

April 5, 2001

Mr. Charles H. Cruse  
Vice President - Nuclear Energy  
Calvert Cliffs Nuclear Power Plant, Inc.  
Calvert Cliffs Nuclear Power Plant  
1650 Calvert Cliffs Parkway  
Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 2 - AMENDMENT RE:  
LEAD TEST FUEL ASSEMBLY (TAC NO. MB0007)

Dear Mr. Cruse:

The Commission has issued the enclosed Amendment No. 220 to Renewed Facility Operating License No. DPR-69 for the Calvert Cliffs Nuclear Power Plant, Unit No. 2. This amendment consists of changes to the Technical Specifications in response to your application transmitted by letter dated September 14, 2000, as supplemented by your letter dated December 21, 2000.

The amendment permits operation of Calvert Cliffs Unit 2 with a core containing a lead fuel (test) assembly that includes fuel rods with advanced zirconium alloy cladding.

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,

*/RA/*

Donna Skay, Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-318

Enclosures: 1. Amendment No. 220 to DPR-69  
2. Safety Evaluation

cc w/encls: See next page

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| M. Gamberoni  | OGC       | ACRS                |                        |

ADAMS ACCESSION NUMBER: ML010290302

\* Input provided by memo dated 12/19/00 incorporated with no significant changes.

|        |          |   |          |          |                     |                 |
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| OFFICE | PM:PDI-1 | E | LA:PDI-1 | OGC      | SC:PDI-1            | SRXB            |
| NAME   | DSkay    |   | SLittle  | RWeisman | PTam for MGamberoni | F. Akstulewicz* |
| DATE   | 2/2/01   |   | 2/1/01   | 2/14/01  | 3/2/01              | 12/19/00        |

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CALVERT CLIFFS NUCLEAR POWER PLANT, INC.

DOCKET NO. 50-318

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 220  
Renewed License No. DPR-69

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Calvert Cliffs Nuclear Power Plant, Inc., (the licensee) dated September 14, 2000, as supplemented on December 21, 2000, 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 Renewed 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. 220 , 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 of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/P* Tam for

Marsha Gamberoni, Chief, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: April 5, 2001

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 220 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-69

DOCKET NO. 50-318

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page

4.0-1

Insert Page

4.0-1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 220 TO RENEWED

FACILITY OPERATING LICENSE NO. DPR-69

CALVERT CLIFFS NUCLEAR POWER PLANT, INC.

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 2

DOCKET NO. 50-318

1.0 INTRODUCTION

In a letter dated September 14, 2000, as supplemented on December 21, 2000, Calvert Cliffs Nuclear Plant Inc. (CCNPPI, or the licensee) submitted a request for changes to the Calvert Cliffs Nuclear Power Plant, Unit No. 2 (CCNPP2), Technical Specifications (TSs). The requested changes would permit operation of CCNPP2 with a core containing a lead fuel assembly (LFA) that includes fuel rods with an advanced zirconium alloy cladding.

Specifically, CCNPPI proposes to add the following statement to TS 4.2.1: "For Unit 2 Cycle 14 only, advanced cladding material may be used in one lead test assembly as described in an approved temporary exemption dated March 6, 2001.

The lead fuel assembly with advanced cladding material is 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 BACKGROUND

Use of this LFA was originally approved for use in Unit 1 for operating Cycle 15 by an exemption dated November 28, 1995, and license amendment dated February 21, 1996. Because of concerns with corrosion performance, the LFA was modified by replacing 48 fuel rods representing 3 advanced fuel types with 27 OPTIN rods, the standard Combustion Engineering Zr<sub>4</sub> clad design, and 21 rods with a CE advanced cladding design (Alloy E), reducing the number of advanced claddings for this LFA to two. In the September 14, 2000, application the licensee requested using the LFA to add to the data base for Alloy E and to obtain corrosion data for Alloy E in an aggressive grid/rod environment. The application included a proposed plant technical specifications change, which would apply only during the Unit 2 operating cycle 14.

On March 6, 2001, pursuant to 10 CFR 50.12, the NRC granted CCNPPI an exemption from the requirements of 10 CFR 50.44, 10 CFR 50.46, and Appendix K to 10 CFR Part 50 for

CCNPP2. Section 50.46 and Appendix K identify requirements for calculating emergency core cooling system (ECCS) performance and acceptance criteria for that performance for reactors containing fuel with zircaloy or ZIRLO cladding. Section 50.44 identifies requirements to ensure that means are provided for the control of hydrogen gas that may be generated following a postulated loss of coolant accident (LOCA). An exemption was required to enable CCNPP2 to operate in Cycle 14 with a core containing an LFA that includes fuel rods with advanced zirconium alloy cladding.

### 3.0 EVALUATION

In its previous application to use LFAs in the Unit 1 core, the licensee submitted a report, CEN 425-P, Rev. 3-P titled, "Safety Evaluation Report for the Use of Advanced Zirconium - Based Cladding Materials in Calvert Cliffs Unit 1 Batch R Lead Fuel Assemblies." The report provides 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 report. The licensee concluded that the predicted chemical, mechanical, and material properties of the LFAs fall within the range of the properties of the zircaloy-4 clad fuel. The staff determined that the licensee had provided adequate assurance that the behavior of the LFAs is bounded by the fuel performance and safety analysis for the zircaloy-4 rods currently in the reactor vessel.

The staff finds that these conclusions also apply to the LFA proposed to be inserted into the Unit 2 core because the LFA is very similarly constituted to the ones approved for Unit 1 Cycle 15. In addition, the Unit 1 core contained more advanced fuel rods and fewer "standard" fuel rods than is being requested for Unit 2. Therefore, the evaluations developed for Unit 1 bound the Unit 2 request.

In similar reviews of advanced fuel applications the staff found that fuels with advanced cladding are not expected to introduce a mixed core penalty in licensing safety analyses, provided that the resident fuel and the LFA were of similar geometry. The LFA and fuel currently in use at CCNPP2 are of like geometry. Therefore, the staff does not expect that use of the LFA will introduce a mixed core penalty into the safety analyses for CCNPP2.

In general, the staff evaluates 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 licensee proposed to insert only one LFA in the Unit 2 core. In addition, the current Calvert Cliffs technical specification (in TS 4.2.1) provision, which will not be changed in this amendment, limits placement of the LFA to a non-limiting location in the core.

Based on the above discussion, the staff concludes that licensing analyses will not be affected by use of the proposed LFA in the CCNPP2 reactor.

The staff concludes that it is acceptable to operate CCNPP2 with the LFA as proposed because (1) the behavior of the LFA is bounded by the fuel performance and safety analysis performed for the zircaloy-4 clad rods currently in the core, and (2) appropriate TS control (one assembly, non-limiting location, only one operating cycle) is provided.

#### 4.0 CHANGES TO TECHNICAL SPECIFICATIONS

The September 14, 2000, letter proposed the following addition to Calvert Cliff Unit 2 Technical Specification 4.2.1, "Fuel Assemblies,":

"For Unit 2 Cycle 14 only, advanced cladding material may be used in one lead test assembly as described in an approved temporary exemption dated \_\_\_\_\_"

The actual date of the exemption, March 6, 2001, was subsequently added.

The TS addition is acceptable because it provides a condition of operation for the plant that is supported by existing plant safety analyses and is also technically supported as discussed in Section 3.0.

#### 5.0 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.

#### 6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the 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 issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (66 FR 2012). Accordingly, the 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.

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

Principal Contributor: F. Orr

Date: April 5, 2001



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Unit Nos. 1 and 2

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