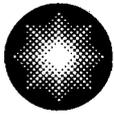


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January 19, 2006

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
Temporary Exemption Request for Use of Lead Fuel Assemblies

- REFERENCES:**
- (a) 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
 - (b) 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
 - (c) 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 Part 50, Appendix K (TAC Nos. MB5648 and MB6065)
 - (d) 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)

Pursuant to Title 10 of the Code of Federal Regulations (CFR) 50.12(a), Calvert Cliffs Nuclear Power Plant, Inc. requests a temporary exemption for Calvert Cliffs Unit Nos. 1 and 2 from the requirements of 10 CFR 50.46 and 10 CFR Part 50, Appendix K.

This temporary exemption will allow the re-insertion of up to four lead fuel assemblies (LFAs) in either Unit 1 or Unit 2. Two of the LFAs were manufactured by Westinghouse Electric Company (Westinghouse) and contain a limited number of fuel rods clad with advanced zirconium-based alloys. These LFAs were originally inserted into the Unit 2 core in April of 2003. The other two LFAs were manufactured by Framatome ANP, Inc. (FRA-ANP) with fuel rods clad with M5™ alloy and were also originally inserted into the Unit 2 core in April of 2003. References (a) and (b) are the original exemption requests and References (c) and (d) are the Nuclear Regulatory Commission approvals.

In April 2003, eight LFAs (four from Westinghouse and four from FRA-ANP) were inserted into the Unit 2 core in accordance with the approval granted for the LFAs in References (c) and (d).

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References (c) and (d) allowed operation with these eight LFAs for two cycles. References (a) and (b) noted that the LFAs would be removed after two cycles and have inspections performed prior to the assemblies being reinserted for a third duty cycle. Since References (a) and (b) were generated, Calvert Cliffs has re-evaluated our LFA program and desires a minor modification where up to four of the eight LFAs (two from each manufacturer) are returned immediately to the core for a third cycle of irradiation in low duty locations on the core periphery to allow evaluation of grid-to-rod fretting resistance. At least four of the LFAs will still be discharged to the spent fuel pool for detailed post-irradiation inspections prior to reinsertion into a future core. We identified in References (a) and (b) that a separate request would be needed for re-insertion of the LFAs into the core for a third cycle. We are providing that request at this time.

Our current schedule assumes that at least four LFAs are discharged to the spent fuel pool during the 2007 refueling outage for Unit 2 for detailed post-irradiation inspection. 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 the Unit 2 core for a third cycle in low duty locations on the core periphery to allow assessment of these designs relative to grid-to-rod fretting. Placement of these assemblies in the core is in accordance with all of the conditions and restrictions contained in References (a), (b), (c), and (d).

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 (a), (b), (c), or (d). 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 (a), (b), (c), or (d). Therefore, we are requesting 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).

TEMPORARY EXEMPTION REQUEST

The CFR specifies standards and acceptance criteria only for fuel rods clad with Zircaloy or ZIRLO™. Thus, a temporary exemption is requested 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 (a) and (b), 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 (a) and (b) 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. This letter constitutes that request.

References (a) and (b) 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 low duty core peripheral locations in either the Unit 1 or 2 cores to gain practical experience for these assembly designs. 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 (c) and (d) peak fuel rod burnup limitation of 60,000 MWD/MTU and will meet all applicable 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 Unit 2 2005 refueling outage showed no anomalies or unexpected cladding behavior. A similar visual inspection of the LFAs will also be performed during the Unit 2 2007 refueling outage.

As noted above, detailed post-irradiation inspections will be performed on the other four LFAs that are discharged. As committed in References (a) and (b), 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 temporarily discharged assemblies in a future cycle, as justified by the inspections in order to assess performance of the cladding material at higher burnups. An explicit submittal will be required at that time.

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.

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.

Title 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 a temporary exemption from this section of the Code.

We plan to re-insert up to four LFAs (two from Westinghouse and two from FRA-ANP) in either Calvert Cliffs Units 1 or 2 containing advanced cladding materials that do not meet the definition of Zircaloy or ZIRLO™. The LFAs are scheduled to be re-inserted into the core at the next Unit 2 refueling outage, scheduled to begin in February 2007, and will remain in the Calvert Cliffs Unit 2 core for Cycle 17. An alternate plan is to insert the LFAs in the Unit 1 core for Cycle 19 during the 2008 refueling outage, scheduled to begin in February 2008. We are requesting a temporary exemption to 10 CFR 50.46 and 10 CFR Part 50, Appendix K, for the period when these LFAs reside in the core.

We believe that the standards of 10 CFR 50.12 are satisfied in this case. Special circumstances are present, as described in 10 CFR 50.12(a)(ii), to warrant granting the temporary exemption. They are described below.

10 CFR 50.12 REQUIREMENTS

The standards set forth in 10 CFR 50.12 provide that specific exemptions may be granted that:

- are authorized by law;
- are consistent with the common defense and security;
- will not present an undue risk to the public health and safety; and
- are accompanied by special circumstances.

We believe that the activities to be conducted under the temporary exemption are clearly authorized by law and are consistent with the common defense and security. The remaining standards for the temporary exemption are also satisfied, as described below.

No Undue Risk

The temporary exemption will not present an undue risk to the public health and safety. The safety evaluation performed by Westinghouse (contained in Reference a) and the approved FRA-ANP topical report (described in Reference b) demonstrates that the predicted chemical, mechanical, and material performance of the advanced zirconium-based cladding is 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 (low duty locations on the core periphery).

In the unlikely event that cladding failures occur in the LFAs, environmental impact would be minimal and is bounded by previous environmental assessments. In addition, the insertion of the LFAs will not foreclose the option of reverting to the use of standard ZIRLO™ cladding. That is, the change is not irreversible. The long-term benefits expected from the LFA program include reduced incidence of fuel failure, longer operating cycles, higher fuel burnup, and improved thermal margin.

Special Circumstances

This request involves special circumstances as set forth in 10 CFR 50.12(a)(ii).

The underlying purpose of 10 CFR 50.46 is to ensure that nuclear power facilities have adequate acceptance criteria for ECCS. The effectiveness of the ECCS in Calvert Cliffs Units 1 or 2 will not be affected by the insertion of the LFAs. Due to the similarities in the material properties of the advanced zirconium-based alloys to Zircaloy-4 or ZIRLO™ and the location of the LFAs in non-limiting locations, the Westinghouse safety evaluation and approved FRA-ANP topical report concluded that the ECCS performance would not be adversely affected. Thus, the Westinghouse safety evaluation and approved FRA-ANP topical report demonstrates the acceptability of the advanced zirconium-based cladding material under loss-of-coolant accident (LOCA) conditions.

The intent of paragraph I.A.5 of Appendix K to 10 CFR Part 50 is to apply an equation for rates of energy release, hydrogen generation, and cladding oxidation from a metal-water reaction that conservatively bounds all post-LOCA scenarios. The Westinghouse safety evaluation and the approved FRA-ANP topical report show that due to the similarities in the composition of the advanced zirconium-based

cladding and Zircaloy-4 or ZIRLO™, the application of the Baker-Just equation will continue to conservatively bound all post-LOCA scenarios.

The wording of the regulations renders the criteria of 10 CFR 50.46 and 10 CFR Part 50, Appendix K inapplicable to the advanced zirconium-based cladding, even though the Westinghouse safety evaluation and the approved FRA-ANP topical report show that the intent of the regulations are met. Application of these regulations in this particular circumstance would not meet the underlying purpose of the rule nor is it necessary to achieve the underlying purpose of the rule, and therefore special circumstances exist.

Conclusion

Therefore, as described above, the requirements of 10 CFR 50.12 are met for the requested exemption to 10 CFR 50.46 and 10 CFR Part 50, Appendix K. We request this exemption be granted by December 1, 2006 to allow us to accommodate possible changes in core design that would be required if this request was not acceptable.

PRECEDENT

The Nuclear Regulatory Commission has granted temporary exemptions for similar LFAs in Calvert Cliffs Nuclear Power Plant Unit 1 for Cycles 13, 14, and 15, for Unit 2 for Cycles 14, 15 and 16.

- Letter from Mr. D. G. McDonald, Jr. (NRC) to Mr. R. E. Denton (BGE), dated November 28, 1995, 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)
- Letter from Ms. D. M. Skay (NRC) to Mr. C. H. Cruse (CCNPP), dated March 6, 2001, Calvert Cliffs Nuclear Power Plant, Unit No. 2, Exemption from the Requirements of 10 CFR Part 50, Sections 50.46, 50.44, and Appendix K (TAC No. MB0008)

Should you have questions regarding this matter, please contact Mr. L. S. Larragoite at (410) 495-4922.

Very truly yours,



for
James A. Spina

Vice President - Calvert Cliffs Nuclear Power Plant

JAS/PSF/bjd

cc: P. D. Milano, NRC
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