



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

CONCERNING

THE REACTOR TRIP SYSTEM RELIABILITY

ITEMS 4.2.1 AND 4.2.2 OF GENERIC LETTER 83-28

FOR

ARKANSAS NUCLEAR ONE, UNITS 1 & 2

ARKANSAS POWER AND LIGHT COMPANY

DOCKET NOS. 50-313 & 50-368

I. 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.

Arkansas Power and Light Company, the licensee for Arkansas Nuclear One, Units 1 and 2, submitted responses to the Generic Letter on July 8, 1983, and April 23, 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 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 175-9.3S and 175-9.20, by General Electric, and NRC IE Information Notice No. 85-58. We have 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 six month intervals that should be included in the licensee's RTB maintenance program are:

1. 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;
2. 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;
3. 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;
4. Verification of the optimum freedom of the armature;
5. Verification of proper trip latch engagement as specified in Service Advice 175-9.3S, Item #S2.
6. Verification of undervoltage pick-up setting, as specified in Service Advice 175-9.3S, Item #S3, and dropout voltage;
7. 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;
8. 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;
9. Verification of proper trip response time as specified in Service Advice 175-9.3S, Item #S6;
10. Shunt Trip Attachment (STA) operation verification;
11. Examination and cleaning of breaker enclosure;
12. 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 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 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 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 approval, 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 states that his preventive maintenance program for RTBs contains all the elements detailed in Section 2.1 of the SE. The licensee states that while maintenance is currently performed at six-month intervals, it is anticipated that the maintenance interval will be extended to 12 months after one complete cycle of satisfactory operation using the new Mobil 28 lubricated trip shaft bearings. We have determined the licensee position on Item 4.2.1 to be acceptable, provided the licensee confirms that 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.

3.2 Evaluation of the Licensee's Position on Item 4.2.2

The licensee states that Arkansas Power and Light is a participant in and supports the activities of the B&W Owners Group for a Reactor Trip Breaker Reliability Monitoring Program, which is attempting to identify the most effective parameters to forecast breaker degradation or failure. That program includes collection of data on trip torque, breaker undervoltage trip response time and undervoltage trip pick up and dropout voltage. The licensee is providing these data to the B&W Owners Group Availability Group, which will perform trend analysis. We have determined the licensee position on Item 4.2.2 to be acceptable.

4. CONCLUSIONS

Based on a review of the licensee responses, we have determined the licensee positions on Items 4.2.1 and 4.2.2 of Generic Letter 83-28 to be acceptable, provided the licensee confirms that 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.

Dated: December 17, 1985

The following NRC personnel have contributed to this Safety Evaluation:
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