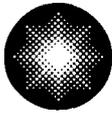


James A. Spina
Vice President

Calvert Cliffs Nuclear Power Plant, Inc.
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657
410.495.4455
410.495.3500 Fax



Constellation Energy
Generation Group

February 27, 2006

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: Use of Lead Fuel Assemblies

REFERENCE: (a) Letter from Mr. J. A. Spina (CCNPP) to Document Control Desk (NRC), dated January 19, 2006, Temporary Exemption Request for Use of Lead Fuel Assemblies

Pursuant to 10 CFR 50.90, Calvert Cliffs Nuclear Power Plant requests an amendment to the Renewed Operating License Nos. DPR-53 and DPR-69 to incorporate the change described below into the Technical Specifications for Calvert Cliffs Unit Nos. 1 and 2. In a letter dated January 19, 2006 (Reference a), we submitted a request for a temporary exemption that would allow the insertion of up to four lead fuel assemblies (LFAs) into either the Unit 1 or Unit 2 core for one cycle of operation. These lead fuel assemblies are currently installed in the Unit 2 core and are scheduled to be discharged during the 2007 refueling outage. We wish to reinstall up to four of these lead fuel assemblies in either the Unit 2 Cycle 17 core in the spring 2007 refueling outage or the Unit 1 Cycle 19 core in the spring 2008 refueling outage. The justification for reinstallation of these lead fuel assemblies into the Unit 1 or Unit 2 core is contained in Reference (a).

Currently, Calvert Cliffs Technical Specification 4.2.1, Fuel Assemblies, only allows fuel that is clad with either Zircaloy or ZIRLO™. Therefore, to allow the installation of these lead fuel assemblies into the Unit 1 or Unit 2 core a change is needed to Technical Specification 4.2.1 to allow non-Zircaloy based cladding to be placed in the core in accordance with the requested temporary exemption. Pursuant to 10 CFR 50.90, we request an amendment to the Calvert Cliffs Unit 1 and 2 Technical Specifications to allow the installation of up to two Westinghouse and two Framatome ANP, Inc. LFAs into the Unit 1 Cycle 19 or Unit 2 Cycle 17 core as allowed by the requested temporary exemption (Reference a). The proposed change to Technical Specification 4.2.1 is described in Attachment (1). Attachment (2) contains the marked-up Technical Specification page. The final Technical Specification pages will be renumbered to accommodate the insertion of this change, if necessary.

SAFETY COMMITTEE REVIEW

The Plant Operations Review Committee and Nuclear Safety Review Board have reviewed this proposed change and concur that operation with the proposed changes will not result in an undue risk to the health and safety of the public.

A001

Document Control Desk
February 27, 2006
Page 3

cc: P. D. Milano, NRC
S. J. Collins, NRC

Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

**TECHNICAL BASIS AND
NO SIGNIFICANT HAZARDS CONSIDERATION**

TABLE OF CONTENTS

- 1.0 DESCRIPTION
- 2.0 PROPOSED CHANGE
- 3.0 BACKGROUND
- 4.0 TECHNICAL ANALYSIS
- 5.0 REGULATORY ANALYSIS
- 6.0 ENVIRONMENTAL CONSIDERATION
- 7.0 PRECEDENCE
- 8.0 REFERENCES

ATTACHMENT (1)

TECHNICAL BASIS AND NO SIGNIFICANT HAZARDS CONSIDERATION

1.0 DESCRIPTION

This letter is a request to amend Renewed Operating Licenses DPR-53 and DPR-69 for Calvert Cliffs Nuclear Power Plant, Inc., Units 1 and 2. After Unit 2, Cycle 16, Calvert Cliffs Technical Specification 4.2.1, Fuel Assemblies, would only allow fuel that is clad with either Zircaloy or ZIRLO™. Pursuant to Title 10 Code of Federal Regulations (CFR) 50.90, we request an Amendment to the Calvert Cliffs Unit 2 Technical Specifications to allow the installation of up to two Westinghouse and two Framatome ANP, Inc. (FRA-ANP) lead fuel assemblies (LFAs) into the Unit 2 Cycle 17 core or the Unit 1 Cycle 19 core.

2.0 PROPOSED CHANGE

This submittal proposes to change Technical Specification 4.2.1, Fuel Assemblies, as shown on the marked-up pages for Calvert Cliffs in Attachment (2). The change allows up to four fuel assemblies with advanced cladding material to be inserted in Unit 2 Cycle 17 core or the Unit 1 Cycle 19 core.

The standard reload analysis process and 50.59 evaluation will ensure that the predicted chemical, mechanical, and material performance of the advanced zirconium-based cladding remain within that approved for Zircaloy-4 or ZIRLO™ under all anticipated operational occurrences and postulated accidents. Furthermore, the LFAs will be placed in non-limiting core locations and will remain with peak rod burnups of less than the currently approved limit for Calvert Cliffs of 60,000 MWD/MTU.

3.0 BACKGROUND

The Calvert Cliffs Unit 2 core consists of 217 fuel assemblies. Each standard fresh fuel assembly consists of 176 fuel rods, 5 guide tubes, a bottom Inconel and 8 Zircaloy fuel rod spacer grids, upper and lower end fittings, and a hold-down device. The rods are arranged in a square 14x14 array. The guide tubes, spacer grids, and end fittings form the structural frame of the assembly. The four outer guide tubes are mechanically attached to the end fittings and the spacer grids are welded to all five guide tubes.

In a standard fresh fuel assembly, the fuel rods consist of slightly enriched uranium dioxide cylindrical ceramic pellets and a round wire stainless steel compression spring located at the top of the fuel column, all encapsulated within a seamless ZIRLO™ tube with a Zircaloy-4 cap welded at each end. The uranium dioxide pellets are dished and chamfered on both ends to accommodate thermal expansion and swelling. The LFAs contain advanced cladding material that does not meet the definition of Zircaloy or ZIRLO™.

In April 2003, eight LFAs (four from Westinghouse and four from Framatome) were inserted into the Unit 2 core in accordance with the approval granted for the LFAs in References (4) and (5). References (4) and (5) allowed operation with these eight LFAs for two cycles. References (2) and (3) noted that the LFAs would be removed after two cycles and have inspections performed. Since References (2) and (3) were generated, Calvert Cliffs has re-evaluated our LFA program and desires a minor modification where up to four of the eight LFAs (up to two from each manufacturer) continue to be irradiated. Four of the LFAs will still be discharged to the spent fuel pool for detailed post-irradiation inspections. We identified in References (2) and (3) that a separate temporary exemption request would be needed for re-insertion of the LFAs into the core for a third cycle. We provided that request in Reference (1).

Our current schedule assumes that at least four LFAs are discharged to the spent fuel pool for detailed post-irradiation inspection during the 2007 refueling outage for Unit 2. Up to four of the other LFAs will undergo visual inspections to look for indications of unexpected cladding performance that would preclude placing them back into the Unit 2 core. These LFAs are then scheduled to be placed back into

ATTACHMENT (1)

TECHNICAL BASIS AND NO SIGNIFICANT HAZARDS CONSIDERATION

the Unit 2 core for a third cycle. Placement of these assemblies in the core is in accordance with all of the conditions and restrictions contained in References (2), (3), (4), and (5).

However, it should be noted that the Unit 2 Cycle 17 final core design is not complete at this time. Once that final design is complete, we may determine that the LFAs cannot be placed in the core in locations that would not violate the conditions and restrictions contained in References (2), (3), (4), or (5). In that case, we would design the Unit 1 Cycle 19 core to include the LFAs, if possible. Again, the core design would not violate the conditions and restrictions contained in References (2), (3), (4), or (5). Therefore, we have requested a temporary exemption to install up to four LFAs into either the Unit 1 or Unit 2 core during their next operating cycle (Unit 1 Cycle 19 or Unit 2 Cycle 17). This license amendment request would allow implementation of the temporary exemption.

4.0 TECHNICAL ANALYSIS

The CFR specifies standards and acceptance criteria only for fuel rods clad with Zircaloy or ZIRLO™. Thus, a temporary exemption was requested (Reference 1) to use fuel rods clad with an advanced alloy that is not Zircaloy or ZIRLO™. The original license amendment was only approved for Unit 2 Cycles 15 and 16.

As noted in References (2) and (3), the Calvert Cliffs LFA program is intended to provide data to support the use of new and improved fuel cladding material and fuel evaluation codes and methods. Additionally, References (2) and (3) stated that the LFAs may be reinserted for a third cycle and that an explicit submittal for use during an additional cycle would be provided at that time. Reference (1) constitutes that request and this license amendment request is made to allow implementation of the temporary exemption.

References (2) and (3) were generated with the assumption that the LFAs would see two fuel cycles of duty, and would then be discharged to the spent fuel pool to allow for detailed inspections. However, as noted above, we plan to place up to four LFAs back into either the Unit 1 or 2 cores to gain practical experience for these assemblies as they will reside on the core periphery during their third cycle. Calvert Cliffs has experienced grid-to-rod fretting failures in peripheral assemblies and is one of the few United States pressurized water reactors on 24-month fuel cycles.

The LFAs placed back in the core will not exceed the References (4) and (5) peak fuel rod burnup limitation of 60,000 MWD/MTU or other conditions evaluated by the Nuclear Regulatory Commission staff in those references and will meet all applicable site reload design criteria. Other changes associated with the reload core design are evaluated under 10 CFR 50.59.

A visual inspection of the LFAs during the 2005 refueling outage showed no anomalies or unexpected cladding behavior. A visual inspection of the LFAs will also be performed during the 2007 refueling outage to confirm expected cladding behavior.

As noted above, detailed post-irradiation inspections will be performed on the four discharged assemblies. As committed in References (1), (2), and (3), we will provide the Nuclear Regulatory Commission with the inspection results to assist them in their continuing evaluations of fuel performance of the LFAs. Calvert Cliffs intends to re-insert these discharged assemblies in a future cycle as well, as justified by the inspections. An explicit submittal will be provided at that time.

ATTACHMENT (1)

TECHNICAL BASIS AND NO SIGNIFICANT HAZARDS CONSIDERATION

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

The proposed change to the Technical Specifications has been evaluated against the standards in 10 CFR 50.92. The proposed change 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.*

Calvert Cliffs Technical Specification 4.2.1, Fuel Assemblies, states that fuel rods are clad with either Zircaloy or ZIRLO™. Calvert Cliffs Nuclear Power Plant, Inc. proposes to re-insert up to four fuel assemblies into Calvert Cliffs Unit 1 or Unit 2 that have some fuel rods clad in zirconium alloys that do not meet the definition of Zircaloy or ZIRLO™. A temporary exemption to the regulations has also been requested to allow these fuel assemblies to be re-inserted into Unit 1 or Unit 2. The proposed change to the Calvert Cliffs Technical Specifications will allow the use of cladding materials that are not Zircaloy or ZIRLO™ for one fuel cycle once the temporary exemption is approved. The proposed change to the Technical Specification is effective only as long as the temporary exemption is effective. The addition of what will be an approved temporary exemption for Unit 1 or Unit 2 to Technical Specification 4.2.1 does not change the probability or 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.

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

The proposed change does not add any new equipment, modify any interfaces with existing equipment, change the equipment's function, or change the method of operating the equipment. The proposed change does not affect normal plant operations or configuration. Since the proposed change does not change the design, configuration, or operation, it could not become an accident initiator.

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

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

The proposed change will add an approved temporary exemption to the Calvert Cliffs Technical Specifications allowing the installation of up to four lead fuel assemblies. The assemblies use advanced cladding materials that are not specifically permitted by existing regulations or Calvert Cliffs' Technical Specifications. A temporary exemption to allow the installation of these assemblies has been requested. The addition of an approved temporary exemption to Technical Specification 4.2.1 is an administrative change to allow the installation of the lead fuel assemblies under the provisions of the temporary exemption. The license amendment is effective only as long as the exemption is effective. This amendment does not change the margin of safety since it only adds a reference to an approved, temporary exemption to the Technical Specifications.

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

ATTACHMENT (1)

TECHNICAL BASIS AND NO SIGNIFICANT HAZARDS CONSIDERATION

5.2 Regulatory Requirements

Title 10 CFR 50.46(a)(1)(i) states, "Each boiling or pressurized light-water nuclear power reactor fueled with uranium oxide pellets within cylindrical zircaloy or ZIRLO cladding must be provided with an emergency core cooling system (ECCS) that must be designed so that its calculated cooling performance following postulated loss-of-coolant accidents conforms to the criteria set forth in paragraph (b) of this section. ECCS cooling performance must be calculated in accordance with an acceptable evaluation model and must be calculated for a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated loss-of-coolant accidents are calculated." Section 10 CFR 50.46 goes on to delineate specifications for peak cladding temperature, maximum cladding oxidation, maximum hydrogen generation, coolable geometry, and long-term cooling.

Additionally, 10 CFR Part 50, Appendix K, paragraph I.A.5, states, "The rate of energy release, hydrogen generation, and cladding oxidation from the metal/water reaction shall be calculated using the Baker-Just equation." Since the Baker-Just equation presumes the use of Zircaloy or ZIRLO™ cladding, the use of fuel with zirconium-based alloys that do not conform to either of these two designations requires an exemption from this section of the Code.

Because 10 CFR 50.46 and 10 CFR Part 50, Appendix K do not explicitly apply to either the FRA-ANP or Westinghouse advanced claddings, we have requested an exemption (Reference 1) from these regulations to allow use of these advanced claddings in the Unit 1 or Unit 2 cores. In doing so, we provided information to show compliance with the provisions of 10 CFR 50.12.

6.0 ENVIRONMENTAL CONSIDERATION

We have 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, and no significant increases 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.

7.0 PRECEDENT

- Letter from Mr. D. G. McDonald, Jr. (NRC) to Mr. R. E. Denton (BGE), dated February 21, 1996, Issuance of Amendment for Calvert Cliffs Nuclear Power Plant, Unit No. 1 (TAC No. M94365)
- Letter from Ms. D. M. Skay (NRC) to Mr. C. H. Cruse (CCNPP), dated April 5, 2001, Calvert Cliffs Nuclear Power Plant, Unit No. 2 – Amendment RE: Lead Test Fuel Assembly (TAC No. MB0007)

8.0 REFERENCES

1. Letter from Mr. J. A. Spina (CCNPP) to Document Control Desk (NRC), dated January 19, 2006, Temporary Exemption Request for Use of Lead Fuel Assemblies
2. Letter from Mr. P. E. Katz (CCNPP) to Document Control Desk (NRC), dated July 17, 2002, Westinghouse Lead Fuel Assemblies – Temporary Exemption Request and License Amendment Request
3. Letter from Mr. P. E. Katz (CCNPP) to Document Control Desk (NRC), dated August 6, 2002, Framatome Lead Fuel Assemblies - Temporary Exemption Request and License Amendment Request

ATTACHMENT (1)

TECHNICAL BASIS AND NO SIGNIFICANT HAZARDS CONSIDERATION

4. Letter from Mr. G. S. Vissing (NRC) to Mr. P. E. Katz (CCNPP), dated April 11, 2003, Exemption from the Requirements of 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50, Appendix K (TAC Nos. MB5648 and MB6065)
5. Letter from Mr. G. S. Vissing (NRC) to Mr. P. E. Katz (CCNPP), dated April 14, 2003, Amendments re: Lead Fuel Assemblies (TAC Nos. MB5646, MB5647 and MB6064)

ATTACHMENT (2)

MARKED-UP TECHNICAL SPECIFICATION PAGE

4.0-1

4.0 DESIGN FEATURES

4.1 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 southeast 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.

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 217 fuel assemblies. Each assembly shall consist of a matrix of Zircalloy or ZIRLO fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO₂) 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 core regions. 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. For Unit 2

Cycles 15 and 16 only, advanced cladding material from Framatome-ANP may be used in up to four lead test assemblies as described in approved temporary exemption dated April 11, 2003. For Unit 2 Cycles 15 and 16 only, advanced cladding material from Westinghouse may be used in up to four lead test assemblies as described in approved temporary exemption dated April 11, 2003.

Insert →

Insert

For Unit 1 Cycle 19 or Unit 2 Cycle 17 only, advanced cladding material from Framatome-ANP may be used in up to 2 lead test assemblies as described in approved temporary exemption dated MM DD, YYYY. For Unit 1 Cycle 19 or Unit 2 Cycle 17 only, advanced cladding material from Westinghouse may be used in up to 2 lead test assemblies as described in approved temporary exemption dated MM DD, YYYY.