July 7, 1987

Docket Nos. 50-317
and 50-318

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Mr. J. A. Tiernan
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
P. O. Box 1475
Baltimore, Maryland 21203

Dear Mr. Tiernan:

The Commission has issued the enclosed Amendment No. 127 to Facility Operating License No. DPR-53 and Amendment No. 109 to Facility Operating License No. DPR-69 for the Calvert Cliffs 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 October 1, 1986, as supplemented by your submittals of March 13, March 19, April 17 and May 4, 1987. Additionally, a minor clarifying change was made in TS 3/4.1.3 with your staff's consent. This change was included in the associated Federal Register Notice of Consideration and proposed determination of no significant hazards.

These amendments 1) modify TS 3/4.1.3, "Movable Control Assemblies" by lengthening the response time and increasing the maximum reactor thermal power limit for control element assembly misalignments of greater than fifteen inches and 2) extend the response time for containment purge valves isolation on a containment radiation-high signal as specified in TS Table 3.3-5, "Engineered Safety Features Response Times," to less than or equal to seven seconds. In addition, several administrative changes were made.

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

Sincerely,

Scott Alexander McNeil, Project Manager
Project Directorate I-1
Division of Reactor Projects, I/II

Enclosures:
1. Amendment No. 127 to DPR-53
2. Amendment No. 109 to DPR-69
3. Safety Evaluation

cc: w/enclosures
See next page

PDI-1	PDI-1	PDI-1	OGC
CVogan CV	SMcNeil SAM	for RCapra	MYoung
6/22/87	6/22/87	7/7/87	6/25/87

SAM admin. review to SE. check SECY before issuance

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PDR ADOCK 05000317
P PDR

Mr. J. A. Tiernan
Baltimore Gas & Electric Company

Calvert Cliffs Nuclear Power Plant

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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NOS. 50-317

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 127
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 October 1, 1986, as supplemented March 13, March 19, April 17 and May 4, 1987, 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. 127 , 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.

FOR THE NUCLEAR REGULATORY COMMISSION

Joseph D. Neighbors

for Robert A. Capra, Acting Director
Project Directorate I-1
Division of Reactor Projects, I/II

Attachment:
Changes to the Technical Specifications

Date of Issuance: July 7, 1987

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

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NOS. 50-318

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 109
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 October 1, 1986, as supplemented March 13, March 19, April 17 and May 4, 1987, 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. 109, 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.

FOR THE NUCLEAR REGULATORY COMMISSION

for Joseph D. Neighbors

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

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 7, 1987

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

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 127 FACILITY OPERATING LICENSE NO. DPR-53

AMENDMENT NO. 109 FACILITY OPERATING LICENSE NO. DPR-69

DOCKET NOS. 50-317 AND 50-318

Revise Appendix A as follows:

Remove Pages	Insert Pages
3/4 1-17	3/4 1-17
3/4 1-18	3/4 1-18
3/4 1-19	3/4 1-19
----	3/4 1-19A
----	3/4 1-19B
3/4 1-20*	3/4 1-20*
3/4 3-19	3/4 3-19*
3/4 3-20	3/4 3-20
B3/4 1-3	B3/4 1-3**
B3/4 1-4	B3/4 1-4
B3/4 1-5	B3/4 1-5

* Overleaf pages provided to maintain document completeness
** Revised for DPR-69 only; overleaf page for DPR-53

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

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 inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be 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. Place and maintain the CEA drive system mode switch in either the "Off" or any "Manual Mode" position and 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 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 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.

---

* See Special Test Exceptions 3.10.2 and 3.10.4.

LIMITING CONDITION FOR OPERATION

e. With one or more CEAs misaligned from any other CEAs in its group by more than 7.5 inches but less than 15 inches, operation in **MODES** 1 and 2 may continue, provided that within one hour the misaligned CEA(s) is either:

1. Restored to **OPERABLE** status within its above specified alignment requirements, or

2. Declared inoperable. After declaring the CEA inoperable, operation in **MODES** 1 and 3 may continue for up to 7 days per occurrence with a total accumulated time of $\leq$ 14 days per calendar year provided all of the following conditions are met:

a. The **THERMAL POWER** level shall be reducing to $\leq$ 70% of the maximum allowable **THERMAL POWER** level for the existing Reactor Coolant Pump combination within one hour; if negative reactivity insertion is required to reducing **THERMAL POWER**, boration shall be used.

b. Within one hour after reducing the **THERMAL POWER** as required by a) above, the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1-2; the **THERMAL POWER** level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation.

f. With one CEA 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 positioned within 7.5 inches of the other CEAs in its group in accordance with the time allowance shown in Figure 3.1-3. The pre-misaligned F_I^T value used to determine the allowable time to realign the CEA from Figure 3.1-3 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, a pre-misaligned F_I^T of 1.65 shall be assumed.

g. With one CEA misaligned from any other CEA in its group by 15 inches or more at the conclusion of the time allowance permitted in Figure 3.1-3, 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:

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP VALUES

FUNCTIONAL UNIT	TRIP VALUE	ALLOWABLE VALUES
8. CVCS ISOLATION		
West Penetration Room/ Letdown Heat Exchanger Room Pressure - High	≤ 0.5 psig	≤ 0.5 psig
9. AUXILIARY FEEDWATER ACTUATION SYSTEM		
a. Manual (trip Buttons)	Not Applicable	Not Applicable
b. Steam Generator (A or B) Level - Low	-194" to -149" (inclusive)	-194" to -149" (inclusive)
c. Steam Generator ΔP-High (SG-A > SG-B)	≤ 130.0 psid	≤ 130.0 psid
d. Steam Generator ΔP-High (SG-B > SG-A)	≤ 130.0 psid	≤ 130.0 psid

TABLE 3.3-5

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
1. Manual	
a. SIAS Safety Injection (ECCS)	Not Applicable
b. CSAS Containment Spray	Not Applicable
c. CIS Containment Isolation	Not Applicable
d. RAS Containment Sump Recirculation	Not Applicable
e. AFAS Auxiliary Feedwater Initiation	Not Applicable
2. Pressurizer Pressure-Low	
a. Safety Injection (ECCS)	≤ 30*/30**
3. Containment Pressure-High	
a. Safety Injection (ECCS)	≤ 30*/30**
b. Containment Isolation	≤ 30
c. Containment Fan Coolers	≤ 35*/10**
4. Containment Pressure-High	
a. Containment Spray	≤ 60*/60**(1)
5. Containment Radiation-High	
a. Containment Purge Valves Isolation	≤ 7

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 737 gallons of 7.25% boric acid solution from the boric acid tanks 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.

The ACTION statements applicable to a stuck or 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 a stuck or untrippable CEA, the loss of SHUTDOWN MARGIN.

For small misalignments ($\leq$ 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 to within its 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.

BASES

Overpower margin is provided to protect the core in the event of a large misalignment ($\geq$ 15 inches) of a 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) 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^T as specified in Technical Specification 3.2.3.

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

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

The requirement to reduce power level after the time limit of Figure 3.1-3 is reached offsets the continuing increase in F_T^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 bring 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.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

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 inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be 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. Place and maintain the CEA drive system mode switch in either the "Off" or any "Manual Mode" position and 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 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 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.

---

* See Special Test Exceptions 3.10.2 and 3.10.4.

LIMITING CONDITION FOR OPERATION

e. With one or more CEAs misaligned from any other CEAs in its group by more than 7.5 inches but less than 15 inches, operation in **MODES** 1 and 2 may continue, provided that within one hour the misaligned CEA(s) is either:

1. Restored to **OPERABLE** status within its above specified alignment requirements, or

2. Declared inoperable. After declaring the CEA inoperable, 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 provided all of the following conditions are met:

a. The **THERMAL POWER** level shall be reduced to $\leq$ 70% of the maximum allowable **THERMAL POWER** level for the existing Reactor Coolant Pump combination within one hour; if negative reactivity insertion is required to reduce **THERMAL POWER**, boration shall be used.

b. Within one hour after reducing the **THERMAL POWER** as required by a) above, the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1-2; the **THERMAL POWER** level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation.

f. With one CEA 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 positioned within 7.5 inches of the other CEAs in its group in accordance with the time allowance shown in Figure 3.1-3. The pre-misaligned F_I^T value used to determine the allowable time to realign the CEA from Figure 3.1-3 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, a pre-misaligned F_I^T of 1.65 shall be assumed.

g. With one CEA misaligned from any other CEA in its group by 15 inches or more at the conclusion of the time allowance permitted in Figure 3.1-3, 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 Figure 3.1-3.

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 the above 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 the remainder of the CEAs in the group with the inoperable CEA are aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1-2; the **THERMAL POWER** level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation.

h. With more than one CEA inoperable or misaligned from any other CEA in its group by 15 inches (indicated position) or more, be in at least **HOT STANDBY** within 6 hours.

i. For the purposes of performing the CEA operability test of TS 4.1.3.1.2, 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.

SURVEILLANCE REQUIREMENTS

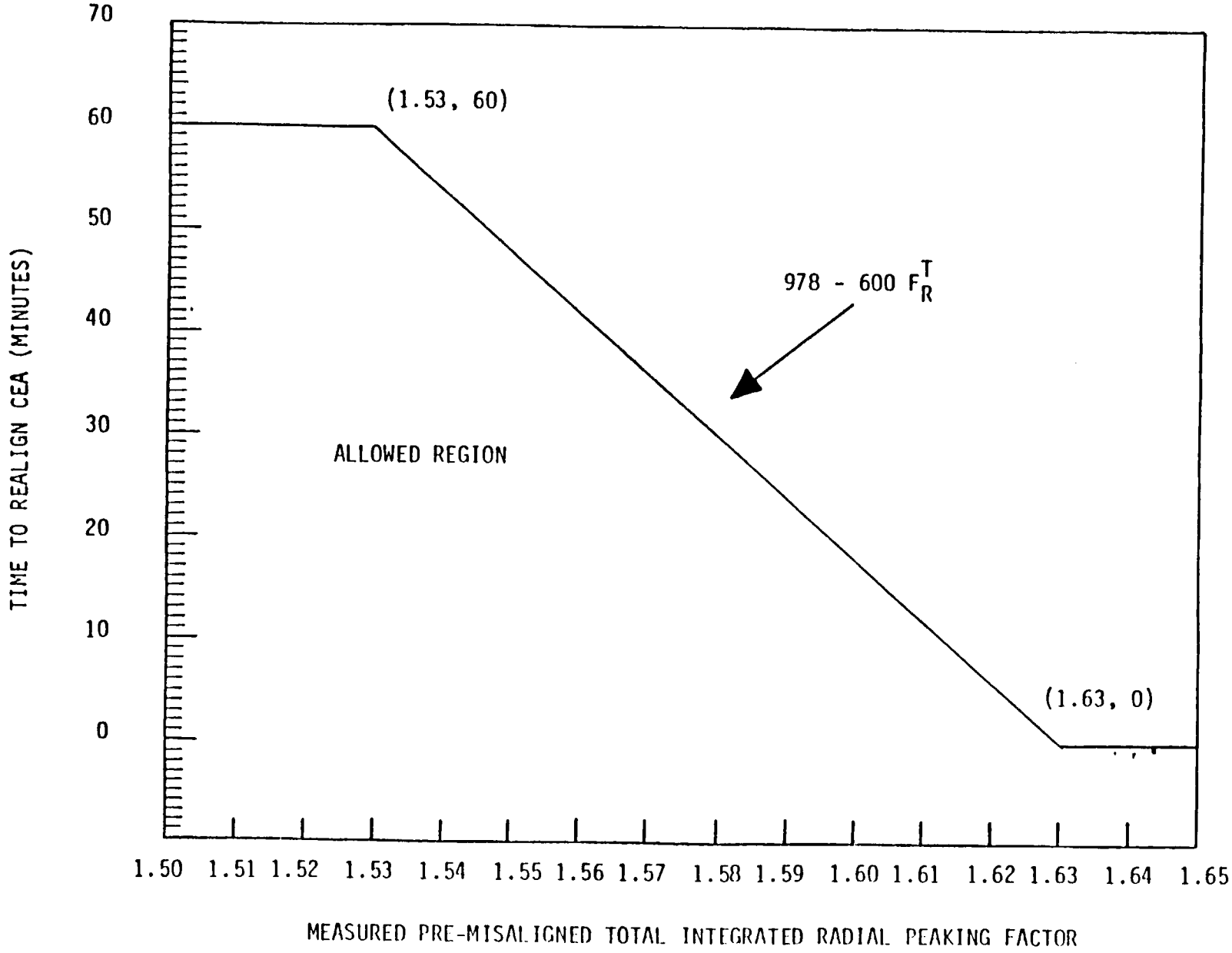
4.1.3.1.1 The position of each CEA shall be determined to be within 7.5 inches (indicated position) of all other CEAs in its group at least once per 12 hours except during time intervals when the Deviation Circuit and/or CEA Motion Inhibit are inoperable, then verify the individual CEA positions at least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

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).

FIGURE 3.1-3

ALLOWABLE TIME TO REALIGN CEA VERSUS
INITIAL TOTAL INTEGRATED RADIAL PEAKING FACTOR



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BASES

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 737 gallons of 7.25% boric acid solution from the boric acid tanks 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.

The ACTION statements applicable to a stuck or 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 a stuck or untrippable CEA, the loss of SHUTDOWN MARGIN.

For small misalignments ($\leq$ 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 to within its 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.

BASES

Overpower margin is provided to protect the core in the event of a large misalignment ($\geq$ 15 inches) of a 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**.

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

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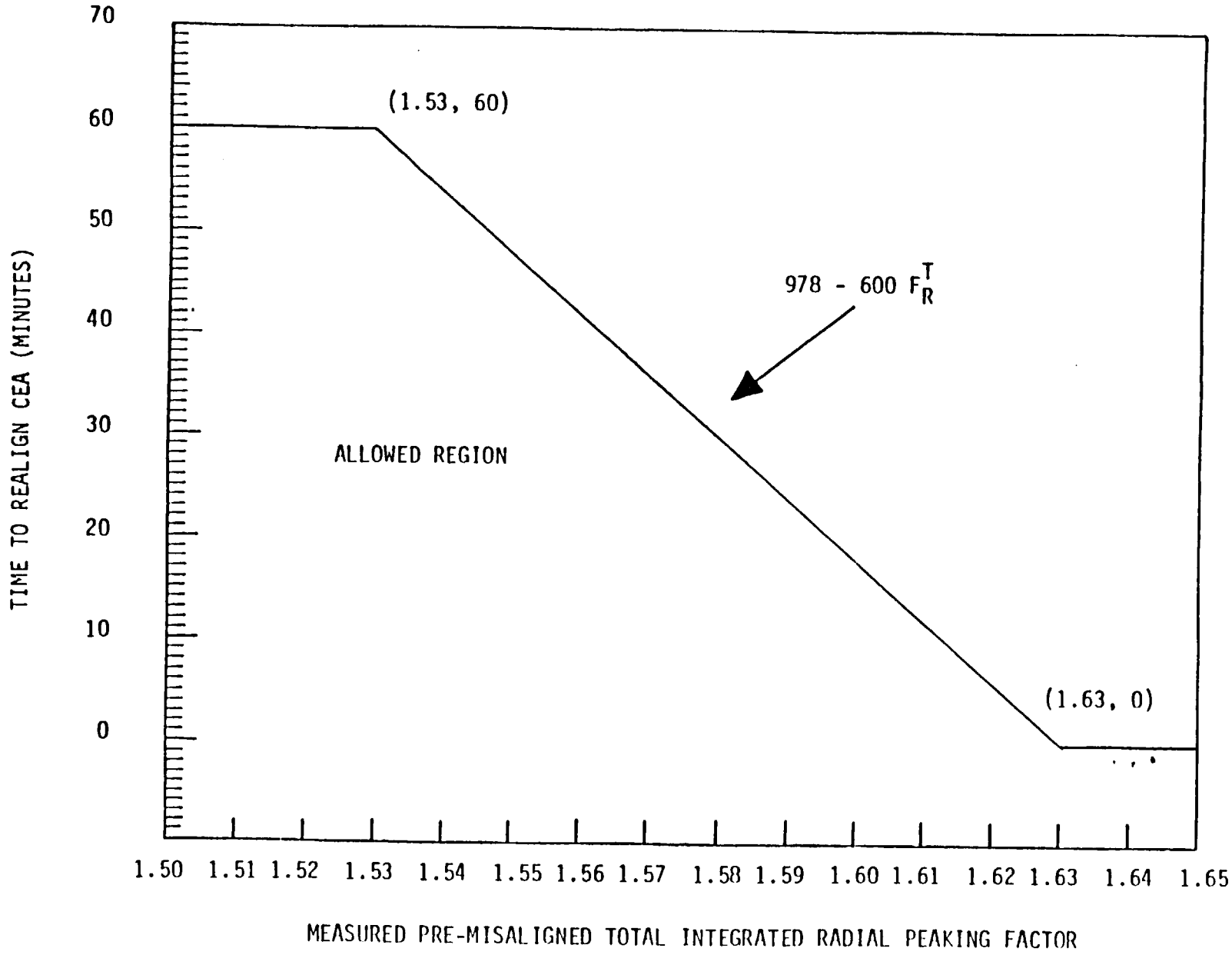
The requirement to reduce power level after the time limit of Figure 3.1-3 is reached offsets the continuing increase in F_I^T that can occur due to xenon redistribution. A power reduction is not required below 50% power. Below 50% power there is sufficient conservatism in the DNB power distribution 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 bring 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.

FIGURE 3.1-3

ALLOWABLE TIME TO REALIGN CEA VERSUS
INITIAL TOTAL INTEGRATED RADIAL PEAKING FACTOR



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LIMITING CONDITION FOR OPERATION

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 Figure 3.1-3.

2. If the **THERMAL POWER** level prior to the misalignment was ≤ 50% of **RATED THERMAL POWER**, maintain **THERMAL POWER** no higher than the value prior to 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 the above 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 ≤ 14 days per calendar year provided the remainder of the CEAs in the group with the inoperable CEA are aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1-2; the **THERMAL POWER** level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation.

h. With more than one CEA inoperable or misaligned from any other CEA in its group by 15 inches (indicated position) or more, be in at least **HOT STANDBY** within 6 hours.

i. For the purposes of performing the CEA operability test of TS 4.1.3.1.2, 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.

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.

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).

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP VALUES

FUNCTIONAL UNIT	TRIP VALUE	ALLOWABLE VALUES
8. CVCS ISOLATION		
West Penetration Room/ Letdown Heat Exchanger Room Pressure - High	≤0.5 psig	≤0.5 psig
9. AUXILIARY FEEDWATER ACTUATION SYSTEM (AFAS)		
a. Manual (trip buttons)	Not Applicable	Not Applicable
b. Steam Generator (A or B) Level - Low	-149 inches to -194 inches (inclusive)	-149 inches to -194 inches (inclusive)
c. Steam Generator ΔP - High (SG-A > SG-B)	≤135.0 psi	≤135.0 psi
d. Steam Generator ΔP - High (SG-B > SG-A)	≤135.0 psi	≤135.0 psi

TABLE 3.3-5

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
1. Manual	
a. SIAS Safety Injection (ECCS)	Not Applicable
b. CSAS Containment Spray	Not Applicable
c. CIS Containment Isolation	Not Applicable
d. RAS Containment Sump Recirculation	Not Applicable
e. AFAS Auxiliary Feedwater Initiation	Not Applicable
2. Pressurizer Pressure-Low	
a. Safety Injection (ECCS)	≤ 30*/30**
3. Containment Pressure-High	
a. Safety Injection (ECCS)	≤ 30*/30**
b. Containment Isolation	≤ 30
c. Containment Fan Coolers	≤ 35*/10**
4. Containment Pressure-High	
a. Containment Spray	≤ 60*/60**(1)
5. Containment Radiation-High	
a. Containment Purge Valves Isolation	≤ 7

BASES

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 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 70% of maximum allowable thermal power within one hour 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 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.

BASES

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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 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 70% of maximum allowable thermal power within one hour 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.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 127 TO FACILITY OPERATING LICENSE NO. DPR-53

AND AMENDMENT NO. 109 TO FACILITY OPERATING LICENSE NO. DPR-69

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-317 AND 50-318

INTRODUCTION

By the application for license amendments dated October 1, 1986, as supplemented by the March 13 and March 19, 1987 submittals, the Baltimore Gas and Electric Company (BG&E, the licensee) requested changes to the Technical Specifications (TS) for Calvert Cliffs, Units 1 and 2. The TS changes proposed are as follows:

1. Modify TS 3/4.1.3, "Movable Control Assemblies," for Units 1 and 2 to permit continued operations at steady-state power for up to one hour following a misalignment or drop of a control element assembly (CEA). This period of time will be used to attempt to realign the CEA. If the CEA cannot be realigned within the allowed time period, a power reduction shall be required. The allowable period of time for realignment will be dependent upon the pre-misalignment valve of the integrated radial peaking factor (F_rT).

2. Delete the modifier "full length" from the phrase "full length CEAs" throughout TS 3/4.1.3. This constitutes an administrative change as all CEAs at Calvert Cliffs Units 1 and 2 are full length CEAs.

3. Extend the required response time for containment purge valves isolation on a containment radiation-high signal as specified in TS Table 3.3-5, "Engineered Safety Features Response Times" from less than or equal to five seconds to less than or equal to seven seconds.

The March 13, 1987 submittal provided additional information and the March 19, 1987 submittal revised a TS figure for clarification.

Final, camera-ready versions of the proposed TS changes were submitted by the licensee on April 17 and May 4, 1987. Action Statement "g" of TS 3/4.1.3, "Movable Control Assemblies," did not reflect a previously agreed upon clarifying change. This change specified that Action Statement "g.2" would be applicable to thermal powers of "less than or equal to 50% of Rated Thermal Power" rather than "less than 50% of Rated Thermal Power" as originally requested. This clarifying change was described in the Federal Register Notice of Consideration and Proposed No Significant Hazards Consideration (52 FR 2872).

To reflect this previously agreed upon clarification, the NRC staff appropriately modified the final TS change as submitted on April 17, 1987.

The supplements to the October 1, 1986 submittal did not affect the proposed TS changes noticed in the Federal Register on January 28, 1987 and did not affect the staff's proposed no significant hazards determination.

DISCUSSION AND EVALUATION

Change No. 1 proposed to modify TS 3/4.1.3, "Movable Control Assemblies," by extending the time by which thermal power must be reduced if a CEA is misaligned (due to stuck or dropped CEA or CEA drift) from any other CEA in its group by 15 inches or more.

The single CEA drop event initially causes a decrease in reactor power with a resulting decrease in average reactor coolant temperature. The CEA Block System inhibits automatic CEA withdrawal during the event. However, because of the negative value of the moderator temperature coefficient, this temperature decrease may cause the reactor power level to return to its initial power level. The presence of the dropped (or misaligned) CEA would then result in a distorted core power distribution and increased power peaking factors, with a possible degradation in the margin to the departure from nucleate boiling ratio (DNBR) specified acceptable fuel design limit (SAFDL). Xenon redistribution effects, which start to become significant within five to ten minutes after the CEA is dropped/misaligned, contribute to the radial peaking factor increase.

In order to allow continued full power operation for a specified period of time in the event of a single misaligned CEA, the licensee performed analyses to determine the increase in assembly peak $F_{\Delta T}$ values following a dropped CEA event. The single CEA drop (misalignment) event does not rely upon a reactor trip, but instead, is protected by including sufficient margin in the DNBR limiting condition of operation (LCO) to accommodate the initial effects of the worst CEA drop at any time during the cycle of operation. The analyses encompassed the combinations of core power versus CEA insertion that are allowed by the TS power dependent insertion limits and also bounded all core exposure conditions from beginning-of-cycle to end-of-cycle. The assumptions used in the analyses, therefore, bound the possible Units 1 and 2 configurations and are acceptable. In addition, the calculations were performed with the approved ROCS computer code.

The results of the analyses established an allowable time interval within which the dropped (or misaligned) CEA could be realigned without a degradation in thermal margin. This time interval varies as a function of initial radial peaking factor. The results also showed that if the CEA cannot be realigned within the allowable time period, a reduction in power level to 75% of the value prior to the CEA misalignment is sufficient to completely offset the worst increase in peaking factor with time. A power reduction is not required when operating below 50% of full power because there exists sufficient conservatism in the DNBR power distribution LCO to completely offset the xenon redistribution effect.

The licensee has proposed to incorporate the Figure 3.1-3 into the Calvert Cliffs Technical Specifications which shows the allowable time to realign a dropped CEA as a function of the initial value of F_r^T. The figure requires a reduction to 75% of the power level prior to the CEA drop within one hour when the pre-drop value of F_r^T equals or exceeds 1.63. As the misalignment value of F_r^T decreases to 1.53, operation at full power for up to one hour is allowed before a power reduction is required. Based on the CEA drop analyses performed by the licensee, the staff finds this acceptable.

The staff has reviewed the proposed changes to TS 3/4.1.3 of Calvert Cliffs Units 1 and 2 to allow continued full power operation for a specified period of time following a CEA misalignment and finds them acceptable.

Change No. 2 proposed the deletion of the modifier "full length" from the phrase "full length CEAs" throughout TS 3/4.1.3. As all CEAs at Calvert Cliffs Units 1 and 2 are full length CEAs, these TS changes are deemed solely administrative by the staff and are found to be acceptable.

Change No. 3 proposed extending the required response time for containment purge valves closure on a containment radiation-high signal. The originally required TS closure time for the containment purge isolation valve of five seconds as specified in TS Table 3.3-5 was based upon minimizing the potential release of radioactivity following a postulated loss of coolant accident. At that time, the valves could be open during reactor operation. Presently, administrative controls have been put into effect which require that these valves be closed during power operation (Operational Modes 1 through 4). This change precludes the valves from being open when a design basis loss of coolant accident could occur. Therefore, the basis for valve closure is now to limit potential radioactivity releases from a design basis fuel handling accident in containment.

The staff has reviewed the material submitted by the licensee in support of the proposed TS modification to increase the required containment purge line isolation valve closure time from five to seven seconds. The staff has also made an independent evaluation of the radiological releases from the design basis fuel handling accident inside the containment. This evaluation was previously documented in the Cycle 8 reload Safety Evaluation dated May 20, 1985. The staff's bounding dose analysis conservatively assumed no isolation of the containment and resulted in peak doses outside the exclusion zone to the thyroid of 55 rem and whole body of 1 rem. Both of these doses are significantly below the 10 CFR 100 guidelines dose valves of 300 rem thyroid and 25 rem whole body. Increasing the required containment purge closure time from five to seven seconds does not change these bounding dose values which assumed no containment isolation (no purge valve closure).

Based on the above, the staff concludes that the licensee's proposed change to TS Table 3.3-5, "Engineered Safety Features Response Times," to increase the required closure time of the containment purge line isolation valves from five to seven seconds will not result in radiological releases in excess of the prescribed limits of 10 CFR Part 100 following a design basis fuel handling accident inside containment and is, therefore, acceptable.

ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of the facilities' components located within the restricted areas as defined in 10 CFR 20. The staff has determined that these 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 published a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR Sec 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 these amendments.

CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: July 7, 1987

PRINCIPAL CONTRIBUTORS:

L. Kopp
I. Spickler

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No.109 , 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.

FOR THE NUCLEAR REGULATORY COMMISSION

Joseph D. Neighbors for
Robert A. Capra, Acting Director
Project Directorate I-1
Division of Reactor Projects, I/II

Attachment:
Changes to the Technical
Specifications

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