



GPU Nuclear Corporation
Post Office Box 480
Route 441 South
Middletown, Pennsylvania 17057-0191
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number:

June 24, 1985
5211-85-2092

Office of Nuclear Reactor Regulation
Attn: J. F. Stolz, Chief
Operating Reactor Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Stolz:

Three Mile Island Nuclear Station Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Response to NRC Request for Additional Information
(Generic Letter 83-28)

- References:
- (1) GPUN Letter 5211-83-330, H. D. Hukill to D. G. Eisenhut, "Required Actions Based on Generic Implications of Salem/ATWS Events" dated November 8, 1983
 - (2) NRC Letter 5211-84-3386, John F. Stolz to H. D. Hukill, dated December 4, 1984
 - (3) GPUN Letter 5211-85-2021, H. D. Hukill to J. F. Stolz, "Response to NRC Request for Additional Information" dated February 13, 1985

Reference (1) provided the GPUN response to Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem/ATWS Events," defining the degree of TMI-1 conformance as well as plans and schedules for upgrade to conform with the positions of the Generic Letter. Reference (2) transmitted NRC's request for additional information regarding the TMI-1 periodic maintenance and trending programs for reactor trip breakers, items 4.2.1 and 4.2.2 of the Generic Letter. Reference (3) transmitted GPUN's request to delay its response to Reference (2) until after submittal of a generic response by the B&WOG. Attachment 1 is the GPUN response to the NRC's request for additional information.

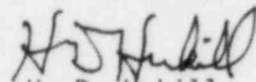
8506280032 850624
PDR ADOCK 05000289
P PDR

A055
1/1

June 24, 1985

In response to item 4.2.1 of the Generic Letter, GPUN in Reference (1) committed to revise Preventive Maintenance Procedure PM E-36, which contains the instructions for periodic maintenance, lubrication, cleaning, adjustments, and trip time testing, to incorporate the latest vendor recommendations. Procedure PM E-36 (Revision 12), which incorporates changes as described in Attachment 1, is available at the TMI-1 site for NRC review. Procedural changes discussed in Attachment 1 in response to item 4.2.1, part 12 will be incorporated in a later revision by August 1, 1985.

Sincerely,


H. D. Hukill
Director, TMI-1

HDH/MRK/spb:0298A

Attachment

NRC Question 1

Item 4.2.1 Periodic Maintenance Program for Reactor Trip Breakers

1.1 Criteria for Evaluating Compliance with Item 4.2.1

The Three Mile Island Unit 1 Reactor Trip System utilizes General Electric AK-2A circuit breakers. The primary criteria for an acceptable maintenance program for this breaker 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 advise 9.3S and 9.20, by General Electric. The NRC Staff, Equipment Qualification Branch, has reviewed these items and endorsed the maintenance program they describe. More specifically, the criteria used to evaluate compliance include those items in the General Electric instructions and advisors that related to the safety function of the breaker, supplemented by those measures that must be taken to accumulate data for trending. The acceptable maintenance activity interval is six months.

1.2 Issues Relating to Item 4.2.1

The licensee response identifies the procedure which contains the instructions for semi-annual maintenance (PM E-36) and states that it is being revised to incorporate the latest vendor recommendations. The referenced procedure was not included with the submittal.

The Three Mile Island Unit 1 periodic maintenance program for the reactor trip should include, on a six month basis:

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 proper optimum freedom of the armature as specified in General Electric Service Advice 175-9.3SA, item #S1;

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 #4; "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. Lubrication of trip shaft and latch roller bearings with Mobil 28 lubricant;
11. Shunt Trip Attachment (STA) operation verification;
12. Examination and cleaning of breaker enclosure;
13. Functional test of the breaker prior to returning it to service.

The licensee is to confirm that the periodic maintenance program includes these 13 items at the specified interval or commit to their inclusion and provide a date by which they will be included.

Response

As you are aware, GPUN participated in the B&W Owners Group (B&WOG) program to determine long term actions appropriate for improving the reliability of the RTBs. GPUN has replaced the roller bearings of its RTBs with bearings lubricated with Mobil 28 grease. G.E. recommends a 12 month preventative maintenance interval for those RTBs lubricated with Mobil 28. GPUN intends to maintain a 6 month maintenance interval until sufficient information is available to assess the breaker performance at the 12 month maintenance interval. Responses to the specific issues relating to item 4.2.1 are provided below.

1. Verification of the cleanliness of the breakers and insulation structure is covered under Section 6.8 of the Electrical PM Procedure E-36.
2. The physical condition of the breaker is currently inspected to Section 6.8 of Electrical PM Procedure E-36.

This section has been expanded to include inspection of wiring insulation and terminations, 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 is presently covered by Section 6.12 (Functional Check of Circuit Breaker).

Checks for excessive friction are covered by Section 6.2 (Breaker Trip Time Test).

Trip bar freedom is covered by Section 6.4 (Check of Trip Shaft Torque).

Latch engagement is checked by Section 6.7 (Latch Adjustment).

A check for operating mechanism alignment and freedom has been added to Section 6.8 (Clean and Inspect Breaker).

A check for the undervoltage trip (UVT) device armature freedom is covered by Section 6.5(a) (Check UV Device Armature Clearance) of Electrical PM Procedure E-36.

4. The optimum armature clearance is set per Section 6.5 of Electrical PM Procedure E-36. The clearance is set between 0.001 and 0.010 inches as per GE Service Advice 175-9.3S.
5. The trip latch engagement is adjusted per PM Procedure E-36 Section 6.7 (Latch Adjustment), per Service Advice 175-9.3S.
6. The undervoltage device pick-up and dropout voltage testing are covered under Section 6.3 of Electrical PM Procedure E-36. Nominal and acceptable setpoint values are the same as those in Service Advice 175-9.3S.
7. The trip torque required to trip the breaker is measured in Section 6.4 of PM Procedure E-36.

Maximum allowable trip torque is 24 oz/in (1.5 pound/in.), per Service Advice 175-9.3S. "Before" and "After" maintenance torque values are recorded.
8. The adjustment between the UVT device and the trip paddle is covered by Electrical PM Procedure E-36 Section 6.6. The overtravel limit from Service Advice 175-9.3S has been incorporated into Procedure E-36.
9. The verification of proper trip response time has been incorporated into Electrical PM Procedure E-36 Section 6.2, per Service Advice 175-9.3S.
10. The CRD breakers were sent to General Electric to have new trip shaft and latch roller bearings installed with Mobil 28 lubricant. All of the presently installed CRD breakers now contain the Mobil 28 lubricated bearings. The new bearings have an extended service life of approximately 10 times that of the Lubriko brand lubricant (General Electric Report No. 6691-5288-101, page 22).

(The service frequency for 6 month maintenance activity does not apply to the lubrication of the trip shaft and latch roller bearings.)

11. The verification of proper shunt trip operation is covered in Step 6.13 of the Electrical PM Procedure E-36. In addition, the shunt trip will be actuated during Technical Specification surveillance testing.
12. Currently, there is no specific step in Electrical PM Procedure E-36 calling for the examination and cleaning of the breaker enclosure. The enclosure is checked while performing breaker periodic maintenance.

PM Procedure E-10, Relay Cabinet/Control Cabinet Inspection, has Enclosure 6, #4 and Enclosure 7, #1 and #2 which cover the inspection and cleaning of the CRD breaker enclosure. Procedure E-10 is performed annually.

Additional steps will be incorporated into Electrical PM Procedure E-36 to cover cleaning and inspection of cubicals when PM Procedure E-36 is performed.

13. The functional test of the breakers prior to return to service is covered under Step 6.12 of Electrical PM Procedure E-36.

NRC Question 2

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

2.1 Criteria for Evaluating Compliance with Item 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 torque, (3) breaker response time for undervoltage trip, and (4) breaker insulation resistance.

2.2 Issues Relating to Item 4.2.2

The licensee submittal states that the licensee has participated in and supports the activities of the B&W Owners Group for a Reactor Trip Breaker (RTB) Reliability Monitoring Program. The B&W Owners Group response to GL 83-28, dated November 4, 1983, proposes "monitoring of critical performance parameters (particularly response time)" to identify the need for maintenance or replacement of breakers. It is not clear whether the response time is for a shunt or undervoltage trip.

The licensee is to commit to inclusion of trip torque, 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.

Response:

GPUN is participating in the B&WOG Reactor Trip Breaker Reliability Monitoring Program which includes trending of undervoltage device trip response time, trip shaft operating torque, undervoltage device pickup voltage, and undervoltage device dropout voltage. The program duration will be approximately two years. The program does not include breaker insulation resistance as a trending parameter because it was not considered appropriate for the objective of the program.

GPUN will provide B&W with trending data collected during RTB preventive maintenance. B&W will compile data from the member utilities and perform a trend analysis. The analyzed data will be compiled and reviewed by GPUN on a six month basis to determine if action is warranted.