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

September 3, 1992

Docket Nos. 50-317
and 50-318

Mr. R. E. Denton
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
MD Rts. 2 & 4
P. O. Box 1535
Lusby, Maryland 20657

Dear Mr. Denton:

SUBJECT: ISSUANCE OF AMENDMENTS FOR CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1 (TAC NO. M82776) AND UNIT NO. 2 (TAC NO. M82777)

The Commission has issued the enclosed Amendment No. 174 to Facility Operating License No. DPR-53 and Amendment No. 151 to Facility Operating License No. DPR-69 for the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TS) in response to your application transmitted by letter dated February 13, 1992.

The amendments revise the Technical Specifications relating to reactivity control systems to provide clarification and simplification for the control element assemblies and other minor administrative corrections. The TS Bases is revised to reflect the TS changes.

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

Daniel G. McDonald, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 174 to DPR-53
2. Amendment No. 151 to DPR-69
3. Safety Evaluation

cc w/enclosures:
See next page

1/1

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DATED: September 3, 1992

AMENDMENT NO. 174 TO FACILITY OPERATING LICENSE NO. DPR-53-CALVERT CLIFFS UNIT 1
AMENDMENT NO. 151 TO FACILITY OPERATING LICENSE NO. DPR-69-CALVERT CLIFFS UNIT 2

Docket File
NRC & Local PDRs
PDI-1 Reading
S. Varga, 14/E/4
J. Calvo, 14/A/4
R. Capra
C. Vogan
D. McDonald
OGC
D. Hagan, 3302 MNBB
C. Liang, 8/E/23
G. Hill (8), P1-22
Wanda Jones, P-370
C. Grimes, 11/F/23
H. Balukjian, 8/E/23
L. Kopp, 8/E/23
ACRS (10)
OPA
OC/LFMB
Plant File
C. Cowgill, Region I

cc: Plant Service list

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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-317

CALVERT CLIFFS NUCLEAR POWER PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 174
License No. DPR-53

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Baltimore Gas and Electric Company (the licensee) dated February 13, 1992, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-53 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 174 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A. Capra, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 3, 1992

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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-318

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 151
License No. DPR-69

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Baltimore Gas and Electric Company (the licensee) dated February 13, 1992, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.2 of Facility Operating License No. DPR-69 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 151, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A. Capra, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 3, 1992

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 174 FACILITY OPERATING LICENSE NO. DPR-53

AMENDMENT NO. 151 FACILITY OPERATING LICENSE NO. DPR-69

DOCKET NOS. 50-317 AND 50-318

Revise Appendix A as follows:

Remove Pages	Insert Pages
3/4 1-1	3/4 1-1
3/4 1-4	3/4 1-4
3/4 1-5	3/4 1-5
3/4 1-24	3/4 1-24
3/4 1-25	3/4 1-25
3/4 1-26	3/4 1-26
3/4 1-27	3/4 1-27
3/4 1-33	3/4 1-33
B3/4 1-1	B3/4 1-1
B3/4 1-3	B3/4 1-3
B3/4 1-4	B3/4 1-4
B3/4 1-5	B3/4 1-5
B3/4 1-6	B3/4 1-6

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} > 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The **SHUTDOWN MARGIN** shall be equal to or greater than the limit line of Figure 3.1.1-1*.

APPLICABILITY: **MODES** 1, 2**, 3 and 4.

ACTION: With the **SHUTDOWN MARGIN** less than the limit line of Figure 3.1.1-1*, immediately initiate and continue boration at ≥ 40 gpm of 2300 ppm boric acid solution or equivalent until the required **SHUTDOWN MARGIN** is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The **SHUTDOWN MARGIN** shall be determined to be equal to or greater than the limit line of Figure 3.1.1-1*:

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is untrippable, the above required **SHUTDOWN MARGIN** shall be increased by an amount at least equal to the withdrawn worth of the untrippable CEA(s).

b. When in **MODES** 1 or 2#, at least once per 12 hours by verifying that CEA group withdrawal is within the Transient Insertion Limits of Specification 3.1.3.6.

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* Adherence to Technical Specification 3.1.3.6 as specified in Surveillance Requirement 4.1.1.1.1 assures that there is sufficient available **SHUTDOWN MARGIN** to match the **SHUTDOWN MARGIN** requirements of the safety analyses.

** See Special Test Exception 3.10.1.

\# With $K_{eff} \geq 1.0$.

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - $T_{avg} \leq 200°F$

LIMITING CONDITION FOR OPERATION

3.1.1.2 The **SHUTDOWN MARGIN** shall be $\geq$ 3.0% $\Delta k/k$, and when pressurizer level is less than 90 inches from bottom of the pressurizer, all sources of non-borated water shall be $\leq$ 88 gpm.

APPLICABILITY: **MODE** 5.

ACTION:

a. With the **SHUTDOWN MARGIN** < 3.0% $\Delta k/k$, immediately initiate and continue boration at $\geq$ 40 gpm of 2300 ppm boric acid solution or equivalent until the required **SHUTDOWN MARGIN** is restored.

b. With the pressurizer drained to < 90 inches and all sources of non-borated water > 88 gpm, immediately suspend all operations involving positive reactivity changes while the **SHUTDOWN MARGIN** is increased to compensate for the additional sources of non-borated water or reduce the sources of non-borated water to $\leq$ 88 gpm.

SURVEILLANCE REQUIREMENTS

4.1.1.2.1 The **SHUTDOWN MARGIN** shall be determined to be $\geq$ 3.0% $\Delta k/k$:

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is untrippable, the above required **SHUTDOWN MARGIN** shall be increased by an amount at least equal to the withdrawn worth of the untrippable CEA(s).

b. At least once per 24 hours by consideration of the following factors:

1. Reactor Coolant System boron concentration,
2. CEA position,

SURVEILLANCE REQUIREMENTS (Continued)

3. Reactor Coolant System average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

4.1.1.2.2 With the pressurizer drained to < 90 inches determine:

a. Within one hour and every 12 hours thereafter that the level in the Reactor Coolant System is above the bottom of the hot leg nozzles, and

b. Within one hour and every 12 hours thereafter that the sources of non-borated water are $\leq$ 88 gpm or the **SHUTDOWN MARGIN** has been increased to compensate for the additional non-borated water sources.

3/4.1 **REACTIVITY CONTROL SYSTEMS**

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

Full Length CEA Position

LIMITING CONDITION FOR OPERATION

3.1.3.1 The CEA Motion Inhibit and all shutdown and regulating CEAs shall be **OPERABLE** with each CEA of a given group positioned within 7.5 inches (indicated position) of all other CEAs in its group.

APPLICABILITY: **MODES** 1* and 2*.

ACTION:

a. With one or more CEAs (regulating or shutdown) inoperable due to being untrippable, be in at least **HOT STANDBY** within 6 hours.

b. With the CEA Motion Inhibit inoperable, within 6 hours either:

1. Restore the CEA Motion Inhibit to **OPERABLE** status, or

2. Fully withdraw all CEAs in groups 3 and 4 and withdraw the CEAs in group 5 to less than 5% insertion, or

3. Be in at least **HOT STANDBY**.

c. With one regulating CEA inoperable due to causes other than addressed by **ACTION** a, above, and inserted beyond the Long Term Steady State Insertion Limits but within its above specified alignment requirements, operation in **MODES** 1 and 2 may continue for up to 7 days per occurrence with a total accumulated time of $\leq$ 14 days per calendar year.

d. With one CEA (regulating or shutdown) inoperable due to causes other than addressed by **ACTION** a, above, but within its above specified alignment requirements and either fully withdrawn or within the Long Term Steady State Insertion Limits if in CEA group 5, operation in **MODES** 1 and 2 may continue.

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* See Special Test Exceptions 3.10.2 and 3.10.4.

LIMITING CONDITION FOR OPERATION (Continued)

e. With one CEA (regulating or shutdown) misaligned from any other CEA in its group by less than 15 inches, operation in **MODES** 1 and 2 may continue, provided that the misaligned CEA is restored to within its specified alignment requirements within one hour, otherwise implement Action g.

f. With one CEA (regulating or shutdown) misaligned from any other CEA in its group by 15 inches or more, operation in **MODES** 1 and 2 may continue, provided that the misaligned CEA is restored to within its specified alignment requirements within the time allowance determined by the Better Axial Shape Selection System (BASSS) or, if the BASSS time allowance is unavailable, the time allowance shown in Figure 3.1.3-1, otherwise implement Action g. If Figure 3.1.3-1 is used, the pre-misaligned F_r^L value used to determine the allowable time to realign the CEA from Figure 3.1.3-1 shall be the latest measurement taken within 5 days prior to the CEA misalignment. If no measurements were taken within 5 days prior to the misalignment, immediately implement Action g.

LIMITING CONDITION FOR OPERATION (Continued)

g. With one CEA (regulating or shutdown) not within its specified alignment requirements at the conclusion of the time allowance permitted by Actions e, f or h, immediately start to implement the following actions:

1. If the **THERMAL POWER** level prior to the misalignment was greater than 50% of **RATED THERMAL POWER, THERMAL POWER** shall be reduced to less than the greater of:

   a) 50% of **RATED THERMAL POWER**

   b) 75% of the **THERMAL POWER** level prior to the misalignment

within one hour after exceeding the time allowance permitted by Actions e, f or h.

2. If the **THERMAL POWER** level prior to the misalignment was $\leq$ 50% of **RATED THERMAL POWER**, maintain **THERMAL POWER** no higher than the value prior to the misalignment.

If negative reactivity insertion is required to reduce **THERMAL POWER**, boration shall be used. Within one hour after establishing the appropriate **THERMAL POWER** as required above, either:

1. Restore the CEA to within its specified alignment requirements, or

2. Declare the CEA inoperable. After declaring the CEA inoperable, **POWER OPERATION** may continue for up to 7 days per occurrence with a total accumulated time of $\leq$ 14 days per calendar year provided that within one hour after declaring the CEA inoperable, the remainder of the CEAs in the group with the inoperable CEA are aligned to within 7.5 inches of the inoperable CEA while:

   a) maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1.3-2; for a regulating CEA, and with the **THERMAL POWER** level restricted pursuant to Specification 3.1.3.6 during subsequent operation, or

   b) maintaining the remainder of the CEAs in a shutdown group withdrawn to at least 129 inches.

LIMITING CONDITION FOR OPERATION (Continued)

h. With more than one CEA (regulating or shutdown) misaligned and each misaligned CEA is within 15 inches of any other CEA in its group (indicated position) restore the misaligned CEAs to within their specified alignment requirements within one hour, otherwise immediately declare the misaligned CEAs inoperable and implement Action i. If only one CEA (regulating or shutdown) remains misaligned at the end of one hour, implement Action g.

i. With more than one CEA (regulating or shutdown) inoperable or with more than one CEA (regulating or shutdown) misaligned and any one or more of the misaligned CEAs is 15 inches (indicated position) or more from any other CEA in its group, be in at least **HOT STANDBY** within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The position of each CEA shall be determined to be within 7.5 inches (indicated position) of all other CEAs in its group at least once per 12 hours except during time intervals when the Deviation Circuit and/or CEA Motion Inhibit are inoperable, then verify the individual CEA positions at least once per 4 hours.

4.1.3.1.2 Each CEA not fully inserted shall be determined to be **OPERABLE** by inserting it at least 7.5 inches at least once per 31 days. For the purposes of performing this CEA operability test, if the CEA has an inoperable position indication channel, the alternate indication system (pulse counter or voltage dividing network) will be used to monitor position. If a direct position indication (full out reed switch or voltage dividing network) cannot be restored within ten minutes from the commencement of CEA motion, or CEA withdrawal exceeds the surveillance testing insertion by > 7.5 inches, the position of the CEA shall be assumed to have been > 15 inches from its group at the commencement of CEA motion.

4.1.3.1.3 The CEA Motion Inhibit shall be demonstrated **OPERABLE** at least once per 31 days by a functional test which verifies that the circuit maintains the CEA group overlap and sequencing requirements of Specification 3.1.3.6 and that the circuit also prevents any CEA from being misaligned from all other CEAs in its group by more than 7.5 inches (indicated position).

3/4.1 **REACTIVITY CONTROL SYSTEMS**

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

Shutdown CEA Insertion Limit

LIMITING CONDITION FOR OPERATION

3.1.3.5 All shutdown CEAs shall be withdrawn to at least 129.0 inches.

APPLICABILITY: **MODES** 1 and 2*#.

ACTION: With one or more shutdown CEA(s) withdrawn, except for surveillance testing pursuant to Specification 4.1.3.1.2, to less than 129.0 inches, consider the CEA(s) misaligned, and immediately apply Specification 3.1.3.1; Actions e, f, h, or i, as appropriate.

SURVEILLANCE REQUIREMENTS

4.1.3.5 Each shutdown CEA shall be determined to be withdrawn to at least 129.0 inches:

a. Within 15 minutes prior to withdrawal of any CEAs in regulating groups during an approach to reactor criticality, and

b. At least once per 12 hours thereafter.

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* See Special Test Exception 3.10.2.

\# With $K_{eff} \geq 1.0$.

3/4.1 REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4.1.1.2 SHUTDOWN MARGIN

A sufficient **SHUTDOWN MARGIN** ensures that 1) the reactor can be made subcritical from all operating conditions, 2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and 3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

The most limiting **SHUTDOWN MARGIN** requirement at beginning of cycle is determined by the requirements of several transients, including Boron Dilution and Steam Line Rupture. The **SHUTDOWN MARGIN** requirements for these transients are relatively small and nearly the same. However, the most limiting **SHUTDOWN MARGIN** requirement at end of cycle comes from just one transient, the Steam Line Rupture event. The requirement for this transient at end of cycle is significantly larger than that for any other event at that time in cycle and, also, considerably larger than the most limiting requirement at beginning of cycle.

The variation in the most limiting requirement with time in cycle has been incorporated into Technical Specification 3.1.1.1, in the form of a specified **SHUTDOWN MARGIN** value which varies linearly from beginning to end of cycle. This variation in specified **SHUTDOWN MARGIN** is conservative relative to the actual variation in the most limiting requirement. Consequently, adherence to Technical Specification 3.1.1.1 provides assurance that the available **SHUTDOWN MARGIN** at anytime in cycle will exceed the most limiting **SHUTDOWN MARGIN** requirement at that time in cycle. Without the specified **SHUTDOWN MARGIN** available, immediate boration is required (by Specifications 3/4.1.1.1 or 3/4.1.1.2) that is at least equivalent to boration from the refueling water tank, at its minimum boric acid concentration, via a charging pump, at its minimum flow rate. For example, lower flow rates with higher boric acid concentration could also provide the equivalent boration, but should be verified as equivalent prior to use.

In **MODE** 5, the reactivity transients resulting from any event are minimal and do not vary significantly during the cycle. Therefore, the specified **SHUTDOWN MARGIN** in **MODE** 5 via Technical Specification 3.1.1.2 has been set equal to a constant value which is determined by the requirement of the most limiting event at any time during the cycle, i.e., Boron Dilution with the pressurizer level less than 90 inches and the sources of non-borated water restricted. Consequently, adherence to Technical Specification 3.1.1.2 provides assurance that the available **SHUTDOWN MARGIN** will exceed the most limiting **SHUTDOWN MARGIN** requirement at any time in cycle.

3/4.1.1.3 Boron Dilution

A minimum flow rate of at least 3000 GPM provides adequate mixing, prevents stratification and ensures that reactivity changes will be gradual during boron concentration reductions in the Reactor Coolant System. A

repair or corrective action may be completed without undue risk to overall facility safety from injection system failures during the repair period.

The boration capability of either system is sufficient to provide a **SHUTDOWN MARGIN** from all operating conditions of 3.0% Δk/k after xenon decay and cooldown to 200°F. The maximum boration capability requirement occurs at EOL from full power equilibrium xenon conditions and requires boric acid solution from the boric acid tanks, the concentration and volume of which are met by the range of values given in Specifications 3.1.2.8 and 3.1.2.9, or 55,627 gallons of 2300 ppm borated water from the refueling water tank. However, to be consistent with the ECCS requirements, the RWT is required to have a minimum contained volume of 400,000 gallons during **MODES** 1, 2, 3 and 4. The maximum boron concentration of the refueling water tank shall be limited to 2700 ppm and the maximum boron concentration of the boric acid storage tanks shall be limited to 8% to preclude the possibility of boron precipitation in the core during long term ECCS cooling.

With the RCS temperature below 200°F, one injection system is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting **CORE ALTERATIONS** and positive reactivity change in the event the single injection system becomes inoperable.

The boron capability required below 200°F is based upon providing a 3% Δk/k **SHUTDOWN MARGIN** after xenon decay and cooldown from 200°F to 140°F. This condition requires either boric acid solution from the boric acid tanks, the requirements of which are met by Specification 3.1.2.7, or 9,844 gallons of 2300 ppm borated water from the refueling water tank.

The **OPERABILITY** of one Boron Injection System during **REFUELING** ensures that this system is available for reactivity control while in **MODE** 6.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that (1) acceptable power distribution limits are maintained, (2) the minimum **SHUTDOWN MARGIN** is maintained, and (3) the potential effects of a CEA ejection accident are limited to acceptable levels.

The **ACTION** statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original criteria are met. A regulating or shutdown CEA is considered to be misaligned if it is more than 7.5 inches from any other CEA in its group, however, a shutdown CEA is also considered to be misaligned if it is withdrawn to less than 129 inches even if it is within 7.5 inches of all other CEAs in its group. For the purposes of the Technical Specifications, a dual assembly, connected to a single CEA drive mechanism, is considered to be a single CEA (e.g., dual shutdown CEAs connected to a single drive mechanism).

BASES

The **ACTION** statements applicable to an untrippable CEA and to a large misalignment (≥ 15 inches) of two or more CEAs, require a prompt shutdown of the reactor since either of these conditions may be indicative of a possible loss of mechanical functional capability of the CEAs and in the event of an untrippable CEA, the loss of **SHUTDOWN MARGIN**. A CEA is considered untrippable when it is known that the CEA would not be insertable in response to a Reactor Protection System signal or is known to be immovable due to excessive friction or mechanical interference.

For small misalignments (< 15 inches) of the CEAs, there is 1) a small degradation in the peaking factors relative to those assumed in generating LCOs and LSSS setpoints for DNBR and linear heat rate, 2) a small effect on the time dependent long term power distributions relative to those used in generating LCOs and LSSS setpoints for DNBR and linear heat rate, 3) a small effect on the available **SHUTDOWN MARGIN**, and 4) a small effect on the ejected CEA worth used in the safety analysis. Therefore, the **ACTION** statement associated with the small misalignment of a CEA permits a one hour time interval during which attempts may be made to restore the CEA(s) to within their alignment requirements prior to initiating a reduction in **THERMAL POWER**. The one hour time limit is sufficient to (1) identify causes of a misaligned CEA, (2) take appropriate corrective action to realign the CEAs and (3) minimize the effects of xenon redistribution.

Overpower margin is provided to protect the core in the event of a large misalignment (≥ 15 inches) of a single regulating or shutdown CEA. However, this misalignment would cause distortion of the core power distribution. The Reactor Protective System would not detect the degradation in radial peaking factors and since variations in other system parameters (e.g., pressure and coolant temperature) may not be sufficient to cause trips, it is possible that the reactor could be operating with process variables less conservative than those assumed in generating LCO and LSSS setpoints. The **ACTION** statement associated with a large CEA misalignment requires prompt action to realign the CEA to avoid excessive margin degradation. If the CEA is not realigned within the given time constraints, **ACTION** is specified which will preserve margin, including reductions in **THERMAL POWER**.

For a single CEA misalignment, the time allowance to realign the CEA (Figure 3.1.3-1 or as determined by BASSS) is permitted for the following reasons:

1. The margin calculations which support the power distribution LCOs for DNBR are based on a steady-state F_T^L as specified in Technical Specification 3.2.3.

2. When the actual F_T^L is less than the Technical Specification value, additional margin exists.

3. This additional margin can be credited to offset the increase in F_r^t with time that will occur following a CEA misalignment due to xenon redistribution.

4. If an F_r^t measurement has not been taken recently (within 5 days), a pre-misaligned value of 1.70 is assumed and no time for realignment is permitted.

The requirement to reduce power level after the time limit of Figure 3.1.3-1 or after the time limit determined by BASSS is reached offsets the continuing increase in F_r^t that can occur due to xenon redistribution. A power reduction is not required below 50% power. Below 50% power there is sufficient conservatism in the DNB power distribution LCOs to completely offset any, or any additional, xenon redistribution effects.

The **ACTION** statements applicable to misaligned or inoperable CEAs include requirements to align the **OPERABLE** CEAs in a given group with the inoperable CEA. Conformance with these alignment requirements brings the core, within a short period of time, to a configuration consistent with that assumed in generating LCO and LSSS setpoints. However, extended operation with CEAs significantly inserted in the core may lead to perturbations in 1) local burnup, 2) peaking factors, and 3) available **SHUTDOWN MARGIN** which are more adverse than the conditions assumed to exist in the safety analyses and LCO and LSSS setpoints determination. Therefore, time limits have been imposed on operation with inoperable CEAs to preclude such adverse conditions from developing.

There are five different operating modes for control of CEAs; Off, Manual Individual, Manual Group, Manual Sequential and Automatic. The Manual Sequential mode is applicable to only the regulating CEAs and the Automatic mode is disabled and not used for both regulating and shutdown CEAs.

OPERABILITY of the CEA position indicators is required to determine CEA positions and thereby ensure compliance with the CEA alignment and insertion limits and ensures proper operation of the rod block circuit. The CEA "Full In" and "Full Out" limits provide an additional independent means for determining the CEA positions when the CEAs are at either their fully inserted or fully withdrawn positions. Therefore, the **OPERABILITY** and the **ACTION** statements applicable to inoperable CEA position indicators permit continued operations when positions of CEAs with inoperable indicators can be verified by the "Full In" or "Full Out" limits.

CEA positions and **OPERABILITY** of the CEA position indicators are required to be verified on a nominal basis of once per 12 hours with more frequent verifications required if an automatic monitoring channel is inoperable. These verification frequencies are adequate for assuring that the applicable LCOs are satisfied.

BASES

The surveillance requirements affecting CEAs with inoperable position indication channels allow 10 minutes for testing each affected CEA. This time limit was selected so that 1) the time would be long enough for the required testing, and 2) if all position indication were lost during testing, the time would be short enough to allow a power reduction to 75% of maximum allowable **THERMAL POWER** within two hours from when the testingwas initiated. The time limit ensures CEA misalignments occurring during CEA testing are corrected within the time requirements required by existing specifications.

The maximum CEA drop time restriction is consistent with the assumed CEA drop time used in the safety analyses. Measurement with $T_{avg} \geq 515°F$ and with all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

The LSSS setpoints and the power distribution LCOs were generated based upon a core burnup which would be achieved with the core operating in an essentially unrodded configuration. Therefore, the CEA insertion limit specifications require that during **MODES** 1 and 2, the full length CEAs be nearly fully withdrawn. The amount of CEA insertion permitted by the Steady State Insertion Limits of Specification 3.1.3.6 will not have a significant effect upon the unrodded burnup assumption but will still provide sufficient reactivity control. The Transient Insertion Limits of Specification 3.1.3.6 are provided to ensure that (1) acceptable power distribution limits are maintained, (2) the minimum **SHUTDOWN MARGIN** is maintained, and (3) the potential effects of a CEA ejection accident are limited to acceptable levels; however, long term operation at these insertion limits could have adverse effects on core power distribution during subsequent operation in an unrodded configuration.

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} > 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The **SHUTDOWN MARGIN** shall be equal to or greater than the limit line of Figure 3.1.1-1*.

APPLICABILITY: **MODES** 1, 2**, 3 and 4.

ACTION: With the **SHUTDOWN MARGIN** less than the limit line of Figure 3.1.1-1*, immediately initiate and continue boration at ≥ 40 gpm of 2300 ppm boric acid solution or equivalent until the required **SHUTDOWN MARGIN** is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The **SHUTDOWN MARGIN** shall be determined to be equal to or greater than the limit line of Figure 3.1.1-1*:

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is untrippable, the above required **SHUTDOWN MARGIN** shall be increased by an amount at least equal to the withdrawn worth of the untrippable CEA(s).

b. When in **MODES** 1 or 2#, at least once per 12 hours by verifying that CEA group withdrawal is within the Transient Insertion Limits of Specification 3.1.3.6.

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* Adherence to Technical Specification 3.1.3.6 as specified in Surveillance Requirement 4.1.1.1.1 assures that there is sufficient available **SHUTDOWN MARGIN** to match the **SHUTDOWN MARGIN** requirements of the safety analyses.

** See Special Test Exception 3.10.1.

\# With $K_{eff} \geq 1.0$.

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - $T_{avg} \leq 200°F$

LIMITING CONDITION FOR OPERATION

3.1.1.2 The **SHUTDOWN MARGIN** shall be $\geq$ 3.0% $\Delta k/k$, and when pressurizer level is less than 90 inches from bottom of the pressurizer, all sources of non-borated water shall be $\leq$ 88 gpm.

APPLICABILITY: **MODE** 5.

ACTION:

a. With the **SHUTDOWN MARGIN** < 3.0% $\Delta k/k$, immediately initiate and continue boration at $\geq$ 40 gpm of 2300 ppm boric acid solution or equivalent until the required **SHUTDOWN MARGIN** is restored.

b. With the pressurizer drained to < 90 inches and all sources of non-borated water > 88 gpm, immediately suspend all operations involving positive reactivity changes while the **SHUTDOWN MARGIN** is increased to compensate for the additional sources of non-borated water or reduce the sources of non-borated water to $\leq$ 88 gpm.

SURVEILLANCE REQUIREMENTS

4.1.1.2.1 The **SHUTDOWN MARGIN** shall be determined to be $\geq$ 3.0% $\Delta k/k$:

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is untrippable, the above required **SHUTDOWN MARGIN** shall be increased by an amount at least equal to the withdrawn worth of the untrippable CEA(s).

b. At least once per 24 hours by consideration of the following factors:

1. Reactor Coolant System boron concentration,
2. CEA position,

SURVEILLANCE REQUIREMENTS (Continued)

3. Reactor Coolant System average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

4.1.1.2.2 With the pressurizer drained to < 90 inches determine:

a. Within one hour and every 12 hours thereafter that the level in the Reactor Coolant System is above the bottom of the hot leg nozzles, and

b. Within one hour and every 12 hours thereafter that the sources of non-borated water are ≤ 88 gpm or the **SHUTDOWN MARGIN** has been increased to compensate for the additional non-borated water sources.

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

Full Length CEA Position

LIMITING CONDITION FOR OPERATION

3.1.3.1 The CEA Motion Inhibit and all shutdown and regulating CEAs shall be **OPERABLE** with each CEA of a given group positioned within 7.5 inches (indicated position) of all other CEAs in its group.

APPLICABILITY: **MODES** 1* and 2*.

ACTION:

a. With one or more CEAs (regulating or shutdown) inoperable due to being untrippable, be in at least **HOT STANDBY** within 6 hours.

b. With the CEA Motion Inhibit inoperable, within 6 hours either:

1. Restore the CEA Motion Inhibit to **OPERABLE** status, or

2. Fully withdraw all CEAs in groups 3 and 4 and withdraw the CEAs in group 5 to less than 5% insertion, or

3. Be in at least **HOT STANDBY**.

c. With one regulating CEA inoperable due to causes other than addressed by **ACTION** a above, and inserted beyond the Long Term Steady State Insertion Limits but within its above specified alignment requirements, operation in **MODES** 1 and 2 may continue for up to 7 days per occurrence with a total accumulated time of $\leq$ 14 days per calendar year.

d. With one CEA (regulating or shutdown) inoperable due to causes other than addressed by **ACTION** a above, but within its above specified alignment requirements and either fully withdrawn or within the Long Term Steady State Insertion Limits if in CEA group 5, operation in **MODES** 1 and 2 may continue.

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* See Special Test Exceptions 3.10.2 and 3.10.4.

LIMITING CONDITION FOR OPERATION (Continued)

e. With one CEA (regulating or shutdown) misaligned from any other CEA in its group by less than 15 inches, operation in **MODES** 1 and 2 may continue, provided that the misaligned CEA is restored to within its specified alignment requirements within one hour, otherwise implement Action g.

f. With one CEA (regulating or shutdown) misaligned from any other CEA in its group by 15 inches or more, operation in **MODES** 1 and 2 may continue, provided that the misaligned CEA is restored to within its specified alignment requirements within the time allowance determined by the Better Axial Shape Selection System (BASSS) or, if the BASSS time allowance is unavailable, the time allowance shown in Figure 3.1.3-1, otherwise implement Action g. If Figure 3.1.3-1 is used, the pre-misaligned F_T^I value used to determine the allowable time to realign the CEA from Figure 3.1.3-1 shall be the latest measurement taken within 5 days prior to the CEA misalignment. If no measurements were taken within 5 days prior to the misalignment, immediately implement Action g.

LIMITING CONDITION FOR OPERATION (Continued)

g. With one CEA (regulating or shutdown) not within its specified alignment requirements at the conclusion of the time allowance permitted by Actions e, f or h, immediately start to implement the following actions:

1. If the **THERMAL POWER** level prior to the misalignment was greater than 50% of **RATED THERMAL POWER, THERMAL POWER** shall be reduced to less than the greater of:

   a) 50% of **RATED THERMAL POWER**

   b) 75% of the **THERMAL POWER** level prior to the misalignment

within one hour after exceeding the time allowance permitted by Actions e, f or h.

2. If the **THERMAL POWER** level prior to the misalignment was $\leq$ 50% of **RATED THERMAL POWER**, maintain **THERMAL POWER** no higher than the value prior to the misalignment.

If negative reactivity insertion is required to reduce **THERMAL POWER**, boration shall be used. Within one hour after establishing the appropriate **THERMAL POWER** as required above, either:

1. Restore the CEA to within its specified alignment requirements, or

2. Declare the CEA inoperable. After declaring the CEA inoperable, **POWER OPERATION** may continue for up to 7 days per occurrence with a total accumulated time of $\leq$ 14 days per calendar year provided that within one hour after declaring the CEA inoperable, the remainder of the CEAs in the group with the inoperable CEA are aligned to within 7.5 inches of the inoperable CEA while:

   a) maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1.3-2; for a regulating CEA, and with the **THERMAL POWER** level restricted pursuant to Specification 3.1.3.6 during subsequent operation, or

   b) maintaining the remainder of the CEAs in a shutdown group withdrawn to at least 129 inches.

LIMITING CONDITION FOR OPERATION (Continued)

h. With more than one CEA (regulating or shutdown) misaligned and each misaligned CEA is within 15 inches of any other CEA in its group (indicated position) restore the misaligned CEAs to within their specified alignment requirements within one hour, otherwise immediately declare the misaligned CEAs inoperable and implement Action i. If only one CEA (regulating or shutdown) remains misaligned at the end of one hour, implement Action g.

i. With more than one CEA (regulating or shutdown) inoperable or with more than one CEA (regulating or shutdown) misaligned and any one or more of the misaligned CEAs is 15 inches (indicated position) or more from any other CEA in its group, be in at least **HOT STANDBY** within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The position of each CEA shall be determined to be within 7.5 inches (indicated position) of all other CEAs in its group at least once per 12 hours except during time intervals when the Deviation Circuit and/or CEA Motion Inhibit are inoperable, then verify the individual CEA positions at least once per 4 hours.

4.1.3.1.2 Each CEA not fully inserted shall be determined to be **OPERABLE** by inserting it at least 7.5 inches at least once per 31 days. For the purposes of performing the CEA operability test, if the CEA has an inoperable position indication channel, the alternate indication system (pulse counter or voltage dividing network) will be used to monitor position. If a direct position indication (full out reed switch or voltage dividing network) cannot be restored within ten minutes from the commencement of CEA motion, or CEA withdrawal exceeds the surveillance testing insertion by > 7.5 inches, the position of the CEA shall be assumed to have been > 15 inches from its group at the commencement of CEA motion.

4.1.3.1.3 The CEA Motion Inhibit shall be demonstrated **OPERABLE** at least once per 31 days by a functional test which verifies that the circuit maintains the CEA group overlap and sequencing requirements of Specification 3.1.3.6 and that the circuit also prevents any CEA from being misaligned from all other CEAs in its group by more than 7.5 inches (indicated position).

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

Shutdown CEA Insertion Limit

LIMITING CONDITION FOR OPERATION

3.1.3.5 All shutdown CEAs shall be withdrawn to at least 129.0 inches.

APPLICABILITY: **MODES** 1 and 2*#.

ACTION: With one or more shutdown CEA(s) withdrawn, except for surveillance testing pursuant to Specification 4.1.3.1.2, to less than 129.0 inches, consider the CEA(s) misaligned, and immediately apply Specification 3.1.3.1; Action e, f, h or i, as appropriate.

SURVEILLANCE REQUIREMENTS

4.1.3.5 Each shutdown CEA shall be determined to be withdrawn to at least 129.0 inches:

a. Within 15 minutes prior to withdrawal of any CEAs in regulating groups during an approach to reactor criticality, and

b. At least once per 12 hours thereafter.

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* See Special Test Exception 3.10.2.

\# With $K_{eff} \geq 1.0$.

3/4.1 REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4.1.1.2 SHUTDOWN MARGIN

A sufficient **SHUTDOWN MARGIN** ensures that 1) the reactor can be made subcritical from all operating conditions, 2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and 3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

The most limiting **SHUTDOWN MARGIN** requirement at beginning of cycle is determined by the requirements of several transients, including Boron Dilution and Steam Line Rupture. The **SHUTDOWN MARGIN** requirements for these transients are relatively small and nearly the same. However, the most limiting **SHUTDOWN MARGIN** requirement at end of cycle comes from just one transient, the Steam Line Rupture event. The requirement for this transient at end of cycle is significantly larger than that for any other event at that time in cycle and, also, considerably larger than the most limiting requirement at beginning of cycle.

The variation in the most limiting requirement with time in cycle has been incorporated into Technical Specification 3.1.1.1, in the form of a specified **SHUTDOWN MARGIN** value which varies linearly from beginning to end of cycle. This variation in specified **SHUTDOWN MARGIN** is conservative relative to the actual variation in the most limiting requirement. Consequently, adherence to Technical Specification 3.1.1.1 provides assurance that the available **SHUTDOWN MARGIN** at any time in cycle will exceed the most limiting **SHUTDOWN MARGIN** requirement at that time in cycle. Without the specified **SHUTDOWN MARGIN** available, immediate boration is required (by Specifications 3/4.1.1.1 or 3/4.1.1.2) that is at least equivalent to boration from the refueling water tank, at its minimum boric acid concentration, via a charging pump, at its minimum flow rate. For example, lower flow rates with higher boric acid concentrations could also provide the equivalent boration, but should be verified as equivalent prior to use.

In **MODE** 5, the reactivity transients resulting from any event are minimal and do not vary significantly during the cycle. Therefore, the specified **SHUTDOWN MARGIN** in **MODE** 5 via Technical Specification 3.1.1.2 has been set equal to a constant value which is determined by the requirement of the most limiting event at any time during the cycle, i.e., Boron Dilution with the pressurizer level less than 90 inches and the sources of non-borated water restricted. Consequently, adherence to Technical Specification 3.1.1.2 provides assurance that the available **SHUTDOWN MARGIN** will exceed the most limiting **SHUTDOWN MARGIN** requirement at any time in cycle.

BASES

The **ACTION** statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original criteria are met. A regulating or shutdown CEA is considered to be misaligned if it is more than 7.5 inches from any other CEA in its group, however, a shutdown CEA is also considered to be misaligned if it is withdrawn to less than 129 inches even if it is within 7.5 inches of all other CEAs in its group. For the purposes of the Technical Specifications, a dual assembly, connected to a single CEA drive mechanism, is considered to be a single CEA (e.g., dual shutdown CEAs connected to a single drive mechanism).

The **ACTION** statements applicable to an untrippable CEA and to a large misalignment ($\geq$ 15 inches) of two or more CEAs, require a prompt shutdown of the reactor since either of these conditions may be indicative of a possible loss of mechanical functional capability of the CEAs and in the event of an untrippable CEA, the loss of **SHUTDOWN MARGIN**. A CEA is considered untrippable when it is known that the CEA would not be insertable in response to a Reactor Protection System signal or is known to be immovable due to excessive friction or mechanical interference.

For small misalignments (< 15 inches) of the CEAs, there is 1) a small degradation in the peaking factors relative to those assumed in generating LCOs and LSSS setpoints for DNBR and linear heat rate, 2) a small effect on the time dependent long term power distributions relative to those used in generating LCOs and LSSS setpoints for DNBR and linear heat rate, 3) a small effect on the available **SHUTDOWN MARGIN**, and 4) a small effect on the ejected CEA worth used in the safety analysis. Therefore, the **ACTION** statement associated with the small misalignment of a CEA permits a one hour time interval during which attempts may be made to restore the CEA(s) to within their alignment requirements prior to initiating a reduction in **THERMAL POWER**. The one hour time limit is sufficient to (1) identify causes of a misaligned CEA, (2) take appropriate corrective action to realign the CEAs and (3) minimize the effects of xenon redistribution.

Overpower margin is provided to protect the core in the event of a large misalignment ($\geq$ 15 inches) of a single regulating or shutdown CEA. However, this misalignment would cause distortion of the core power distribution. The Reactor Protective System would not detect the degradation in radial peaking factors and since variations in other system parameters (e.g., pressure and coolant temperature) may not be sufficient to cause trips, it is possible that the reactor could be operating with process variables less conservative than those assumed in generating LCO and LSSS setpoints. The **ACTION** statement associated with a large CEA misalignment requires prompt action to realign the CEA to avoid excessive margin degradation. If the CEA is not realigned within the given time constraints, action is specified which will preserve margin, including reductions in **THERMAL POWER**.

BASES

For a single CEA misalignment, the time allowance to realign the CEA (Figure 3.1.3-1 or as determined by BASSS) is permitted for the following reasons:

1. The margin calculations which support the power distribution LCOs for DNBR are based on a steady-state F_r^T as specified in the Technical Specification 3.2.3.

2. When the actual F_r^T is less than the Technical Specification value, additional margin exists.

3. This additional margin can be credited to offset the increase in F_r^T with time that will occur following a CEA misalignment due to xenon redistribution.

4. If an F_r^T measurement has not been taken recently (within 5 days), a pre-misaligned value of 1.70 is assumed and no time for realignment is permitted.

The requirement to reduce power level after the time limit of Figure 3.1.3-1 or the time limit determined by BASSS is reached offsets the continuing increase in F_r^T that can occur due to xenon redistribution. A power reduction is not required below 50% power. Below 50% power there is sufficient conservatism in the DNB power distribution LCOs to completely offset any, or any additional, xenon redistribution effects.

The **ACTION** statements applicable to misaligned or inoperable CEAs include requirements to align the **OPERABLE** CEAs in a given group with the inoperable CEA. Conformance with these alignment requirements brings the core, within a short period of time, to a configuration consistent with that assumed in generating LCO and LSSS setpoints. However, extended operation with CEAs significantly inserted in the core may lead to perturbations in 1) local burnup, 2) peaking factors, and 3) available **SHUTDOWN MARGIN** which are more adverse than the conditions assumed to exist in the safety analyses and LCO and LSSS setpoints determination. Therefore, time limits have been imposed on operation with inoperable CEAs to preclude such adverse conditions from developing.

There are five different operating modes for control of CEAs; Off, Manual Individual, Manual Group, Manual Sequential and Automatic. The Manual Sequential mode is applicable to only the regulating CEAs and the Automatic mode is disabled and not used for both regulating and shutdown CEAs.

OPERABILITY of the CEA position indicators is required to determine CEA positions and thereby ensure compliance with the CEA alignment and insertion limits and ensures proper operation of the rod block circuit. The CEA "Full In" and "Full Out" limits provide an additional independent means for determining the CEA positions when the CEAs are at either their fully inserted or fully withdrawn positions. Therefore, the **OPERABILITY**

and the **ACTION** statements applicable to inoperable CEA position indicators permit continued operations when positions of CEAs with inoperable indicators can be verified by the "Full In" or "Full Out" limits.

CEA positions and **OPERABILITY** of the CEA position indicators are required to be verified on a nominal basis of once per 12 hours with more frequent verifications required if an automatic monitoring channel is inoperable. These verification frequencies are adequate for assuring that the applicable LCOs are satisfied.

The surveillance requirements affecting CEAs with inoperable position indication channels allow 10 minutes for testing each affected CEA. This time limit was selected so that 1) the time would be long enough for therequired testing, and 2) if all position indication were lost during testing, the time would be short enough to allow a power reduction to 75% of maximum allowable **THERMAL POWER** within two hours from when the testing was initiated. The time limit ensures CEA misalignments occurring during CEA testing are corrected within the time requirements required by existing specifications.

The maximum CEA drop time restriction is consistent with the assumed CEA drop time used in the accident analyses. Measurements with $T_{avg} \geq 515°$ and with all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

The LSSS setpoints and the power distribution LCOs were generated based upon a core burnup which would be achieved with the core operating in an essentially unrodded configuration. Therefore, the CEA insertion limit specifications require that during **MODES** 1 and 2, the full length CEAs be nearly fully withdrawn. The amount of CEA insertion permitted by the Steady State Insertion Limits of Specification 3.1.3.6 will not have a significant effect upon the unrodded burnup assumption but will still provide sufficient reactivity control. The Transient Insertion Limits of Specification 3.1.3.6 are provided to ensure that (1) acceptable power distribution limits are maintained, (2) the minimum **SHUTDOWN MARGIN** is maintained, and (3) the potential effects of a CEA ejection accident are limited to acceptable levels; however, long term operation at these insertion limits could have adverse effects on core power distribution during subsequent operation in an unrodded configuration.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 174 TO FACILITY OPERATING LICENSE NO. DPR-53

AND AMENDMENT NO. 151 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 February 13, 1992, Baltimore Gas and Electric Company (the licensee) submitted a request for changes to the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, Technical Specifications (TS). The requested changes would revise the TS relating to the reactivity control systems for both units to provide clarifications and simplifications to several specifications for the control element assemblies (CEAs). The changes also provide other minor administrative corrections and the TS Bases are revised to support the proposed changes.

The specific changes requested would: (1) provide a clarification of the terminology for a CEA which is not available for reactivity insertion during a reactor trip; (2) clarify the applicability of a specification; (3) provide clarification of the appropriate actions to be applied for inoperable and misaligned CEAs; (4) remove an unnecessary portion of an action statement that implies that an unavailable, automatic mode of CEA operation is acceptable; and (5) provides other minor administrative corrections and clarifications. The proposed TS amendments will revise TSs 3/4.1.1.1, 3/4.1.1.2, 3/4.1.2.3.1, and 3/4.1.3.5 and Bases 3/4.1.3 for both Units 1 and Unit 2.

2.0 EVALUATION

The licensee proposed changes for five categories of TS items. The NRC staff's evaluation of each of the five categories is as follows:

Item 1 - Specifications 4.1.1.1.1.a, 4.1.1.2.a, 3.1.3.1 Action a and the Bases for Specification 3/4.1.3 do not use consistent terminology when referring to a CEA that is not available for reactivity insertion during a reactor trip. This inconsistency has been a source of confusion regarding actions required for an inoperable CEA when inoperability was due to electrical malfunctions which did not affect the ability to trip the CEA. The licensee has proposed that the terms "immoveable and untrippable" in the TSs be reduced to "untrippable" since the purpose of the specifications is to assure adequate shutdown margin. The term "immoveable" is associated only with being

inoperable as a result of excessive friction or mechanical interference. This change clarifies that an increase in the shutdown margin is required only if the CEA is untrippable, i.e., unavailable for reactivity insertion. The Bases section is also revised to reflect the proposed changes.

The staff finds this change to be acceptable in that it provides clarification as discussed above.

Item 2 - Specification 3/4.1.1.2 is identified as applicable during Mode 5 with either: (1) pressurizer level above 90 inches or (2) pressurizer level below 90 inches while the flow rate from all sources of non-borated water are less than 88 gpm. However, the specification is also intended to be applicable when the flow rate from non-borated sources of water is greater than 88 gpm as evidenced by Action b. The licensee proposes to eliminate this inconsistency by making the specification applicable during all of Mode 5, and identifying the intended limiting condition for operation. To accomplish the intent, a portion of the current applicability statement is proposed to be relocated to the Limiting Condition for Operation (LCO) section of the TS so that the LCO and the applicability statements will match.

The staff finds this proposed change to be acceptable in that it clarifies the intended requirements as discussed above.

Item 3 - Specifications 3.1.3.1 and 3.1.3.5 both provide action requirements to be met when a shutdown CEA is found to be mispositioned. The action statements of Specifications 3.1.3.1 and 3.1.3.5 contain several confusing elements. Some of the action requirements apply when the CEA is withdrawn to less than 129.0 inches, and others apply when the CEA is misaligned in relation to the other CEAs in its group, some apply to both instances and some do not ever apply to shutdown CEAs. Based on prior analysis, the licensee has proposed the following changes, (a) to (f), to simplify and clarify the appropriate actions:

(a) The action statements for TS 3.1.3.1 do not all apply to both regulating and shutdown CEAs, some are applicable to only regulating CEAs and some are applicable to both. This TS has been clarified by specifying that Action c is for regulating CEAs and that the other actions are applicable for both regulating and shutdown CEAs.

(b) Action e of TS 3.1.3.1 currently provides requirements for more than one CEA being misaligned, but does not differentiate which portions of the action statement apply when only a single CEA is inoperable. To prevent potential misinterpretation, Action e is proposed to be split into two separate Actions (e and a new h), each with clear entry conditions. The revised Action e which is for a single CEA, does not require restoration of the CEA to "OPERABLE status" since the CEA has not yet been declared inoperable. Inoperable CEAs are covered under action statement g.

(c) Actions e, f, and g for TS 3.1.3.1 were developed separately and do not contain consistent requirements for power levels and timing. The licensee proposed that the action requirements be combined into a new Action g which

would include the current power reduction requirements for CEAs misaligned at greater than 15 inches. Action g would also be revised to include an entry condition of "With one CEA (regulating or shutdown) not within its specified alignment requirements..." rather than "With one CEA misaligned from an other CEA in its group by 15 inches or more ..." since it would be applicable to other misalignment conditions as well, i.e., resulting from new Actions e, f, and h. Action g includes the conditions for determining that a misaligned CEA is inoperable and also includes a time requirement for realigning the remainder of the CEAs with the inoperable CEA such as currently exist in Action e.

(d) The action statement of Specification 3.1.3.5 requires application of Specification 3.1.3.1, but is unclear on which of the action statements of Specification 3.1.3.1 are applicable to shutdown CEAs that are not fully withdrawn. An analysis performed to support Amendment Nos. 127 and 109 for Units 1 and 2, respectively, considered both the shutdown and regulating CEAs, independent of their type, to ensure that adequate shutdown margin would be available. Therefore, the licensee proposes that a shutdown CEA not be treated any differently from a regulating CEA except that it be considered "misaligned" when it is withdrawn to less that 129.0 inches as well as when it is greater than 7.5 inches from any other CEA in its group. This revision requires other minor editorial changes to Action e, new Action h, and Action f. The proposed changes continue to allow 1 hour for attempting to realign a misaligned CEA and provides clear application of an appropriate action statement if the realignment is not successful.

(e) Action f of TS 3.1.3.1 requires an unnecessary referral to a figure to determine the next action. The proposed wording will eliminate an assumed pre-misalignment value and reference to the figure and require an immediate implementation of Action g.

(f) Action i of TS 3.1.3.1 provides information to be used when conducting a surveillance and is not really an action statement. Therefore, the licensee proposes to incorporate the current Action i into Surveillance Requirement 4.1.3.1.2. This revision does not result in any actual changes to the requirements, but only provides clarification of when the requirements must be met.

We find the proposed changes, as detailed above, to be acceptable in that they provide simplification and clarification for the specific conditions and required actions to meet the LCO for CEAs based on their relative alignment within their specified group.

Item 4 - The CEA drive system is designed to operate in any one of five modes; one of these is an automatic mode. However, for Calvert Cliffs, the automatic mode has been disabled and operation in this mode is not allowed. The CEA drive system mode switch has an off position and three types of manual control positions. Specification 3.1.3.1.b.2 begins with the requirement to "place and maintain the CEA drive system mode switch in either the 'Off' or any 'Manual Mode' position...," which implies that another mode of the CEA drive system can be used. But the only other position is the disallowed "automatic

mode" and this mode is not available for use at Calvert Cliffs. We find it acceptable to delete this statement in that it eliminates any confusion relating to the CEA operating modes. However, if the licensee decides to enable the automatic mode at some future time, this specification must be revised to reflect the change.

Item 5 - The licensee has also proposed several other administrative and editorial changes. These include: (a) incorporating a discussion in the Bases of the "greater than or equal to" symbol prior to the "40 gpm or 2300 ppm" to clarify that the symbol applies to the entire phrase and not just the 40 gpm. This is necessary to the understanding of the "or equivalent" phrase; (b) incorporating the missing title of Specification 3/4.1.3.1, "CEA POSITION" which was inadvertently omitted in a past amendment; (c) correcting the number of the identifier for the "MOVEABLE CONTROL ASSEMBLIES" Specification from 3.4.1.3 to 3/4.1.3; (d) adding periods to the end of notes for Specification 3/4.1.1.1 and 3/4.1.3.5; and (e) revising a time reference in Bases 3/4.1.3 to match the time actually allowed by the current action statements.

The staff finds these administrative and editorial changes to be acceptable.

3.0 SUMMARY

Based on the staff evaluation detailed in Section 2.0 above, the staff concludes that the licensee proposed revisions, which provide clarification and simplification to CEA Technical Specifications 3/4.1.1.1, 3/4.1.1.2, 3/4.1.3.1, and 3/4.1.3.5 and Bases 3/4.1.3 for Unit 1 and 2, are acceptable.

4.0 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.

5.0 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 (57 FR 9439). 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.

6.0 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.

Principal Contributors:
H. Balukjian
L. Kopp

Date: September 3, 1992

September 3, 1992

Docket Nos. 50-317
and 50-318

Mr. R. E. Denton
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
MD Rts. 2 & 4
P. O. Box 1535
Lusby, Maryland 20657

Dear Mr. Denton:

SUBJECT: ISSUANCE OF AMENDMENTS FOR CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1 (TAC NO. M82776) AND UNIT NO. 2 (TAC NO. M82777)

The Commission has issued the enclosed Amendment No. 174 to Facility Operating License No. DPR-53 and Amendment No. 151 to Facility Operating License No. DPR-69 for the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TS) in response to your application transmitted by letter dated February 13, 1992.

The amendments revise the Technical Specifications relating to reactivity control systems to provide clarification and simplification for the control element assemblies and other minor administrative corrections. The TS Bases is revised to reflect the TS changes.

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,
Original Signed By:
Daniel G. McDonald, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 174 to DPR-53
2. Amendment No. 151 to DPR-69
3. Safety Evaluation

cc w/enclosures:
See next page

*See previous concurrence

OFFICE	PDI-1:LA	PDI-1:PM	OTSB*	OGC*	PDI-1:D
NAME	CVogan	DMcDonald:avl	CIGrimes	JHull	RACapra
DATE	9/3/92	9/3/92	8/28/92	9/1/92	9/3/92

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