APPLICATION FOR AMENDMENT

TO

FACILITY OPERATING LICENSE NO. NPF-3

FOR

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NO. 1

Enclosed are forty-three (43) copies of the requested changes to the Davis-Besse Nuclear Power Station Unit No. 1 Facility Operating License No. NPF-3, together with the Safety Evaluation for the requested change.

The proposed changes include Cycle 5 Reload Report (BAW1827, April 1984).

By /s/ R. P. Crouse
Vice President, Nuclear

Sworn and subscribed before me this 20th day of July, 1984.

/s/ Laurie A. Hinkle, nee (Brudzinski)
Notary Public, State of Ohio
My Commission Expires May 16, 1986

Docket No. 50-346
License No. NPF-3
Serial No. 1062
July 20, 1984

Attachment

I. Changes to Davis-Besse Nuclear Power Station Unit 1, Appendix A Technical Specifications for Cycle 5 Reload contained in Reload Report BAW1827, April 1984.

   A. Time required to Implement . This change is to be effective upon NRC approval.

   B. Reason for Change (Facility Change Request 83-097). To reflect changes in Cycle 5 core.

   C. Safety Evaluation (See Attached)

   D. Significant Hazard Consideration (See Attached)

SAFETY EVALUATION

This amendment request for Technical Specification for reloading of new fuel and the shuffling of fuel and control rod assemblies to facilitate nuclear power generation for Cycle 5 in accordance with the limits and analysis presented in the attached Reload Report BAW-1827. The safety function of the Reload Report and the affected Technical Specifications is to ensure operation of the core within safety limits.

The reference cycle for the nuclear and thermal-hydraulic design of Cycle 5 is the projected Cycle 4 End of Cycle (EOC) conditions. The Cycle 5 physics parameters are based on a 280 effective full power day (EFPD) Cycle 4 length including APSR withdrawal and coastdown. There were no anomalies during Cycle 4 which would adversely affect fuel performance during Cycle 5, as designed. The Cycle 5 design is characterized by only eight fuel assemblies being cross core shuffled so as to minimize any carryover effects from tilts encountered in previous cycles.

The Cycle 5 loading includes 64 new fuel assemblies (Batch 7), and the reinsertion of 1 previously discharged fuel assembly. Due to the increased length of Cycle 5, additional core reactivity is necessary. This increased reactivity will be controlled in part by 64 burnable poison rod assemblies (BPRAs) located in the fresh fuel. Batch 7 is comprised of the MK-B5 design which is identical in concept to the MK-B4 currently used. The only change is to the upper end fitting which has the retention mechanism built in for BPRA holddown. This change is to eliminate the need for retainer assemblies.

The analytical methods are the same for Cycle 5 as for the reference Cycle 4. The changes in the Cycle 5 physics parameters reflect the change in core loading philosophy. In going to 18 month cycles, the transition to a low leakage core was incorporated. This scheme loads the fresh fuel in a checkerboard pattern with the twice burned fuel in the core interior and loads the once burned fuel on the core periphery. This scheme and the use of the BPRAs produces a flatter radial power distribution causing the changes in reactivity when compared to Cycle 4.

The thermal-hydraulic design of Cycle 5 is identical to Cycle 4. The Batch 7 fuel is geometrically and hydraulically similar to the remaining batches with the new upper end fitting neither affecting the core flow rate nor the thermal-hydraulic performance. The increased core flow available for heat transfer due to the BPRAs has been conservatively ignored. The moderator and Doppler coefficients remain negative such that Cycle 5 is bounded for main steam line break or any over cooling transient. All FSAR accidents have been examined with respect to Cycle 5 parameters to ensure that the thermal performance during the hypothetical transients has not been degraded.

The pertinent Technical Specifications in the Reload Report have been revised for Cycle 5 operation to account for changes in power peaking and control rod worths. A notable change for Cycle 5 is the exposure dependent Quadrant Power Tilt limit as presented in Table 8-2 of the Reload Report (Tech Spec Table 3.2.2). The Beginning of Cycle (BOC) steady state limit for the symmetrical incore detector system must be updated at 0-50±10 EFPD.

The planned startup physics test program is the same as that performed for Cycle 4 and is sufficient to demonstrate that the core will perform within the assumption of the safety analysis. Special attention should be given to the startup testing for this cycle. One of the concepts of a low leakage core is to reduce the fluence to the reactor vessel. In doing so, the flux "seen" by the out of core detectors is also reduced. At the first sign of sensible heat the out of core detectors should be responding. A heat balance shall be performed as early as possible. The agreement of NI power with heat balance shall be closely monitored as power is escalated the first time after this reload.

It has been determined that this core reload will not adversely affect the operation of Davis-Besse 1 nor endanger the health or safety of the general public. Pursuant to the above, it is concluded that the changes proposed in the Reload Report do not involve an unreviewed safety question.

SIGNIFICANT HAZARD CONSIDERATION

This amendment request for Cycle 5 Reload report for Davis-Besse Nuclear Power Station Unit 1 (DB-1) does not represent a Significant Hazard Consideration. Cycle 5 Reload changes DB-1 operating cycle from a 12 month cycle to a 18 month cycle. This change to the cycle length will extend the cycle from 280 to 390 effective full power days (EFPD) and includes Axial Power Shaping Rods (APSR) withdrawl and coastdown.

The reference cycle for the nuclear and thermal-hydraulic design of Cycle 5 is the projected Cycle 4 End of Cycle (EOC) conditions. The Cycle 5 physics parameters are based on a 280 EFPD Cycle 4 length including APSR withdrawal and coastdown. There were no anomalies during Cycle 4 which would adversely affect fuel performance during Cycle 5, as designed. The Cycle 5 design is characterized by only eight fuel assemblies being cross core shuffled so as to minimize any carryover effects from tilts encountered in previous cycles.

The Cycle 5 loading includes 64 new fuel assemblies (Batch 7), and the reinsertion of 1 previously discharged fuel assembly. Due to the increased length of Cycle 5, additional core reactivity is necessary. This increased reactivity will be controlled in part by 64 burnable poison rod assemblies (BPRAs) located in the fresh fuel. Batch 7 is comprised of the MK-B5 design which is identical in concept to the MK-B4 currently used. The only change is to the upper end fitting which has the retention mechanism built in for BPRA holddown. This change is to eliminate the need for retainer assemblies.

The analytical methods which were used and accepted for Cycle 4 reload have also been used to support the proposed amendment. These methods, including the TACO-2 fuel performance code and the revised cladding models in the Emergency Core Cooling System (ECCS) code package, do not differ from the analytical methods used and accepted for previous cores to demonstrate conformance to acceptance criteria and NRC regulations. The approved TACO-2 code is used to determine the margin for centerline melting and other design calculations for fuel batches 5B, 6 and 7. The ECCS analysis utilizes the TACO-2 code and incorporates cladding rupture, strain, and flow blockage models based upon data presented in NUREG-0630.

The changes in the Cycle 5 physics parameter reflect the change in core loading philosophy. In going to 18 month cycles, the transition to a low leakage core was incorporated. This scheme loads the fresh fuel in a checkerboard pattern with the twice burned fuel in the core interior and loads the once burned fuel on the core periphery. This scheme and the use of the BPRAs produces a flatter radial power distribution causing the changes in reactivity when compared to Cycle 4.

The thermal-hydraulic design of Cycle 5 is identical to Cycle 4. The Batch 7 fuel is geometrically and hydraulically similar to the remaining batches with the new upper end fitting neither affecting the core flow rate nor the thermal-hydraulic performance. The increased core flow available for heat transfer due to the BPRAs has been conservatively ignored. The moderator and Doppler coefficients remain negative such that

Cycle 5 is bounded for main steam line break or any over cooling transient. All FSAR accidents have been examined with respect to Cycle 5 parameters to ensure that the thermal performance during the hypothetical transients has not been degraded.

The pertinent Technical Specifications in the Reload Report have been revised for Cycle 5 operation to account for changes in power peaking and control rod worths. A notable change for Cycle 5 is the exposure dependent Quadrant Power Tilt limit as presented in Table 8-2 of the Reload Report. The Beginning of Cycle (BOC) steady state limit for the symmetrical incore detector system must be updated at 0-50±10 EFPD or the End of Cycle (EOC) limit used throughout the cycle. The EOC limit is determined based upon the incore detectors' rhodium depletion at the projected 390EFPD cycle length. Since a measured tilt is typically slightly greater at BOC, a calculational point was chosen earlier in cycle life when the rhodium was less depleted, i.e., greater system accuracy, allowing a more relaxed limit permitting greater operational flexibility for the first 60 EFPD.

The Commission has provided guidance concerning the application of the standards in 10 CFR 50.92 by providing certain examples (48 FR 14870). One of the examples of actions involving no significant hazards considerations related to a change for a nuclear power reactor, resulting from a nuclear reactor core reloading, if no fuel assemblies significantly differ from those found previously acceptable to the NRC for a previous core at the facility in question are involved. This assumes that no significant changes are made to the acceptance criteria for the technical specifications, that the analytical methods used to demonstrate conformance with the technical specifications and regulations are not significantly changed, and that NRC has previously found such methods acceptable. (example iii)

This request for a license amendment for Cycle 5 Reload Report is similar to Cycle 4 and previously approved extended cycles (18 month) for B&W plants. All accident analysis and safety margins are bounded by the FSAR and/or the fuel densification report.

Based on the above information, this amendment request would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

Therefore, based on the above, the requested license amendment does not present a Significant Hazard.

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