February 21, 1996

Mr. Robert E. Denton
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: ISSUANCE OF AMENDMENT FOR CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1 (TAC NO. M94365)

Dear Mr. Denton:

The Commission has issued the enclosed Amendment No. 211 to Facility Operating License No. DPR-53 for the Calvert Cliffs Nuclear Power Plant, Unit No. 1. This amendment consists of changes to the Technical Specifications (TSs) in response to your application transmitted by letter dated December 21, 1995.

The amendment allows the use of cladding material other than Zircaloy or ZIRLO. The enclosed Safety Evaluation addresses the safety significance of loading four (4) lead fuel assemblies (LFAs) into the Calvert Cliffs Nuclear Power Plant, Unit No. 1, reactor vessel during cycles 13, 14, and 15. A Temporary Exemption was issued on November 28, 1995 (60 FR 62483) approving the loading of the 4 LFAs into the Unit 1 reactor vessel for the cycles noted above. The technical basis for the Temporary Exemption, which is the same basis for the requested TS amendment, was provided in your submittal dated July 13, 1995.

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

Docket No. 50-317

Enclosures: 1. Amendment No. 211 to DPR-53
2. Safety Evaluation

cc w/encls: See next page

DISTRIBUTION: See attached sheet
DOCUMENT NAME: G:\CC1-2\CC194365.AMD
To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	LA:PDI-1	E	PM:PDI-1	E	OGC		D:PDI-1	N		
NAME	SLittle		DMcDonald/rst		MYoung		LMarsh			
DATE	01/22/96		01/22/96		02/ 1/96		02/ /96		01/ /96	

Official Record Copy 02/21

260056

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 21, 1996

Mr. Robert E. Denton
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: ISSUANCE OF AMENDMENT FOR CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1 (TAC NO. M94365)

Dear Mr. Denton:

The Commission has issued the enclosed Amendment No.211 to Facility Operating License No. DPR-53 for the Calvert Cliffs Nuclear Power Plant, Unit No. 1. This amendment consists of changes to the Technical Specifications (TSs) in response to your application transmitted by letter dated December 21, 1995.

The amendment allows the use of cladding material other than Zircaloy or ZIRLO. The enclosed Safety Evaluation addresses the safety significance of loading four (4) lead fuel assemblies (LFAs) into the Calvert Cliffs Nuclear Power Plant, Unit No. 1, reactor vessel during cycles 13, 14, and 15. A Temporary Exemption was issued on November 28, 1995 (60 FR 62483) approving the loading of the 4 LFAs into the Unit 1 reactor vessel for the cycles noted above. The technical basis for the Temporary Exemption, which is the same basis for the requested TS amendment, was provided in your submittal dated July 13, 1995.

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

Docket No. 50-317

Enclosures: 1. Amendment No.211 to DPR-53
2. Safety Evaluation

cc w/encls: See next page

cc:

Ms. Mary Krug, President
Calvert County Board of
Commissioners
175 Main Street
Prince Frederick, MD 20678

D. A. Brune, Esquire
General Counsel
Baltimore Gas and Electric Company
P. O. Box 1475
Baltimore, MD 21203

Jay E. Silberg, Esquire
Shaw, Pittman, Potts and Trowbridge
2300 N Street, NW
Washington, DC 20037

Mr. Terrence J. Camilleri, Director,
NRM
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

Resident Inspector
c/o U.S. Nuclear Regulatory
Commission
P. O. Box 287
St. Leonard, MD 20685

Mr. Richard I. McLean
Administrator - Radioecology
Department of Natural Resources
580 Taylor Avenue
Tawes State Office Building
B3
Annapolis, MD 21401

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. Joseph H. Walter
Engineering Division
Public Service Commission of
Maryland
6 St. Paul Centre
Baltimore, MD 21202-6806

Kristen A. Burger, Esquire
Maryland People's Counsel
6 St. Paul Centre
Suite 2101
Baltimore, MD 21202-1631

Patricia T. Birnie, Esquire
Co-Director
Maryland Safe Energy Coalition
P. O. Box 33111
Baltimore, MD 21218

Mr. Larry Bell
NRC Technical Training Center
5700 Brainerd Road
Chattanooga, TN 37411-4017

DATED: February 21, 1996

AMENDMENT NO. 211 TO FACILITY OPERATING LICENSE NO. DPR-53-CALVERT CLIFFS UNIT 1

Docket File
PUBLIC
PDI-1 Reading
S. Varga, 14/E/4
L. Marsh
S. Little
D. McDonald
OGC
G. Hill (2), T-5 C3
C. Grimes, 11/E/22
T. Attard
ACRS
PD plant-specific file
C. Cowgill, Region I

cc: Plant Service list

DF01

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-317

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 211
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 December 21, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

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

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

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

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

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

2. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 211, 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 to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Ledyard B. Marsh, 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: February 21, 1996

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 211 FACILITY OPERATING LICENSE NO. DPR-53

DOCKET NO. 50-317

Revise Appendix A as follows:

Remove Pages	Insert Pages
5-1	5-1

5.0 DESIGN FEATURES

5.1 SITE LOCATION

The site for the Calvert Cliffs Nuclear Power Plant is located on the western shore of the Chesapeake Bay in Calvert County, Maryland, about 10-1/2 miles southeast of Prince Frederick, Maryland. The site is approximately 45 miles southwest of Washington, DC, and 60 miles south of Baltimore, Maryland. The exclusion area boundary has a minimum radius of 1,150 meters from the center of the plant.

5.2 REACTOR CORE

5.2.1 FUEL ASSEMBLIES

The reactor shall contain 217 fuel assemblies. Each assembly shall consist of a matrix of cylindrical zircaloy or ZIRLO cladding fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting regions. For Cycles 13, 14 and 15 only, advanced cladding material may be used in four lead test assemblies as described in an approved temporary exemption dated November 28, 1995.

5.2.2 CONTROL ELEMENT ASSEMBLIES

The reactor core shall contain 77 full length and no part length control element assemblies.

5.3 FUEL STORAGE

5.3.1 CRITICALITY

5.3.1.1 The spent fuel storage racks are designed and shall be maintained with:

a. Fuel assemblies having a maximum U-235 enrichment of 4.52 weight percent;

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.7.2 of the UFSAR;

c. A nominal 10-3/32-inch center-to-center distance between fuel assemblies.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 211 TO FACILITY OPERATING LICENSE NO. DPR-53

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-317

1.0 INTRODUCTION

By letter dated December 21, 1995, the Baltimore Gas and Electric Company (BGE licensee) submitted a request for changes to the Calvert Cliffs Nuclear Power Plant, Unit No. 1, Technical Specifications (TSs). The requested changes would allow the use of cladding materials other than Zircaloy or ZIRLO. A Temporary Exemption was issued on November 28, 1995, (60 FR 62483) approving the loading of four (4) lead fuel assemblies (LFAs) into the Unit No. 1 reactor vessel during cycles 13, 14, and 15. The technical basis for the Exemption, which is the same basis for the requested TS amendment, was provided in the BGE submittal dated July 13, 1995. The submittal addressed the safety significance of operating with 4 LFAs in Calvert Cliffs Nuclear Power Plant, Unit No. 1, reactor vessel during cycles 13, 14, and 15.

Specifically, BGE proposes to add a statement to TS 5.2.1, "Fuel Assemblies," indicating, for Cycles 13, 14, and 15 only, advanced cladding material may be used in 4 lead test assemblies (referred to as LFAs in this evaluation) as described in a approved Temporary Exemption dated November 28, 1995.

The 4 LFAs with advanced cladding material are part of a demonstration program. The purpose of the demonstration program is to explore new cladding compositions that may be more corrosion resistant and improve cladding performance for extended irradiation resulting in high burnups.

2.0 EVALUATION

Currently, there is a trend in the nuclear industry towards longer fuel cycles and thus increased fuel discharge burnups. Commercially used fuel cladding material is not adequate to provide the necessary operational flexibility and performance margins that the longer cycles and higher burnups require. BGE (through ABB-Combustion Engineering Nuclear Operations) has developed optimized low-tin Zircaloy-4 for improved material properties which should meet the needs stated above. The same type of assemblies have been loaded into the Palo Verde, Unit No. 1, reactor vessel and have achieved a final burnup of 53 GWD/MTU. This evaluation is based on the 4 LFAs not exceeding the Calvert Cliffs, Unit No. 1 current approved burnup limit of 60 GWD/MTU.

To enhance the corrosion database on advanced cladding alloys, the optimum mix of enhanced corrosion resistance, acceptable mechanical properties, and ease of fabrication need to be determined. To address these issues, the BGE demonstration program will include fuel rods with 5 advanced cladding alloys to be irradiated in the 4 LFAs which BGE proposes to include in the Calvert Cliffs Nuclear Power Plant, Unit No. 1, batch R reload fuel for cycles 13, 14, and 15.

In general there are two criteria governing the use of LFAs: (1) the total number of LFAs in one core should be limited, and (2) the LFAs should not be loaded in limiting positions.

The July 13, 1995, submittal included proprietary and nonproprietary reports, CEN 425-P, Rev. 3-P, and CEN 415-P, Rev. 3-NP, respectively, dated May 1995, "Safety Evaluation Report For the Use of Advanced Zirconium - Based Cladding Materials in Calvert Cliffs Unit 1 Batch R Lead Fuel Assemblies." The reports provided detailed analysis of the advanced alloy cladding chemical, mechanical, and other material properties. In addition, detailed analysis of the behavior of the LFAs during postulated accident conditions, transient conditions, and normal operational conditions were provided in the reports.

BGE has determined that the results of testing and evaluations detailed in the reports support the safety of the planned irradiations of the 4 LFAs during the power operation of Unit No. 1. The predicted chemical, mechanical, and material properties of the LFAs fall within the range of the properties of the Zircaloy-4 clad fuel currently in the Unit No. 1 reactor vessel. In addition, the fuel rods in the LFAs containing the special cladding alloys are identical in design and dimension to the control fuel rods used in the LFAs. All of the fuel rods in the LFAs contain uranis or urania-erbia fuel pellets of the same enrichment.

The LFAs will be placed in non-limiting locations in the core with the a 5 percent safety margin to power peaking for each of the LFAs. The supporting analysis indicates that, since these assemblies will not be in a limiting location, the placement scheme and the similarity of the advanced alloys to zircaloy-4 will assure that the behavior of the fuel rods with these alloys is bounded by the fuel performance and safety analyses performed for the zircaloy-4 clad fuel rods currently in the Unit No. 1 core.

The NRC staff has determined that BGE has provided adequate assurance that the proposed use of the 4 LFAs in the Calvert Cliffs Nuclear Power Plant, Unit No. 1, reactor vessel during cycles 13, 14, and 15 will not result in any new operational or safety considerations. This determination, based on the details provided above, assures that the BGE demonstration program will include a limited number of LFAs, the LFAs will be loaded in non-limiting locations, and the behavior of the LFAs is bounded by the fuel performance and safety analysis performed for the zircaloy-4 clad fuel rods which will be in the Unit No. 1 reactor vessel during cycles 13, 14, and 15. Therefore, the proposed TS change for Calvert Cliffs Nuclear Power Plant Unit No. 1, cycles 13, 14, and 15, is acceptable. TS 5.2.1 will be changed to indicate

that advanced cladding material may be used in four test assemblies as described in the approved Temporary Exemption dated November 28, 1995, for cycles 13, 14, and 15.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact have been prepared and published in the Federal Register on November 9, 1995 (60 FR 56622). Accordingly, based upon the environmental assessment, the staff has determined that the issuance of the amendment will not have a significant effect on the quality of the human environment.

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, 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 nor to the health and safety of the public.

Principal Contributors: T. Attard
D. McDonald

Date: February 21, 1996