



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555

May 6, 1991

Docket Nos. 50-317
and 50-318

Mr. G. C. Creel
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. Creel:

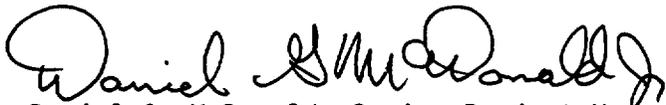
SUBJECT: ISSUANCE OF AMENDMENTS FOR CALVERT CLIFFS NUCLEAR POWER PLANT,
UNIT NO. 1 (TAC NO. 79994) AND UNIT NO. 2 (TAC NO. 79995)

The Commission has issued the enclosed Amendment No. 153 to Facility Operating License No. DPR-53 and Amendment No. 133 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 in response to your application transmitted by letter dated March 7, 1991.

The amendments change the Technical Specifications (TSs) for Unit 2 to require that the Safety Injection Tanks (SITs) be operable throughout Mode 3. The Unit 1 TSs already include this requirement. The amendments also revise the TSs surveillance requirements for the SITs of both Units 1 and 2 to be consistent with the operability requirements during Mode 3 operation, includes editorial changes to the applicable TSs titles to accurately reflect the amendment changes, and the Index and Bases Sections are updated to reflect the changes in the operability and surveillance requirements.

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. 153 to DPR-53
2. Amendment No. 133 to DPR-69
3. Safety Evaluation

cc w/enclosures:
See next page

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Mr. G. C. Creel
Baltimore Gas & Electric Company

Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 and 2

cc:

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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. 153
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 March 7, 1991, 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:

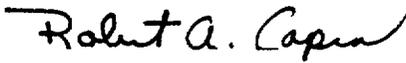
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(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 153, 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: May 6, 1991



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. 133
License No. DPR-69

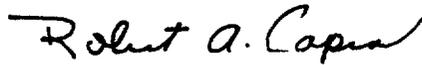
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Baltimore Gas and Electric Company (the licensee) dated March 7, 1991, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's 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. 133, 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: May 6, 1991

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 153 FACILITY OPERATING LICENSE NO. DPR-53

AMENDMENT NO. 133 FACILITY OPERATING LICENSE NO. DPR-69

DOCKET NOS. 50-317 AND 50-318

Revise Appendix A as follows:

Remove Pages

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3/4 5-2
3/4 5-3
3/4 5-6
B 3/4 5-1
B 3/4 5-2
B 3/4 5-2a (DPR 53 only)
B 3/4 5-3 (DPR 69 only)

Insert Pages

V
VI*
3/4 5-1**
3/4 5-2
3/4 5-3
3/4 5-6
B 3/4 5-1
B 3/4 5-2
B 3/4 5-2a (DPR 53 only)
B 3/4 5-2 (DPR 69 only)

* Pages that did not change, but are overlief.

** Changes on DPR-69 only. This page is overlief for DPR-53 with no changes.

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3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SAFETY INJECTION TANKS

LIMITING CONDITION FOR OPERATION

3.5.1 Each reactor coolant system safety injection tank shall be **OPERABLE** with:

- a. The isolation valve open,
- b. A contained borated water volume of between 1113 and 1179 cubic feet of borated water (equivalent to tank levels of between 187 and 199 inches, respectively),
- c. A boron concentration of between 2300 and 2700 ppm, and
- d. A nitrogen cover-pressure of between 200 and 250 psig.

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

ACTION:

- a. With one safety injection tank inoperable, except as a result of a closed isolation valve, restore the inoperable tank to **OPERABLE** status within one hour or be in **HOT SHUTDOWN** within the next 12 hours.
- b. With one safety injection tank inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in **HOT STANDBY** within one hour and be in **HOT SHUTDOWN** within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.5.1 Each safety injection tank shall be demonstrated **OPERABLE**:

- a. At least once per 12 hours by:
 1. Verifying the contained borated water volume and nitrogen cover-pressure in the tanks, and
 2. Verifying that each safety injection tank isolation valve is open.

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- b. At least once per 31 days by verifying the boron concentration of the safety injection tank solution.
- c. At least once per 31 days when the RCS pressure is above 2000 psig, by verifying that power to the isolation valve operator is removed by maintaining the feeder breaker open under administrative control.
- d. Within 4 hours prior to entering MODE 3 from MODE 4 by verifying, via local indication at the valve, that the tank isolation valve is open.
- e. At least once per refueling interval by verifying that each safety injection tank isolation valve opens automatically under each of the following conditions:
 - 1. When the RCS pressure exceeds 300 psia, and
 - 2. Upon receipt of a safety injection test signal.
- f. Within one hour prior to each increase in solution volume of $\geq 1\%$ of normal tank volume by verifying the boron concentration at the operating high pressure safety injection pump discharge is between 2300 and 2700 ppm.

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - MODES 1, 2, AND 3 (\geq 1750 PSIA)

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

- a. One OPERABLE high-pressure safety injection pump,
- b. One OPERABLE low-pressure safety injection pump, and
- c. An OPERABLE flow path capable of taking suction from the refueling water tank on a Safety Injection Actuation Signal and automatically transferring suction to the containment sump on a Recirculation Actuation Signal.

APPLICABILITY: MODES 1, 2 and 3*.

ACTION:

- a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.
- b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

* With pressurizer pressure \geq 1750 psia.

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - MODES 3 (< 1750 PSIA) AND 4

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

- a. One[#] OPERABLE high-pressure safety injection pump, and
- b. An OPERABLE flow path capable of taking suction from the refueling water tank on a Safety Injection Actuation Signal and automatically transferring suction to the containment sump on a Recirculation Actuation Signal.

APPLICABILITY: MODES 3* and 4.

ACTION:

- a. With no ECCS subsystem OPERABLE, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.
- b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

SURVEILLANCE REQUIREMENTS

4.5.3.1 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

* With pressurizer pressure < 1750 psia.

Between 350°F and 327°F, a transition region exists where the OPERABLE HPSI pump will be placed in pull-to-lock on a cooldown and restored to automatic status on a heatup. At 327°F and less, the required OPERABLE HPSI pump shall be in pull-to-lock and will not start automatically. At 327°F and less, HPSI pump use will be conducted in accordance with Technical Specification 3.4.9.3.

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

BASES

3/4.5.1 SAFETY INJECTION TANKS

The **OPERABILITY** of each of the RCS safety injection tanks ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event the RCS pressure falls below the pressure of the safety injection tanks. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The high pressure safety injection (HPSI) pumps are restricted in use during low temperature overpressure potential conditions, and may not be available to automatically start. Therefore, the safety injection tanks are required to provide immediate injection of borated water into the core in the event of an accident, allowing adequate time for operator action to manually start a HPSI pump.

The limits on safety injection tank volume, boron concentration and pressure ensure that the assumptions used for safety injection tank injection in the accident analysis are met.

The safety injection tank power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these safety injection tank isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with a safety injection tank inoperable for any reason except an isolation valve closed minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional safety injection tank which may result in unacceptable peak cladding temperatures. If a closed isolation valve cannot be immediately opened, the full capability of one safety injection tank is not available and prompt action is required to place the reactor in a mode where this capability is not required.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The **OPERABILITY** of two separate ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the safety injection tanks is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

EMERGENCY CORE COOLING SYSTEMS

BASES

Portions of the low pressure safety injection (LPSI) system flowpath are common to both subsystems. This includes the low pressure safety injection flow control valve, CV-306, the flow orifice downstream of CV-306, and the four low pressure safety injection loop isolation valves. Although the portions of the flowpath are common, the system design is adequate to ensure reliable ECCS operation due to the short period of LPSI system operation following a design basis Loss of Coolant Incident prior to recirculation. The LPSI system design is consistent with the assumptions in the safety analysis.

The trisodium phosphate dodecahydrate (TSP) stored in dissolving baskets located in the containment basement is provided to minimize the possibility of corrosion cracking of certain metal components during operation of the ECCS following a LOCA. The TSP provides this protection by dissolving in the sump water and causing its final pH to be raised to ≥ 7.0 . The requirement to dissolve a representative sample of TSP in a sample of RWT water provides assurance that the stored TSP will dissolve in borated water at the postulated post LOCA temperatures.

The Surveillance Requirements provided to ensure **OPERABILITY** of each component ensure that as a minimum, the assumptions used in the safety analyses are met and the subsystem **OPERABILITY** is maintained. The surveillance requirement for flow balance testing provides assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses. Minimum HPSI flow requirements for temperatures above 327°F are based upon small break LOCA calculations which credit charging pump flow following a SIAS. Surveillance testing includes allowances for instrumentation and system leakage uncertainties. The 470 gpm requirement for minimum HPSI flow from the three lowest flow legs includes instrument uncertainties but not system check valve leakage. The **OPERABILITY** of the charging pumps and the associated flow paths is assured by the Boration System Specification 3/4.1.2. Specification of safety injection pump total developed head ensures pump performance is consistent with safety analysis assumptions.

At temperatures of 327°F and less, HPSI injection flow is limited to less than or equal to 210 gpm except in response to excessive reactor coolant leakage. With excessive RCS leakage (LOCA), make-up requirements could exceed a HPSI flow of 210 gpm. Overpressurization is prevented by controlling other parameters, such as RCS pressure and subcooling. This provides overpressure protection in the low temperature region. An analysis has been performed which shows this flow rate is more than

EMERGENCY CORE COOLING SYSTEMS

BASES (Continued)

adequate to meet core cooling safety analysis assumptions. HPSI pumps are not required to auto-start when the RCS is in the MPT enable condition. The Safety Injection Tanks provide immediate injection of borated water into the core in the event of an accident, allowing adequate time for an operator to take action to start a HPSI pump.

Surveillance testing of HPSI pumps is required to ensure pump operability. Some surveillance testing requires that the HPSI pumps deliver flow to the RCS. To allow this testing to be done without increasing the potential for overpressurization of the RCS, either the RWT must be isolated or the HPSI pump flow must be limited to less than or equal to 210 gpm or an RCS vent greater than or equal to 2.6 square inches must be provided.

3/4.5.4 REFUELING WATER TANK (RWT)

The OPERABILITY of the RWT as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWT minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWT and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

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3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SAFETY INJECTION TANKS

LIMITING CONDITION FOR OPERATION

3.5.1 Each reactor coolant system safety injection tank shall be OPERABLE with:

- a. The isolation valve open,
- b. A contained borated water volume of between 1113 and 1179 cubic feet of borated water (equivalent to tank levels of between 187 and 199 inches, respectively),
- c. A boron concentration of between 2300 and 2700 ppm, and
- d. A nitrogen cover-pressure of between 200 and 250 psig.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

- a. With one safety injection tank inoperable, except as a result of a closed isolation valve, restore the inoperable tank to OPERABLE status within one hour or be in HOT SHUTDOWN within the next 12 hours.
- b. With one safety injection tank inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in HOT STANDBY within one hour and be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.5.1 Each safety injection tank shall be demonstrated OPERABLE:

- a. At least once per 12 hours by:
 1. Verifying the contained borated water volume and nitrogen cover-pressure in the tanks, and
 2. Verifying that each safety injection tank isolation valve is open.

EMERGENCY CORE COOLING SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

- b. At least once per 31 days by verifying the boron concentration of the safety injection tank solution.
- c. At least once per 31 days when the RCS pressure is above 2000 psig, by verifying that power to the isolation valve operator is removed by maintaining the feeder breaker open under administrative control.
- d. Within 4 hours prior to entering MODE 3 from MODE 4 by verifying, via local indication at the valve, that the tank isolation valve is open.
- e. At least once per refueling interval by verifying that each safety injection tank isolation valve opens automatically under each of the following conditions:
 - 1. When the RCS pressure exceeds 300 psia, and
 - 2. Upon receipt of a safety injection test signal.
- f. Within one hour prior to each increase in solution volume of $\geq 1\%$ of normal tank volume by verifying the boron concentration at the operating high pressure safety injection pump discharge is between 2300 and 2700 ppm.

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - MODES 1, 2, AND 3 (> 1750 PSIA)

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

- a. One OPERABLE high-pressure safety injection pump,
- b. One OPERABLE low-pressure safety injection pump, and
- c. An OPERABLE flow path capable of taking suction from the refueling water tank on a Safety Injection Actuation Signal and automatically transferring suction to the containment sump on a Recirculation Actuation Signal.

APPLICABILITY: MODES 1, 2, and 3*.

ACTION:

- a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.
- b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

* With pressurizer pressure \geq 1750 psia.

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - MODES 3 (< 1750 PSIA) AND 4

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

- a. One[#] OPERABLE high-pressure safety injection pump, and
- b. An OPERABLE flow path capable of taking suction from the refueling water tank on a Safety Injection Actuation Signal and automatically transferring suction to the containment sump on a Recirculation Actuation Signal.

APPLICABILITY: MODES 3* and 4.

ACTION:

- a. With no ECCS subsystem OPERABLE, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.
- b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

SURVEILLANCE REQUIREMENTS

4.5.3.1 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of Specification 4.5.2.

* With pressurizer pressure < 1750 psia.

Between 350°F and 305°F, a transition region exists where the OPERABLE HPSI pump will be placed in pull-to-lock on a cooldown and restored to automatic status on a heatup. At 305°F and less, the required OPERABLE HPSI pump shall be in pull-to-lock and will not start automatically. At 305°F and less, HPSI pump use will be conducted in accordance with Technical Specification 3.4.9.3.

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

BASES

3/4.5.1 SAFETY INJECTION TANKS

The OPERABILITY of each of the RCS safety injection tanks ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event the RCS pressure falls below the pressure of the safety injection tanks. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The high pressure safety injection (HPSI) pumps are restricted in use during low temperature overpressure potential conditions, and may not be available to automatically start. Therefore, the safety injection tanks are required to provide immediate injection of borated water into the core in the event of an accident, allowing adequate time for operator action to manually start a HPSI pump.

The limits on safety injection tank volume, boron concentration and pressure ensure that the assumptions used for safety injection tank injection in the accident analysis are met.

The safety injection tank power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protection function be removed automatically whenever permissive conditions are not met. In addition, as these safety injection tank isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with a safety injection tank inoperable for any reason except an isolation valve closed minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional safety injection tank which may result in unacceptable peak cladding temperatures. If a closed isolation valve cannot be immediately opened, the full capability of one safety injection tank is not available and prompt action is required to place the reactor in a mode where this capability is not required.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two separate ECCS subsystems ensure that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the safety injection tanks is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

EMERGENCY CORE COOLING SYSTEMS

BASES

Portions of the low pressure safety injection (LPSI) system flowpath are common to both subsystems. This includes the low pressure safety injection flow control valve, CV-306, the flow orifice downstream of CV-306, and the four low pressure safety injection loop isolation valves. Although the portions of the flowpath are common, the system design is adequate to ensure reliable ECCS operation due to the short period of LPSI system operation following a design basis Loss of Coolant Incident prior to recirculation. The LPSI system design is consistent with the assumptions in the safety analysis.

The trisodium phosphate dodecahydrate (TSP) stored in dissolving baskets located in the containment basement is provided to minimize the possibility of corrosion cracking of certain metal components during operation of the ECCS following a LOCA. The TSP provides this protection by dissolving in the sump water and causing its final pH to be raised to ≥ 7.0 . The requirement to dissolve a representative sample of TSP in a sample of RWT water provides assurance that the stored TSP will dissolve in borated water at the postulated post LOCA temperatures.

The Surveillance Requirements provided to ensure **OPERABILITY** of each component ensure that at a minimum, the assumptions used in the safety analyses are met and the subsystem **OPERABILITY** is maintained. The surveillance requirement for flow balance testing provides assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses. Minimum HPSI flow requirements for temperatures above 305°F are based upon small break LOCA calculations which credit charging pump flow following a SIAS. Surveillance testing includes allowances for instrumentation and system leakage uncertainties. The 470 gpm requirement for minimum HPSI flow from the three lowest flow legs includes instrument uncertainties but not system check valve leakage. The **OPERABILITY** of the charging pumps and the associated flow paths is assured by the Boration System Specifications 3/4.1.2. Specification of safety injection pump total developed head ensures pump performance is consistent with safety analysis assumptions.

EMERGENCY CORE COOLING SYSTEMS

BASES

At temperatures of 305°F and less, HPSI injection flow is limited to less than or equal to 210 gpm except in response to excessive reactor coolant leakage. With excessive RCS leakage (LOCA), make-up requirements could exceed a HPSI flow of 210 gpm. Overpressurization is prevented by controlling other parameters, such as RCS pressure and subcooling. This provides overpressure protection in the low temperature region. An analysis has been performed which shows this flow rate is more than adequate to meet core cooling safety analysis assumptions. HPSI pumps are not required to auto-start when the RCS is in the MPT enable condition. The Safety Injection Tanks provide immediate injection of borated water into the core in the event of an accident, allowing adequate time for an operator to take action to start a HPSI pump.

Surveillance testing of HPSI pumps is required to ensure pump operability. Some surveillance testing requires that the HPSI pumps deliver flow to the RCS. To allow this testing to be done without increasing the potential for overpressurization of the RCS, either the RWT must be isolated or the HPSI pump flow must be limited to less than or equal to 210 gpm or an RCS vent greater than or equal to 2.6 square inches must be provided.

3/4.5.4 REFUELING WATER TANK (RWT)

The OPERABILITY of the RWT as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWT minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWT and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 153 TO FACILITY OPERATING LICENSE NO. DPR-53
AND AMENDMENT NO. 133 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 March 7, 1991, 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 (TSs). The requested changes would revise the TSs for Unit 2 to require that the Safety Injection Tanks (SITs) be operable throughout Mode 3. The Unit 1 TSs already include this requirement. The amendments also would revise the TSs surveillance requirements for the SITs of both Units 1 and 2 to be consistent with the operability requirements during Mode 3 operation, provides editorial changes to the applicable TSs titles to accurately reflect the amendment changes, and the Index and Bases Sections are updated to reflect the changes in the operability and surveillance requirements.

2.0 EVALUATION

The safety injection tanks (SITs) provide water to begin the re-flooding of the core following a reactor coolant system (RCS) blowdown to minimize core damage until the safety injection pumps can provide adequate water for reactor cooling. The tanks are designed to inject large quantities of borated water into the RCS immediately following a large pipe break. In such an event, the water begins to re-flood and cool the core, thereby limiting clad-heatup and metal-water reaction until the safety injection pump flows are established. During normal pressure and temperature operating conditions, TS 3.5.1 ensures that the SITs are available to perform this function. The current Unit 2 TS 3.5.1 does not require the SITs to be operable for all of Mode 3. The SITs are only required to be operable when pressures are equal to or greater than 1750 psia.

Previous TS changes have imposed restrictions on the high pressure safety injection (HPSI) pumps when operating in Mode 3. These restrictions are necessary to protect against overpressure events due to mass addition transients. The operability of the SITs through the entire mode is necessary to assure mitigation of a loss-of-coolant accident (LOCA) due to the restrictions placed on the HPSI pumps. This operability requirement has been previously reviewed and approved by the NRC staff for Unit 1.

The licensee provided the results of a postulated LOCA analysis to determine the SITs pressure and volume needed to fill the reactor vessel following a large break LOCA and the minimum time available to initiate additional RCS makeup flow to maintain core heat removal. The results of the licensee's analysis indicates that there is at least 18 minutes available for the operators to identify the plant conditions and take appropriate action to initiate additional RCS makeup flow. The licensee also identified the procedure used, Abnormal Operating Procedures (AOP)-2A, "Excessive Reactor Coolant Leakage," which specifies the operator actions necessary to mitigate the consequences of both small and large break LOCAs.

The staff has determined, based on the details discussed above and its previous safety evaluation in support of Amendment No. 140 to the Unit 1 Operating License, dated March 6, 1990, that the analysis performed supports the capability of the SITs to mitigate a LOCA during Mode 3 operation with the existing HPSI pump restrictions. Therefore, the requirement to have the SITs operable during the entire Mode 3 for Unit 2 is consistent with that previously approved for Unit 1 and is acceptable.

The current TSs require that the isolation valves for each SIT be verified opened within 4 hours prior to increasing the RCS pressure greater than 1750 psia. The requested change requires that the verification be performed within 4 hours prior to entering Mode 3, regardless of the pressure, to assure the SITs availability during the entire Mode 3 operation.

The staff has determined that the requested surveillance requirements will provide assurance that the SITs will meet their operability requirements prior to entering Mode 3 for both Units 1 and 2 and are, therefore, acceptable.

The title changes are proposed to accurately reflect the required Limiting Condition For Operation (LCO) of Emergency Core Cooling Systems for operation equal to or greater than 1750 psia (TS 3.5.2) and for operation less than 1750 psia (TS 3.5.2). The licensee has indicated, and the staff agrees, that the changes more closely reflect the applicable operational conditions of the TSs, for which they are provided. The staff, therefore, has determined that the title changes are acceptable.

The Index and Bases Sections are updated to reflect those changes discussed above and are acceptable.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change to 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 to the 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 (56 FR 13658). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

5.0 CONCLUSION

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

Principal Contributor:
Daniel G. McDonald

Date: May 6, 1991

Docket Nos. 50-317
and 50-318

May 6, 1991

Mr. G. C. Creel
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. Creel:

SUBJECT: ISSUANCE OF AMENDMENTS FOR CALVERT CLIFFS NUCLEAR POWER PLANT,
UNIT NO. 1 (TAC NO. 79994) AND UNIT NO. 2 (TAC NO. 79995)

The Commission has issued the enclosed Amendment No. 153 to Facility Operating License No. DPR-53 and Amendment No. 133 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 in response to your application transmitted by letter dated March 7, 1991.

The amendments change the Technical Specifications (TSs) for Unit 2 to require that the Safety Injection Tanks (SITs) be operable throughout Mode 3. The Unit 1 TSs already include this requirement. The amendments also revise the TSs surveillance requirements for the SITs of both Units 1 and 2 to be consistent with the operability requirements during Mode 3 operation, includes editorial changes to the applicable TSs titles to accurately reflect the amendment changes, and the Index and Bases Sections are updated to reflect the changes in the operability and surveillance requirements.

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. 153 to DPR-53
2. Amendment No. 133 to DPR-69
3. Safety Evaluation

cc w/enclosures:
See next page

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