch engagement is not adequate.

3.2 Evaluation of the Licensee's Position on Item 4.2.2

The licensee will trend undervoltage trip attachment dropout voltage, trip force and breaker response time but does not trend breaker insulation resistance. The licensee states that the insulation resistance is verified by procedure to be greater than 5 megohms, and is normally greater than 100 megohms. Any discernible drop in this value would normally be corrected prior to returning the breaker to service. The licensee will perform any appropriate preventive or corrective maintenance if the analysis of the trend data indicates need for such action. The staff finds the licensee position on Item 4.2.2 acceptable.

4.0. CONCLUSIONS

Based on a review of the licensee response, the staff finds the licensee position on Item 4.2.1 acceptable, provided the licensee confirms those items discussed in Paragraph 3.1 of this report. The licensee position on Item 4.2.2 is acceptable to the staff.

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