

November 28, 1995

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

SUBJECT: TEMPORARY EXEMPTION FROM 10 CFR 50.44, 10 CFR 50.46, AND  
APPENDIX K TO 10 CFR PART 50, FOR LEAD FUEL ASSEMBLIES - CALVERT  
CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1 (TAC NO. M93232)

Dear Mr. Denton:

By letter dated July 13, 1995, Baltimore Gas and Electric Company's (BGE) requested a temporary exemption from 10 CFR 50.44, 10 CFR 50.46, and Appendix K to 10 CFR Part 50 to allow the use of lead fuel assemblies with advanced cladding materials.

Four lead fuel assemblies are scheduled to be inserted into the Unit 1 reactor core during the upcoming refueling outage and will remain in the core for Cycles 13, 14, and 15.

The NRC staff has reviewed the information provided in support of your request for the temporary exemption. On the basis of the information provided, as discussed in the enclosed exemption, the NRC staff has concluded that explicit consideration of the advanced zirconium-based clad fuel present in the four lead fuel assemblies is not required in order to be in compliance with the above regulations. This temporary exemption applies to Unit 1, Cycles 13, 14, and 15 only.

A copy of the temporary exemption has been forwarded to the Office of the Federal Register for publication.

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

Enclosure: Exemption

cc w/encl: See next page

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**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

WASHINGTON, D.C. 20555-0001

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Vice President - Nuclear Energy  
Baltimore Gas and Electric Company  
Calvert Cliffs Nuclear Power Plant  
1650 Calvert Cliffs Parkway  
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A copy of the temporary exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

A handwritten signature in black ink, appearing to read "Daniel G. McDonald, Jr.", is positioned above the typed name.

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

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cc w/encl: See next page

Mr. Robert E. Denton

Calvert Cliffs Nuclear Power Plant  
Unit No. 1

cc:

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of

BALTIMORE GAS AND ELECTRIC COMPANY

(Calvert Cliffs Nuclear Power Plant  
Unit No. 1)

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Docket No. 50-317

EXEMPTION

I.

Baltimore Gas and Electric Company (BGE or the licensee) is the holder of Facility Operating License No. DPR-53, which authorizes operation of Calvert Cliffs Nuclear Power Plant, Unit 1 (the facility/CC-1), at a steady-state reactor power level not in excess of 2700 megawatts thermal. The facility is a pressurized water reactor located at the licensee's site in Calvert County, Maryland. The license provides among other things, that it is subject to all rules, regulations, and orders of the U. S. Nuclear Regulatory Commission (the Commission or NRC) now or hereafter in effect.

II.

By letter dated July 13, 1995, the licensee requested a temporary exemption to 10 CFR 50.44, 10 CFR 50.46, and Appendix K to 10 CFR Part 50 that would enable the use of four lead fuel assemblies during CC-1 Cycles 13, 14, and 15. These regulations refer to pressurized water reactors fueled with uranium oxide pellets within cylindrical zircaloy or ZIRLO cladding. The four

Enclosure

lead fuel assemblies to be used during these fuel cycles contain fuel rods with zirconium-based claddings that are not chemically identical to zircaloy or ZIRLO.

Since 10 CFR 50.46 and Appendix K to 10 CFR Part 50 identify requirements for calculating emergency core cooling system (ECCS) performance for reactors containing fuel with zircaloy or ZIRLO cladding, and 10 CFR 50.44 relates to the generation of hydrogen gas from a metal-water reaction between the reactor coolant and reactor fuel having zircaloy or ZIRLO cladding, a temporary exemption is required to place the four lead fuel assemblies containing fuel rods with advanced zirconium based cladding in the core during CC-1 Cycles 13, 14, and 15.

### III.

Title 10 of the Code of Federal Regulations at 50.12(a)(2)(ii) enables the Commission to grant an exemption from the requirements of Part 50 when special circumstances are present such that application of the regulation in the particular circumstances would not serve the underlying purpose of the rule, or is not necessary to achieve the underlying purpose of the rule. The underlying purpose of 10 CFR 50.46 and 10 CFR Part 50, Appendix K is to establish requirements for the calculation of ECCS performance in order to assure reactor safety in the event of a loss of coolant accident. The licensee has performed a calculation demonstrating adequate ECCS performance for CC-1 and has shown that the four lead fuel assemblies do not have a significant impact on that previous calculation. The lead fuel assemblies, with the zirconium-based alloy cladding, meet the same design basis as the Zircaloy-4 fuel which is currently in the CC-1 reactor core and have similar

thermal-hydraulic characteristics. No safety limits will be changed or setpoints altered as a result of using the lead fuel assemblies.

The Updated Final Safety Analysis Report (UFSAR) analysis are bounding for the lead fuel assemblies as well as the remainder of the core. The mechanical properties and behavior of the lead fuel assemblies during postulated loss-of-coolant-accidents (LOCA) and non-LOCA transients and operational transients will be essentially the same. In addition, the four lead fuel assemblies represent a small portion of the total core and will be placed in non-limiting core locations which experience no more than 0.95 of the core power density during operation. As such, the licensee has achieved the underlying purpose of 10 CFR 50.46 and 10 CFR Part 50, Appendix K.

The underlying purpose of 10 CFR 50.44 is to ensure that means are provided for the control of hydrogen gas that may be generated following a postulated LOCA. The licensee has provided means for controlling hydrogen gas and has previously considered the potential for hydrogen gas generation stemming from a metal-water reaction. The small number of fuel rods in the four lead fuel assemblies containing advanced zirconium-based claddings in conjunction with the chemical similarity of the advanced claddings to zircaloy and ZIRLO ensures that previous calculations of hydrogen production resulting from a metal-water reaction would not be significantly changed. As such, the licensee has achieved the underlying purpose of 10 CFR 50.44.

In addition to the above, the advanced claddings have been tested for corrosion resistance, tensile and burst strength, and creep characteristics. The test results indicate that the advanced claddings are safe for reactor

service under all the anticipated operating conditions considered in the CC-1 UFSAR.

#### IV.

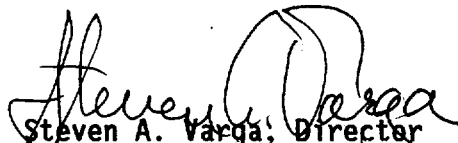
For the foregoing reasons, the NRC staff has concluded that the use of the four lead fuel assemblies in the CC-1 reactor during Cycles 13, 14, and 15 will not present an undue risk to public health and safety and is consistent with the common defense and security. The NRC staff has determined that there are special circumstances present as specified in 10 CFR 50.12(a)(2)(ii) such that the application of 10 CFR 50.44, 10 CFR 50.46, and Appendix K to 10 CFR Part 50 to explicitly consider the advanced clad fuel rods present within the four lead fuel assemblies is not necessary in order to achieve the underlying purpose of these regulations.

Accordingly, the Commission has determined that pursuant to 10 CFR 50.12, a temporary exemption is authorized by law and will not endanger life or property or common defense and security and is otherwise in the public interest, and hereby grants BGE a temporary exemption from the requirements of 10 CFR 50.44, 10 CFR 50.46, and Appendix K to 10 CFR Part 50 in that explicit consideration of the advanced zirconium-based clad fuel present within the four lead fuel assemblies is not required in order to be in compliance with these regulations. This exemption applies only to the four lead fuel assemblies for the time period (Cycles 13, 14, and 15) for which these assemblies will be in the CC-1 reactor core.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will have no significant impact on the quality of the human environment (60 FR 56622).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "Steven A. Varga". The signature is fluid and cursive, with the first name "Steven" being more prominent.

Steven A. Varga, Director  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,  
this 28th day of November 1995.