February 25, 1987

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Docket No. 50-317

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

Dear Mr. Tiernan:

The Commission has issued the enclosed Amendment No. 126 to Facility Operating License No. DPR-53 for Calvert Cliffs Nuclear Power Plant, Unit No. 1. This amendment changes the full closure time for main steam isolation valve (MSIV) operability to "less than 5.2 seconds" as specified in Technical Specification (TS) Surveillance Requirement 4.7.1.5. This amendment is in partial response to your application dated July 31, 1986. Amendment of TS 4.7.1.5 for Unit 2 will be considered upon installation of the modified MSIVs and the new MSIV actuators in Unit 2. All other items remaining from your July 31, 1986 application will be addressed in future correspondence.

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

Sincerely,

Original signed by

Scott Alexander McNeil, Project Manager
PWR Project Directorate #8
Division of PWR Licensing-B

Enclosures:
1. Amendment No. 126 to DPR-53
2. Safety Evaluation

cc w/enclosures:
See next page

PBD#8	PBD#8	FOB	OGC	PBD#8
PMKreutzer	SAMcNeil:jch		MYoung	AThadani
2/25/87	2/25/87	2/6/87	2/11/87	2/25/87

check STATE & SECY before issuance

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

Calvert Cliffs Nuclear Power Plant

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. 126
License No. DPR-53

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

   A. The application for amendment by Baltimore Gas & Electric Company (the licensee) dated July 31, 1986, as supplemented January 21, 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 Appendix A, as revised through Amendment No. 126, 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

Ashok C. Thadani, Director
PWR Project Directorate #8
Division of PWR Licensing-B

Attachment:
Changes to the Technical
Specifications

Date of Issuance: February 25, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 126

FACILTIY OPERATING LICENSE NO. DPR-53

DOCKET NO. 50-317

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change. The corresponding overleaf pages are provided to maintain document completeness.

Remove Pages	Insert Pages
3/4 7-9	3/4 7-9
B 3/4 7-3	B 3/4 7-3
B 3/4 7-4	B 3/4 7-4 (No change, repositioned.)

3/4.7.1.3 CONDENSATE STORAGE TANK

The OPERABILITY of the condensate storage tank with the minimum water volume ensures that sufficient water is available to maintain the RCS at HOT STANDBY conditions for 6 hours with steam discharge to atmosphere with concurrent and total loss of offsite power. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

3/4.7.1.4 ACTIVITY

The limitations on secondary system specific activity ensure that the resultant off-site radiation dose will be limited to a small fraction of 10 CFR Part 100 limits in the event of a steam line rupture. This dose also includes the effects of a coincident 1.0 GPM primary to secondary tube leak in the steam generator of the affected steam line and a concurrent loss of offsite electrical power. These values are consistent with the assumptions used in the accident analyses.

3/4.7.1.5 MAIN STEAM LINE ISOLATION VALVES

The OPERABILITY of the main steam line isolation valves ensures that no more than one steam generator will blowdown in the event of a steam line rupture. This restriction is required to 1) minimize the positive reactivity effects of the Reactor Coolant System cooldown associated with the blowdown, and 2) limit the pressure rise within containment in the event the steam line rupture occurs within containment. The OPERABILITY of the main steam isolation valves within the closure times of the surveillance requirements are consistent with the assumptions used in the accident analyses. The main steam isolation valves are surveilled to close in less than 5.2 seconds to ensure that under reverse steam flow conditions, the valves will close in less than the 6.0 seconds assumed in the accident analysis.

3/4.7.1.6 SECONDARY WATER CHEMISTRY

The secondary water chemistry program is designed to provide maximum protection to both the steam generator and secondary system internals. The most damaging chemical reactants enter the system via condenser cooling water ingress. Accumulation of these impurities in the steam generators may lead to loss of metallurgical integrity and/or eventual component failure. The limits presented in Table 3.7-3 are those prescribed by the NSSS supplier as "limited-operation" chemistry parameters and are consistent with the most recent industry standards. By routine monitoring of these parameters, plant personnel are able to rapidly detect and limit the duration of ingress of chemically detrimental species and thereby maintain steam generator tube integrity.

3/4.7.2 STEAM GENERATOR PRESSURE/TEMPERATURE LIMITATION

The limitation on steam generator pressure and temperature ensures that the pressure induced stresses in the steam generators do not exceed the maximum allowable fracture toughness stress limits. The limitations of 80°F and 200 psig are based on steam generator secondary side limitations and are sufficient to prevent brittle fracture.

3/4.7.3 COMPONENT COOLING WATER SYSTEM

The OPERABILITY of the component cooling water system ensures that sufficient cooling capacity is available for continued operation of safety related equipment during normal and accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the accident analyses.

3/4.7.4 SERVICE WATER SYSTEM

The OPERABILITY of the service water system ensures that sufficient cooling capacity is available for continued operation of equipment during normal and accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the accident analyses.

3/4.7.5 SALT WATER SYSTEM

The OPERABILITY of the salt water system ensures that sufficient cooling capacity is available for continued operation of equipment during normal and accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the accident analyses.

3/4.7.6 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

The OPERABILITY of the control room emergency ventilation system ensures that 1) the ambient air temperature does not exceed the allowable temperature for continuous duty rating for the equipment and instrumentation cooled by this system and 2) the control room will remain habitable for operations personnel during and following all credible accident conditions. The OPERABILITY of this system in conjunction with control room design provisions is based on limiting the radiation exposure to personnel occupying the control room to 5 rem or less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criteria 10 of Appendix "A", 10 CFR 50.

3/4.7.7 ECCS PUMP ROOM EXHAUST AIR FILTRATION SYSTEM

The OPERABILITY of the ECCS pump room exhaust air filtration system ensures that radioactive materials leaking from the ECCS equipment within the pump room following a LOCA are filtered prior to reaching the

PLANT SYSTEMS

MAIN STEAM LINE ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.7.1.5 Each main steam line isolation valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

MODE 1 - With one main steam line isolation valve inoperable, POWER OPERATION may continue provided the inoperable valve is either restored to OPERABLE status or closed within 4 hours; otherwise, be in HOT SHUTDOWN within the next 12 hours.

MODES 2 and 3 - With one main steam line isolation valve inoperable, subsequent operation in MODES 1, 2 or 3 may proceed provided:

a. The isolation valve is maintained closed.

b. The provisions of Specification 3.0.4 are not applicable.

Otherwise, be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.7.1.5 Each main steam line isolation valve shall be demonstrated OPERABLE by verifying full closure in less than 5.2 seconds when tested pursuant to Specification 4.0.5.

Deleted

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 126

TO FACILITY OPERATING LICENSE NO. DPR-53

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT UNIT NO. 1

DOCKET NO. 50-317

INTRODUCTION

By the letter dated July 31, 1986, as supplemented on January 21, 1987, the Baltimore Gas and Electric Co., (BG&E, the licensee) has requested a change to Surveillance Requirement 4.7.1.5 of the Technical Specifications (TS) for demonstrating main steam isolation valve (MSIV) operability at Calvert Cliffs Unit 1. The requested change is to delete the current requirement for full MSIV closure "within 3.6 seconds" and substitute a requirement for full MSIV closure "in less than 5.2 seconds."

The original application requested an MSIV closure time of 6 seconds; however, during the course of NRC staff review, data from factory testing indicated that closure time under loaded conditions is slightly greater than under unloaded conditions. To assure the MSIV closure time stays within the 6 seconds on which the safety analysis is based, a closure time for testing was specified as 5.2 seconds. This does not affect the substance of the proposed change.

The licensee's request is an integral part of a major MSIV modification at Calvert Cliffs. Rationale for the TS change, specific proposed modified TS and details of the MSIV modifications were included in the July 31, 1986 letter. This staff evaluation concerns both the acceptability of the TS change and the technical adequacy of the MSIV modifications.

MSIV modifications for Unit 1 were completed during the fall 1986 refueling outage.

BACKGROUND

The original MSIV design at Calvert Cliffs included a hydraulic valve closure actuator capable of developing adequate force to close the MSIV against a reverse steam flow. This required a physically large actuator with commensurately large hydraulic system capacity. The design of this hydraulic system is such that it tends to lose capacity unless the system is continually maintained. On at least one occasion, the MSIV's were declared inoperable because the hydraulic system capacity was not adequate to fully close the MSIV's.

In order to preclude any repeat of MSIV inoperability due to lack of hydraulic system capacity, the licensee will modify both the MSIV's and their associated actuators. The valve internals will be changed to include a balanced disc design. Utilizing a balanced disc will allow valve closure under all conditions, including reverse flow, but will require substantially less actuator force and a much smaller actuator. A completely new actuator will be installed and the original actuator, hydraulic system, and associated piping and controls will be removed. The new actuators will be much smaller and will be mounted directly on their respective MSIV's. The MSIV modifications and new actuators, along with the TS change, are the subject of this staff evaluation.

EVALUATION

In Chapter 14 of the Calvert Cliffs Nuclear Power Plant Units 1 and 2 Updated Final Safety Analysis Report (UFSAR), an MSIV closure time of 6 seconds is assumed for a steam line break event (SLB) inside and outside the containment, and a closure time of 12 seconds is assumed for a feedline break event (FLB) inside and outside the containment. Since the limiting event is an SLB, closure of the MSIV's in less than 6 seconds would be within the bounds of the accident analysis. With the balanced disc, MSIV closure time is not as significantly affected by steam backpressure as it was with the original MSIV configuration. However, steam flow across the valve seat can increase closure time of the modified MSIV by up to 0.6 seconds over the closure time for no steam flow conditions. To ensure that the MSIV will close in less than 6.0 seconds for all possible steam flow conditions resulting from the SLB event, the licensee has requested that the MSIV must fully close in less than 5.2 seconds for no steam flow conditions. Therefore, the staff concludes that the licensee's proposed change to TS 4.7.1.5 is acceptable since it is supported by the analysis of record.

In the analysis, a time delay of 0.9 seconds between reaching the low steam generator pressure trip setpoint and the actual commencement of MSIV closure is assumed for both the SLB and FLB events. In discussions with the NRC staff, the licensee has confirmed that the MSIV modifications and the change of actuators will not adversely impact the signal delay time assumed in the UFSAR analysis. This also is acceptable.

The above discussion considers the proposed TS change only with respect to the UFSAR Chapter 14 accident analysis. Other factors will have an effect on maximum allowable MSIV closure time. These factors are discussed later in this evaluation.

The existing MSIV bodies are Seismic Category 1, Safety Class 1. As stated above, the actual MSIV's were not replaced; only new internals were installed. Therefore, MSIV acceptability for their intended service is covered by the plant UFSAR and existing staff evaluations. The MSIV actuators, however,

are completely new. Each actuator is designed in accordance with applicable portions of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME) Section VIII. Material selection is in accordance with ASME Section VIII and Section II, and welding is in accordance with ASME Section VIII and Section IX. Quality assurance and inspection are in accordance with ASME Section V and Section VIII. Other industry codes/standards invoked by ASME and/or followed in the design and manufacture of the actuators include ASTM, AISI, and AWS standards. Design of the new actuators to the above codes and standards is in conformance with NRC criteria as stated in NUREG-0800. Finally, an actuator of the same generic design has successfully passed a qualification test program which included testing for radiation, seismic, thermal aging, operational aging, and LOCA simulation. The new actuators are designed to Seismic Category 1, Safety Class 1 requirements, which conform to General Design Criteria (GDC) 1 and 2. (Other applicable GDC are bounded by the plant UFSAR and staff evaluations pertaining to existing MSIV's). Based on the above, the staff concludes that the design of the new MSIV actuators is acceptable for their intended service.

The design of the new actuators includes two hydraulic circuits for each actuator. These hydraulic circuits control MSIV closure on demand to allow rapid valve closure without exerting excessive force on the MSIV seat and disc. Each circuit, individually, has the capability to initiate and control valve closure within the proposed TS time limit. The design of the actuators and associated hydraulic control circuits is such that failure of the hydraulic pressure boundary in any way will cause MSIV closure. The staff finds the new MSIV actuators acceptable with regard to hydraulic control circuitry independence, redundancy, and pressure boundary fail safe design.

Control of hydraulic fluid flow within the MSIV actuator hydraulic circuits is accomplished through the use of solenoid and pilot operated valves, and flow control devices. Each hydraulic circuit has a solenoid valve which controls a pressure operated dump valve. When open, the dump valve allows hydraulic fluid to be exhausted from under the actuator piston to a sump tank via a pressure compensated flow control. The two solenoid control valves for each MSIV are powered from separate, independent Class IE 125 VDC station batteries. The solenoid control valves are also Class IE, as are the feeder circuits from the station batteries to the valves. A second solenoid valve in each actuator hydraulic circuit is used in conjunction with the solenoid control valve to facilitate slow closure of the MSIV for test purposes. This second solenoid valve is also Class IE and is powered from the same circuit as its associated control valve. Each MSIV actuator hydraulic system also has a single solenoid valve to control compressed air flow to an integral pneumatically operated hydraulic pump which is used to open the MSIV's. This pneumatic solenoid valve is Class IE and is powered from the same circuit as one of the solenoid control valves. The above design requires energizing the solenoids to effect MSIV closure. Based on a review of the design, the staff

concludes that no single failure of an active or passive component would disable the actuators to the extent they could not effect MSIV closure in time to meet the UFSAR accident analyses requirements. Therefore, the staff concludes that the MSIV actuator controls are acceptable with respect to independence and redundancy.

In addition to automatic operation, MSIV closure can be initiated manually in the control room. The latter capability includes fast closure as may be required for an emergency response, or slow stroking for test purposes. There is no local (at the MSIV) control of any kind, either manual or electrical. Provisions have been made for monitoring MSIV position and actuator condition in the control room. Indicator lights are provided for MSIV open, 10% closed, and full closed. A common trouble alarm is provided to annunciate actuator low hydraulic pressure, low nitrogen pressure, and/or low hydraulic fluid level. Indication is also provided to show when the solenoid valves required for MSIV testing are energized. Local indications of pressure and fluid levels are also provided. The staff concludes that the controls and instrumentation provided are adequate for MSIV control and monitoring and, as such, are acceptable.

The staff review of the licensee's proposed TS change and attendant MSIV modifications, as detailed in the above evaluations, concentrated on determining that the proposed changes and modifications would provide a level of protection at least equal to the original configuration. A detailed comparison of the significant features of the original and new designs is given below.

APPENDIX A
DETAILED MSIV COMPARISON

Original	New
° 1 hydraulic circuit	° 2 hydraulic circuits
° 2 solenoid control valves	° 2 solenoid control valves
° energize solenoids to close MSIV's	° energize solenoids to close MSIV's
° Loss of hydraulic fluid MSIV inoperable	° Loss of hydraulic fluid MSIV inoperable
° Manual override if solenoids fail	° No manual override if solenoids fail
° Complex, large, many components, external piping	° Compact, less complex, fewer components, no external piping

Orignial	New
° MSIV closure time adversely affected by steam backpressure	° Partial fail safe design ° MSIV closure time only slightly affected by steam backpressure

Based upon its review, the staff concludes that the modified MSIV's with the new actuators are at least the equivalent of the original MSIV's and their associated actuators.

Accordingly, the staff also concludes that the modified MSIV's with their new actuators and the associated change in the MSIV full closure time specified in TS 4.7.1.5 are acceptable.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change in surveillance requirements. The staff has determined that this amendment involves 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets 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 amendment.

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

Date: February 25, 1987

Principal Contributor:
Ed Tomlinson