



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 232 TO FACILITY OPERATING LICENSE NO. DPR-53
AND AMENDMENT NO. 208 TO FACILITY OPERATING LICENSE NO. DPR-69
BALTIMORE GAS AND ELECTRIC COMPANY
CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-317 AND 50-318

1.0 INTRODUCTION

By letter dated September 1, 1999, the Baltimore Gas and Electric Company (BGE or the licensee) submitted a request for changes to the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 Technical Specifications (TSs). The requested changes would: (1) Change the definition of Azimuthal Power Tilt in Technical Specification 1.1; (2) Correct the peak linear heat rate safety limit in Technical Specification 2.1.1.2; (3) Correct the DC voltage range listed in Surveillance Requirements 3.8.1.9 and 3.8.1.15; (4) Correct the loss of voltage and degraded voltage settings in Surveillance Requirement 3.3.6.2; (5) Correct the list of core operating limits in Technical Specification 5.6.5.a; (6) Correct a note on Technical Specification figure 2.1.1-1; (7) Remove references to Unit 2, cycle 12 in various Technical Specifications; and (8) correct a typographical error in Technical Specification 5.6.

2.0 BACKGROUND AND EVALUATION

2.1 Change the Definition of the Azimuthal Power Tilt in TS 1.1

This proposed revision is based on Infobulletin 97-07, Revision 1 (December 31, 1997), issued by Asea Brown Boveri, Inc.-Combustion Engineering, Inc. (ABB-CE) in which they state that a discrepancy exists in the TS definition of azimuthal power tilt in all CE analog protection system plants that use CECOR for monitoring and surveillance, and that use ABB-CE safety analysis methodology.

TS 1.1 currently defines the azimuthal power tilt as the maximum of the difference between the power generated in any core quadrant (upper or lower) (P_{quad}) and the average power of all quadrants (P_{avg}) in that half (upper or lower) of the core, divided by the average power of all quadrants in that half (upper or lower) of the core, or

$$T_q = \text{Max} [P_{quad} / P_{avg} - 1] \quad (1)$$

Calvert Cliffs monitors tilt using symmetric incore or excore neutron flux detectors and the following CECOR tilt algorithm. With this algorithm, the ratio of the power in any core location in the presence of a tilt to the untilted or average power at that location is of the form:

$$P_{\text{tilt}}(r, \Theta) / P_{\text{avg}}(r, \Theta) - 1 = T_q \times g(r) \times \cos(\Theta - \Theta_0) \quad (2)$$

where:

- $P_{\text{tilt}}(r, \Theta)$ is the tilted power at radius r and azimuthal angle Θ
- $P_{\text{avg}}(r, \Theta)$ is the average or untilted power at that location
- T_q is the azimuthal tilt magnitude
- $g(r)$ is the radial normalizing factor, normalized to a maximum value of unity
- Θ is the azimuthal core location
- Θ_0 is the azimuthal core location of maximum tilt

Based on this algorithm, which will be placed in the Calvert Cliffs TS bases Section B3.2.4, "Azimuthal Power Tilt (T_q)," BGE has proposed to modify the azimuthal power tilt definition to state that "the azimuthal power tilt shall be the power asymmetry between azimuthally symmetric fuel assemblies." This definition is consistent with the definition used for Combustion Engineering (CE) digital protection system plans. With this proposed definition, T_q is the maximum fractional increase in power that can occur anywhere in the core because of tilt and is a more conservative measure of the tilt than that given by Equation 1. This is the appropriate measured value of tilt to be used in verifying that the tilt assumed in establishing safety limits has not been exceeded and therefore, the proposed change is acceptable. Although BGE is proposing to incorporate the new definition in their TS, they have stated that they had been using it when the ABB-CE infobulletin was issued and, therefore have operated the plant in a conservative manner.

The value of T_q (azimuthal tilt magnitude) as used in the azimuthal power tilt equation currently in TS 1.1 is not always the most conservative. The proposed change in the definition of azimuthal power tilt will ensure that T_q is the maximum fractional increase in power that can occur anywhere in the core because of tilt, and is therefore more conservative. Because this is the appropriate measured value of tilt to be used in verifying that the tilt assumed by ABB-CE in establishing safety limits has not been exceeded, and because T_q is the maximum value and, therefore, conservative, we find the proposed change in tilt definition acceptable.

2.2 Correct the Peak Linear Heat Rate Safety Limit TS 2.1.1.2

TS 2.1.1.2 states that the peak linear heat rate safety limit shall be maintained ≤ 21 kW/ft. This number is in error.

The peak linear heat rate safety limit was changed from ≤ 21 kW/ft to ≤ 22 kW/ft in License Amendment Nos. 88 (Unit 1) and 61 (Unit 2). This number was valid for both units at the time of implementation of the Improved Standard Technical Specifications (ITS). When the ITS were written, a value of peak linear heat rate safety limit ≤ 21 kW/ft was inadvertently entered.

Based on the above, BGE in a letter dated September 1, 1999, proposed that TS 2.1.1.2 be changed by replacing the peak linear rate safety limit with ≤ 22 kW/ft.

The staff agrees that since the peak linear heat rate safety limit value of ≤ 22 kW/ft was approved in License Amendment Nos. 88 (Unit 1) and 61 (Unit 2) and this number was valid for both units at the time of implementation of the ITS, the staff finds the proposed change acceptable.

2.3 Correct the Diesel Generator Loss-of-Voltage and Degraded-Voltage Settings

TS Surveillance Requirement (SR) 3.3.6.2 gives a degraded voltage function and a loss-of-voltage function for diesel generators. TS SRs are incomplete.

In License Amendment Nos. 226 (Unit 1) and 200 (Unit 2), degraded voltage was divided into transient degraded voltage and steady-state degraded voltage. The license amendment request that these amendments include pages for both the then-current TSs and the ITS. The pages for the TS current at the time were properly marked up in the license amendment request but the ITS page that included the transient degraded voltage and steady-state degraded voltage changes was inadvertently omitted from the ITS license amendment request. Consequently, the entries for transient degraded voltage and steady-state degraded voltage are not in SR 3.3.6.2 of the TS currently in use.

In their letter of September 1, 1999, BGE stated that they recognized the error in the issuance of ITS and have conducted surveillances for transient and steady-state degraded voltage since the approval of License Amendment Nos. 226 and 200. To correct TS SR 3.3.6.2, BGE proposed to replace the degraded voltage function with transient voltage and steady-state degraded voltage functions. The staff agrees that the transient voltage and steady-state degraded voltage changes were inadvertently omitted from the ITS page, and therefore, the proposed TS change is acceptable.

2.4 Correct the Diesel Generator Voltage Range

TS SRs 3.8.1.9 and 3.8.1.15 require each diesel to be started from a stand-by condition. SR 3.8.1.9 request that the generator reach ≥ 3740 volts within 10 seconds. After steady-state conditions are reached, both SRs require the generator to maintain a Voltage range of > 3740 volts and ≤ 4580 volts. These voltage ranges are in error.

BGE ITS conversion added voltage requirements to SRs 3.8.1.9 and 3.8.1.15 consistent with SR 3.8.1.3. License Amendments Nos. 226 and 200 changed the voltage requirement from SR 3.8.1.3 to ≥ 4060 volts and ≤ 4400 volts. The voltage range currently in SRs 3.8.1.9 and 3.8.1.15 is the value of the range before License Amendment Nos. 226 and 200. It was incorrectly left in SRs 3.8.1.9 and 3.8.1.15 when the TSs were changed to ITS.

In its letter of September 1, 1999, BGE stated that an error was recognized before the surveillance was performed. The procedures controlling the conduct of the surveillance were changed to use the correct values.

In its letter of September 1, 1999, BGE proposed that TS SRs 3.8.1.9 and 3.8.1.15 be changed by replacing the steady-state voltage range with the correct range of ≥ 4060 volts and ≤ 4400 volts.

The staff agrees that License Amendments Nos. 226 (Unit 1) and 200 (Unit 2) changed the voltage requirement for SR 3.8.1.3 to ≥ 4060 and ≤ 4400 volts, and that the voltage range currently in SRs 3.8.1.9 and 3.8.1.5 is incorrect. Therefore, the proposed change is accepted.

2.5 Correct the List of Core Operating Limits

TS 5.6.5.a lists limits that are to be included in the Core Operating Limits Report. In the transition to the ITS, TS 3.1.4 (Control Element Assembly Alignment) and 3.3.1 (Reactor Protective System - Operating) were inadvertently omitted from the list.

The licensee proposed that TS 5.6.5.a be changed by adding TS 3.1.4 and 3.3.1 to the list.

The proposed correction makes the list of TSs that are to be included in the core operating limits match the list that existed before ITS conversion. In the ITS conversion, the justification for changing the list was that it was a change of numbers only. The numbers changed before the TS numbering in ITS is different from the former TS numbering. Since the change was intended to only indicate the new TS numbers, leaving out two of the specifications was unintentional.

This proposed change will also make the TS list match the Core Operating Limits Report list.

Based on the above, the staff finds the proposed change acceptable.

2.6 Correct Figure 2.1.1-1

A note on TS Figure 2.1.1-1 was changed in License Amendment Nos. 227 (Unit 1) and 201 (Unit 2) ITS to delete reference to Figure B2.1-1. Figure B2.1-1 was deleted from the TS Bases in the transition to ITS. In License Amendment Nos. 228 (Unit 1) and 202 (Unit 2), an old version of Figure 2.1.1-1 was used, and the reference to Figure B2.1-1 was thus inadvertently put back in the note. Therefore, the licensee proposed that TS Figure 2.1.1-1 be changed by removing reference to Figure B2.1-1.

The staff agrees that the correct wording of the note in TS Figure 2.1.1-1 was approved in License Amendment Nos. 227 (Unit 1) and 201 (Unit 2) ITS and that incorrect wording was inadvertently put back in License Amendment Nos. 228 (Unit 1) and 202 (Unit 2). Therefore, the staff finds the proposed change acceptable.

2.7 Remove References to Unit 2, Cycle 12

License Amendment Nos. 228 and 202 added notes to indicate areas in the TSs that had special application to Cycle 12 of Unit 2 only. Cycle 12 of Unit 2 ended in May 1999. Since these notes no longer have application, they are proposed to be removed. Figure 2.1.1-1a only applies to cycle 12 of Unit 2 and is proposed to be removed. Therefore, the licensee proposes that various TSs and Figure 2.1.1-1a be changed by removing references to Unit 2, Cycle 12, and deleting Figure 2.1.1-a.

In its letter of September 1, 1999, the licensee states that references to Unit 2, cycle 12, have no application now that Unit 2 is in cycle 13 and that the TSs being changed are equally

applicable to both units. Therefore, removal of the notes and deletion of Figure 2.1.1.a are administrative changes. The staff finds the licensee's proposed changes are acceptable.

2.8 Correct a Typographical Error

TS 5.6.5, Item 41.ii gives the number of the document "BASS, use of the Incore director system to monitor the DNB-LCO on Calvert Cliffs Unit 1 and Unit 2" as CEN-199(B)-P. The actual number is CEN-119(B)-P.

The licensee proposes to change TS 5.6.56, Item 41.ii by correcting CEN-199(B)-P to CEN-119(B)-P.

The staff considers correction of a publication number in TS 41.ii an administrative change and therefore, finds the proposed change acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Maryland State official was notified of the proposed issuance of the amendments. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (64 FR 54372). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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