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January 16, 1996

U. S. Nuclear Regulatory Commission  
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant  
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318  
License Amendment Request: Adoption of 10 CFR Part 50, Appendix J, Option B  
for Type A Testing

Pursuant to 10 CFR 50.90, the Baltimore Gas and Electric Company (BGE) hereby requests an amendment to Operating License Nos. DPR-53 and DPR-69 by incorporating the changes described below into the Technical Specifications for Calvert Cliffs Unit Nos. 1 and 2, respectively. These proposed changes will adopt Option B of 10 CFR Part 50, Appendix J to require Type A Containment Leakage Rate Testing to be performed on a performance-based testing schedule.

Containment leakage rate testing is currently performed in accordance with 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." Appendix J specifies containment leakage testing requirements, including the types of tests required, frequency of testing, and reporting requirements. Containment leakage test requirements include performance of Integrated Leakage Rate Tests, also known as Type A tests, which measure overall leakage rate of the containment; and Local Leakage Rate Tests, also known as Type B and C tests, which measure the leakage through containment penetrations and valves. The Nuclear Regulatory Commission has amended the regulations to provide an alternate option, Option B, to the existing Appendix J. Option B permits a licensee to choose Type A; or Type B and C; or Type A, B, and C; testing to be done on a performance basis. At this time, BGE plans to adopt Option B for Type A testing only.

Adoption of Option B necessitates a change to the Technical Specifications for Calvert Cliffs Unit Nos. 1 and 2. Unit 1 Surveillance Requirement 4.6.1.2.a currently specifies a Type A testing frequency of three tests in 10 years. The corresponding Surveillance Requirement for Unit 2 refers to 10 CFR Part 50, Appendix J, as modified by approved exemptions, for the frequency of Type A tests. Attachment (1) provides a description and justification of the proposed Technical Specification changes.

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Baltimore Gas and Electric Company is developing a Containment Leakage Rate Testing Program to implement Type A testing of the containment as required by 10 CFR 50.54 (o) and 10 CFR Part 50, Appendix J, Option B. This program will be developed in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995. The program, which will specify the containment surface visual examination criteria, Type A test performance criteria, and the means of establishing the test interval, will be approved by BGE prior to implementation of this License Amendment.

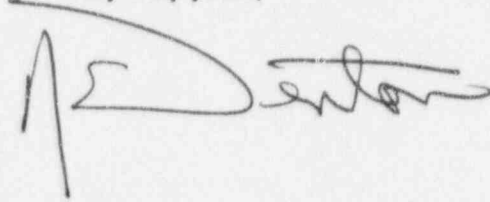
We have evaluated significant hazards considerations associated with this change and have determined that there are none (see Attachment 2 for a complete discussion). We have also determined that operation with the proposed amendment would not result in any significant change in the types, or significant increases in the amounts, of any effluents that may be released offsite, nor would it result in any significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment is eligible for categorical exclusion as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed amendment.

The Plant Operations and Offsite Safety Review Committees have reviewed the proposed change to the Technical Specifications and concurred that operation with the proposed changes will not result in an undue risk to the health and safety of the public.

The next Unit 1 Type A test is scheduled to be performed during the upcoming refueling outage, which is currently scheduled to begin on March 15, 1996. Based upon the acceptable results from the previous two Unit 1 Type A tests, the scheduled Type A test will be unnecessary if BGE adopts Option B before the end of the 1996 Refueling Outage. Therefore, this License Amendment is requested to be approved and issued by April 5, 1996.

Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,



STATE OF MARYLAND :  
: TO WIT:  
COUNTY OF CALVERT :

I hereby certify that on the 16 day of January, 1996, before me, the subscriber, a Notary Public of the State of Maryland in and for Calvert County, personally appeared Robert E. Denton, being duly sworn, and states that he is Senior Vice President of the Baltimore Gas and Electric Company, a corporation of the State of Maryland; that he provides the foregoing response for the purposes therein set forth; that the statements made are true and correct to the best of his knowledge, information, and belief; and that he was authorized to provide the response on behalf of said Corporation.

WITNESS my Hand and Notarial Seal:

Michelle D. Hall  
Notary Public

My Commission Expires:

02/02/98  
Date

RED/NH/dlm

- Attachments: (1) Description and Justification of Proposed Change
- (2) Determination of Significant Hazards
- (3) Unit 1 Marked-up Technical Specification Pages
- (4) Unit 2 Marked-up Technical Specification Pages

- cc: D. A. Brune, Esquire
- J. E. Silberg, Esquire
- L. B. Marsh, NRC
- D. G. McDonald, Jr., NRC
- T. T. Martin, NRC
- Resident Inspector, NRC
- R. I. McLean, DNR
- J. H. Walter, PSC

**ATTACHMENT (1)**

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**DESCRIPTION AND JUSTIFICATION  
OF PROPOSED CHANGE**

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**Baltimore Gas and Electric Company  
License Amendment Request  
January 16, 1996**

## ATTACHMENT (1)

### DESCRIPTION AND JUSTIFICATION OF PROPOSED CHANGE

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#### DESCRIPTION OF CONTAINMENT STRUCTURES

The Calvert Cliffs Units 1 and 2 containment structures are 130-foot diameter reinforced concrete cylinders with shallow domed roofs. The inside height of each structure, including the dome, is 181 feet - 8 inches. The containment free volume is  $2 \times 10^6$  cubic feet. The thickness of the reinforced concrete base is 10 feet and the minimum thicknesses of the cylindrical side wall and dome are 3 feet - 9 inches and 3 feet - 3 inches, respectively. The inside of the structural concrete is lined with 1/4-inch thick steel plate attached to the concrete by means of an angle grid system stitch-welded to the liner plate and embedded in the concrete. The location of the anchoring system prevents significant distortion of the liner plate during accident conditions, and ensures that the liner maintains its leak-tight integrity. The bottom horizontal liner plate is covered with approximately 1 foot - 6 inches of concrete, the top of which forms the floor of the containment. All penetrations made in the structure have been considered as potential leak sources, and, as such, are designed to withstand full containment accident pressure. The containment is designed for a maximum of 0.20 % per day leakage by weight of the original content of air at a design pressure of 50 psig and a concrete surface temperature of 276°F. Further information on the containment design can be found in Chapter 5 of the Calvert Cliffs Updated Final Safety Analysis Report.

#### 10 CFR PART 50, APPENDIX J, TYPE A TESTING

Currently, containment leakage rate testing is performed in accordance with 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." Appendix J specifies containment leakage testing requirements, including the types of tests required. In addition, for each type of test, Appendix J discusses leakage rate acceptance criteria, test methodology, frequency of testing, and reporting requirements. The specific testing requirements are discussed in a variety of sources, including Technical Specifications for Calvert Cliffs Units 1 and 2, the Updated Final Safety Analysis Report, National Standards (e.g., ANSI/ANS 56.8-1994, "Containment System Leakage Testing Requirements"), and correspondence between Baltimore Gas and Electric Company (BGE) and the Nuclear Regulatory Commission (NRC). These documents require that periodic testing be conducted to verify the leakage integrity of the containment and those containment systems and components which penetrate the containment.

Containment leakage rate testing includes performance of Integrated Leakage Rate Tests, also known as Type A tests; and Local Leakage Rate Tests, also known as Type B and Type C tests. The Type A test measures overall leakage rate of the containment. Type B tests are intended to detect leakage paths and measure leakage for certain containment penetrations (e.g., airlocks, flanges, and electrical penetrations). Type C tests are intended to measure containment isolation valve leakage rates.

The NRC has amended its regulations (60FR49495) to provide an alternative option, Option B, for containment leakage rate testing. Option B allows licensees to implement performance-based testing, possibly reducing the Type A testing frequency from three tests in 10 years to one test in 10 years. For Type B and C tests, Option B would allow licensees to reduce testing frequency on a plant-specific basis based on experience history of each component, and established controls to ensure continued performance during the extended testing interval. At this time, BGE plans to adopt Option B for Type A Testing only; therefore, Type B and C leakage testing and reporting will continue to be performed as required by Option A.

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### DESCRIPTION AND JUSTIFICATION OF PROPOSED CHANGE

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#### EXEMPTIONS TO 10 CFR PART 50, APPENDIX J, OPTION A

Option B recognizes that, in many cases, Technical Specifications were approved that incorporated exemptions to provisions of Appendix J. Additionally, some licensees have requested and received exemptions after their Technical Specifications were issued. Option B states that specific exemptions to Option A of Appendix J that have been formally approved by the Atomic Energy Commission or NRC, according to 10 CFR 50.12, are still applicable to Option B if necessary, unless specifically revoked by the NRC. A review of approved exemptions to Appendix J for Calvert Cliffs Nuclear Power Plant has not identified any current exemptions which would affect the adoption of Option B for Type A tests, as requested by this License Amendment Request.

Calvert Cliffs has one current schedular exemption for Unit 2 Type A testing, which allowed an extension of the interval between the first and second Type A test during the second ten-year service period (Reference a). That exemption will no longer be required following the adoption of Option B for Type A testing. Exemptions to Option A specifically for Type B or Type C testing will not be affected by this License Amendment Request, as we are only adopting Option B for Type A testing at this time.

#### ADOPTION OF OPTION B AT CALVERT CLIFFS

This License Amendment Request is to adopt Option B for Type A testing and its associated visual containment inspections only. Implementation of Option B for Type B and Type C testing will be evaluated at a later date. Our proposed method for complying with Option B is in accordance with the guidance provided in Regulatory Guide 1.163 (Reference b). By letter dated November 2, 1995, the Commission transmitted to NEI a set of model Technical Specifications for implementing Option B (Reference c). These Technical Specifications served as a model for our proposed Technical Specifications for Option B, with changes as necessary to implement Option B for Type A testing only, and to conform to the current format of Calvert Cliffs' Technical Specifications. We will evaluate incorporating the remainder of the changes in Reference (c), including the implementation of Option B for Type B and C testing, as part of our conversion to the Improved Technical Specifications.

The following proposed changes to the Calvert Cliffs Units 1 and 2 Technical Specifications are in agreement with the changes suggested in Reference (c):

**Technical Specification 3/4.6.1.2, Containment Leakage**, specifies the Type A testing requirements, including testing frequency, acceptance criteria, error analysis requirements and supplemental test requirements to verify the accuracy of Type A tests. This Specification will be revised to refer to the "Containment Leakage Rate Testing Program" for the procedural details of Type A tests and the associated visual surface examinations.

**Technical Specification 4.6.1.6.3, Containment Structural Integrity, Containment Surfaces**, specifies the requirements for performing visual inspections of the exposed accessible interior and exterior surfaces of the containment. This specification will be revised to refer to the Containment Leakage Rate Testing Program, which will include the procedural details of these visual surface examinations. In accordance with Reference (b), the frequency of the containment visual surface examinations will remain at three inspections every ten years.

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**Specification 6.0, Administrative Controls**, will be revised to add Technical Specification 6.19, "Containment Leakage Rate Testing Program". [This Specification will be renumbered 6.5.6, following the approval of BGE's Administrative Controls License Amendment Request, Reference (d). Other references to Specification 6.19 will also be changed to 6.5.6 following approval of that License Amendment Request.]. Specification 6.19 identifies the programmatic controls for this new program and provides a reference to the source of the programmatic guidelines, Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Programs," dated September 1995. Specification 6.19 follows the guidance in Reference (c) by specifying the peak calculated containment internal pressure, the maximum allowable containment leakage rate, the containment leakage rate acceptance criterion, and the applicability of Specifications 4.0.2 and 4.0.3.

The **BASES for Specifications 3/4.6.1.2 and 3/4.6.1.6** will be revised to reflect relocation of the procedural details of Type A testing and containment visual inspections to the Containment Leakage Rate Testing Program. Additionally, the Bases will clarify that Type A tests will be in accordance with Option B of Appendix J, while Type B and C testing will conform to Option A.

Baltimore Gas and Electric Company is currently developing a Containment Leakage Rate Testing Program to specify the procedural details for Type A testing and containment visual inspections. Following the guidance provided in References (b) and (f), the Containment Leakage Rate Testing Program will include leakage rate testing methods, procedures and analyses that must be used to comply with Option B. This performance-based program will be approved by BGE prior to implementing the requested license amendment, and will be available at Calvert Cliffs for NRC inspection. We will also maintain records at the site showing that the criteria for Type A tests have been met, and comparisons of the performance of the overall containment system to show that the test intervals are adequate.

Three inconsistencies were identified in Revision 0 of NEI 94-01, Reference (f), at the Option B Workshop sponsored by the Nuclear Energy Institute in December 1995. These inconsistencies are presented as points of clarification only, and are not considered exceptions to the guidance in Reference (f), as their incorporation will make the document consistent throughout. Therefore, NEI has proposed issuing an errata sheet to NEI 94-01 to resolve this oversight error. This proposal is expected to be formally submitted to the Commission later this week. Our program will be consistent with the errata sheet changes.

### RISK ASSESSMENT

The risk of containment structural degradation is that a pathway for radionuclides could be created if the containment is challenged, such as in a loss-of-coolant accident. Such leakage does not create any new accident scenarios, nor does it contribute to the initiation of any accident.

From a risk standpoint, the purpose of Appendix J leakage testing is to detect any containment leakage resulting from failures in the containment isolation boundary before an accident occurs. Such leakage could be the result of leakage through containment penetrations, through airlocks, or through containment structural faults. The Appendix J Type B and C tests, which are unaffected by this proposed change, will continue to periodically test for leakage through containment valves, penetrations, and airlocks. The only potential containment failures that would not be detected by Type B and C testing are mechanical failures

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of the containment (i.e., degradations or modifications to the containment). Thus, the only potential effect of the proposed change to the Type A test frequency is the possibility that containment structural leakage would go undetected between tests. As described in the NUREG-1493, Reference (e), passive failures resulting in containment structural leakage in excess of that assumed in the accident analyses are extremely unlikely to develop between Type A tests.

Postulated containment failure under severe accident conditions is primarily due to phenomenological effects associated with severe accidents. Such effects were considered as part of the Calvert Cliffs Individual Plant Examination (IPE). Adopting the performance-based Option B will not significantly affect the containment failure probabilities calculated for the IPE.

Reference (e) includes the results of a sensitivity study performed to explore the risk effect of several alternate leakage rate testing schedules. Based on information provided in Reference (e), the increased risk to the general population due to radiation dose attributable to extending the test interval from three to five years would be extremely small. Another alternative addressed in this study is extending the Type A testing frequency from three in ten years, to one in ten years. Using best estimate data, Reference (e) concludes that the increase in risk to those in the vicinity of the five representative plants ranged from 0.02 to 0.14%. This very low effect on risk is attributable to: 1) the effectiveness of Type B and C tests in identifying potential leak paths (about 97%); 2) a low likelihood of Type A test-identified leakages in excess of two times allowable; and 3) the insensitivity of risk to containment leakage rate (i.e., no discernible increase in population dose risk with containment leakage rates 100 times greater than currently allowed). This led the authors of Reference (e) to conclude that even decreasing the Type A testing frequency to once per twenty years would "lead to an imperceptible increase in risk."

The license amendment requested for Calvert Cliffs Unit Nos. 1 and 2 is concluded to be bounded by the analyses of Reference (e) because Option B could result in a maximum Type A test interval of 10 years, rather than the 20 years addressed in Reference (e). Furthermore, the adoption of Option B will not significantly affect the containment failure probability calculated in the Calvert Cliffs IPE. As such, BGE believes that there is sufficient information in Reference (e) and the Calvert Cliffs IPE to conclude that the requested change will not present an undue risk to the public health and safety.

### IMPLEMENTATION PLAN

Baltimore Gas and Electric Company is scheduled to perform a Type A test during the upcoming Unit 1 refueling outage in spring 1996. Based upon the acceptable results from the previous two Unit 1 Type A tests, the scheduled Type A test will be unnecessary if Option B is approved and implemented prior to the end of the 1996 refueling outage. Therefore, we plan to implement the proposed License Amendment and Containment Leakage Rate Testing Program for Unit Nos. 1 and 2 within 30 days of NRC approval of the License Amendment Request. Our Containment Leakage Rate Testing Program will be in accordance with the guidance presented in Reference (b) for Type A testing.



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REFERENCES

- (a) Letter from Mr. D. G. McDonald, Jr. (NRC) to Mr. R. E. Denton (BGE), "Issuance of Amendment for Calvert Cliffs Nuclear Power Plant, Unit No. 2," dated April 10, 1995
- (b) Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995
- (c) Letter from Mr. C. I. Grimes (NRC) to Mr. D. J. Modeen (NEI), regarding model technical specifications for implementing Option B, dated November 2, 1995
- (d) Letter from Mr. R. E. Denton (BGE) to NRC Document Control Desk, "License Amendment Request: Administrative Controls Section 6.0 Upgrade and Quality Assurance Policy Change," dated March 15, 1995
- (e) NUREG-1493, "Performance-Based Containment Leak-Test Program," dated September 1995
- (f) NEI 94-01, "Nuclear Energy Institute - Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," Revision 0, dated July 26, 1995

**ATTACHMENT (2)**

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**DETERMINATION OF SIGNIFICANT HAZARDS**

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## ATTACHMENT (2)

### DETERMINATION OF SIGNIFICANT HAZARDS

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The proposed change has been evaluated against the standards in 10 CFR 50.92 and has been determined to not involve a significant hazards consideration, in that operation of the facility in accordance with the proposed amendments:

1. *Would not involve a significant increase in the probability or consequences of an accident previously evaluated.*

Containment leakage rate testing is performed in accordance with 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." The Appendix J containment leakage test requirements include performance of Type A tests, which measure the overall leakage rate of the containment, and Type B and C tests, which measure the leakage through containment penetrations and valves. The Commission has amended the regulations to provide a performance-based alternative, Option B, to the existing Appendix J. At this time, Baltimore Gas and Electric Company plans to adopt Option B for Type A testing only.

Implementation of Option B involves no physical or operational changes to the plant structures, systems or components. Furthermore, leakage rate testing and containment surface visual inspections do not contribute to the initiation of any postulated accidents; therefore, this proposed change does not involve an increase in the probability of any previously evaluated accidents.

Type A testing is necessary to demonstrate that leakage through the containment is within the limits assumed in the accident analyses. The only potential effect of the proposed change to the Type A test frequency is the possibility that containment leakage would go undetected between tests. As described in NUREG-1493, passive failures resulting in containment leakage in excess of that assumed in the accident analyses are extremely unlikely to develop between Type A tests. Additionally, the Calvert Cliffs Individual Plant Examination considered the phenomenological effects associated with severe accidents which could lead to containment failure. It was concluded that adopting a performance-based testing interval will not significantly affect the containment failure probabilities calculated for the Individual Plant Examination. Furthermore, the required frequency for containment surface examinations to identify containment degradation precursors will be relocated from the Technical Specifications to the Containment Leakage Rate Testing Program, but will remain at three examinations every ten years as recommended by Regulatory Guide 1.163, September 1995. Altogether, adoption of a performance-based testing frequency, as specified in 10 CFR Part 50, Appendix J, Option B, will not significantly decrease the confidence in the leak-tightness of the containment. Therefore, this change will not result in a significant increase in the probability of undetected containment degradation or in the consequences of an accident previously evaluated.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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### DETERMINATION OF SIGNIFICANT HAZARDS

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2. *Would not create the possibility of a new or different type of accident from any accident previously evaluated.*

The proposed Technical Specification change adopts a performance-based approach to containment leakage rate testing. This change does not add any new equipment, modify any interfaces with any existing equipment, or change the equipment's function, or the method of operating the equipment. The proposed change does not affect normal plant operations or configuration, nor does it affect leakage rate test methods. As the proposed change would not change the design, configuration or operation of the plant, it could not cause containment leakage rate testing to become an accident initiator.

Therefore, the proposed change does not create the possibility of a new or different type of accident from any accident previously evaluated.

3. *Would not involve a significant reduction in a margin of safety.*

The purpose of the existing schedule for Type A tests is to ensure that the release of radioactive material will be restricted to those leak paths and leakage rates assumed in the accident analyses. The margin of safety associated with containment leakage rates is not reduced if containment leakage does not exceed the maximum allowable leakage rate defined in the Technical Specifications. The proposed Technical Specification change implements a performance-based Type A testing option, but does not affect the maximum allowable containment leakage rate. The proposed change does not affect a safety limit, a Limiting Condition for Operation, or the way in which the plant is operated.

In NUREG-1493, the Commission included a sensitivity study to explore the risk affect of several alternate leakage rate testing schedules. This study concludes that decreasing the Type A testing frequency to one test per twenty years would "lead to an imperceptible increase in risk." Additionally, it was determined that implementation of the performance-based testing option will not significantly affect the containment failure probability calculated in the Calvert Cliffs Individual Plant Examination. Based upon these studies, there is sufficient information to conclude that the risk increase, and that the probability of exceeding the maximum allowable containment leakage rate as a result of adopting Option B, is low.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

**ATTACHMENT (3)**

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**UNIT 1**  
**MARKED-UP TECHNICAL SPECIFICATION**  
**PAGES**

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