ARKANSAS POWER & LIGHT COMPANY
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September 21, 1982

2CAN098207

Mr. W. C. Seidle, Chief
Reactor Project Branch #2
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

SUBJECT: Arkansas Nuclear One - Unit 2
Docket No. 50-368 License No. NPF-6
Notification of Intent to Perform ANO-2, Cycle 3 Reload Pursuant to the Provisions of 10CFR50.59

Dear Mr. Seidle:

Pursuant to the provisions of 10CFR50.59, Arkansas Power and Light Company has evaluated operation of Arkansas Nuclear One Unit 2 during the third fuel cycle. The results of the evaluation indicate that no unreviewed safety questions will exist for cycle 3 operation as a result of the fuel reload. In addition, AP&L has determined that no changes to technical specifications are required for cycle 3 operation as a result of the Cycle 3 reload. The Cycle 3 safety analysis was, however, based upon CEA insertion limits more restrictive than those assumed in previous analysis. Operation of ANO-2 during cycle 3 will be administratively controlled to conform within the limits established by this cycle 3 analysis. Although such operation is allowed by the current Technical Specifications, we desire to incorporate this insertion limit into the Technical Specifications to achieve consistency with our operating procedures. As such, a Technical Specification change request was submitted for review and approval by our letter dated July 8, 1982, (2CAN078203). We do not, however, consider approval of this request a restriction to plant startup.

This letter provides a summary evaluation of the design and performance of the ANO-2 core during its third cycle of operation at 100% rated core power of 2815 Mwt.

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The Cycle 3 core will consist of those assembly types shown in Figure 1-1. Sixty Batch B assemblies will be removed from the Cycle 2 core to make way for 52 fresh, unshimmed Batch E assemblies and 8 Batch A assemblies that were discharged after Cycle 1. All Batch C and D assemblies and one Batch A assembly now in the core will be retained for the third cycle.

The Cycle 3 loading pattern depicted in Figure 1-1 is characterized by placing 40 fresh fuel assemblies on the core periphery and shuffling to the interior the fuel assemblies previously located on the periphery in Cycle 2. Twelve fresh fuel assemblies have a lower assembly average enrichment than the fresh fuel on the periphery and are mixed with once-burned and twice-burned fuel in the central region of the core in a pattern which minimizes power peaking. With this loading, the Cycle 3 reactivity lifetime for full power operation is expected to be approximately 9,500 MWD/T. The Cycle 3 length and physics parameters input to the safety analysis are based on a Cycle 2 termination burnup of approximately 11,500 MWD/T. Explicit evaluations have been performed to assure applicability of analyses to a Cycle 2 termination burnup between 10,500 and 11,500 MWD/T and for a Cycle 3 length up to 11,000 MWD/T. The cycle 3 design methodology is consistent with that used for cycle 2

The mechanical design of the Batch E reload fuel is essentially identical to that of the Batch D fuel with two exceptions:

a) The original design Zircaloy spacer grids have been replaced with HID-1 spacer grids, the same as those used at San Onofre Unit 2, except the ANO-2 Batch E assemblies retain the grid spacing of Batch D and do not contain HID-2 grids as used at San Onofre Unit 2 (SONGS-2).

b) Eight Batch E fuel assemblies have three demonstration spacer grids each, featuring a variation on the HID-1 perimeter strip design. There are no changes to the grid interior and the effects of these demonstration-grid bundles on core-wide performance in Cycle 3 have been evaluated and determined to be acceptable and within the bounds of our analyses.

Two types of Batch C test assemblies are to be reinserted into Cycle 3 of the reactor for their third exposure cycle. They include one Batch C assembly containing test fuel rods and four Batch C assemblies containing burnable poison test rods. This program has been previously evaluated for Cycles 1 and 2.

Forty-two test rods were inserted into two Batch D assemblies prior to the start of Cycle 2 as part of a Department of Energy sponsored fuel utilization program. This program was described in the Cycle 2 Reload Report.

Steady state DNBR analyses of Cycle 3 at the rated power level of 2815 MWt have been performed as in Cycle 2 using the TORC code, the CE-1 critical heat flux correlation and the CETOP code. Calculational factors were combined statistically with other uncertainty factors at the 95/95 confidence/probability level for Cycle 2 to define a new design limit on CE-1 minimum DNBR. The 1.24 minimum DNBR limit from the Cycle 2 analysis was verified to be applicable to Cycle 3. The difference between the DNBR limit of 1.24 built into the CPC software and the DNBR limit of 1.26 originally approved by the NRC for Cycle 2 will be accommodated in the BERR1 addressable constant. This method is the same as cycle 2.

Standard zircaloy spacer grids have been replaced with HID-1 grids in the Batch E fuel that will be used in Cycle 3. Both HID-1 and HID-2 grids are being used at SONGS-2. A penalty of 0.01 was applied to the CE-1 CHF correlation DNBR limit for SONGS-2 to address concerns about the effects of the HID-1 and HID-2 spacer grids and a larger grid spacing. This 0.01 DNBR penalty will be applied to the ANO-2 Cycle 3 BERR1 value in the Core Protection Calculators. Use of this penalty for ANO-2 Cycle 3 is conservative as compared to SONGS-2 as the ANO-2 grid spacing remains unchanged and no HID-2 grids have been used. An additional penalty will be applied to BERR1 to account for the effect of mixing standard grid fuel assemblies with HID-1 grid fuel assemblies. The BERR1 value for Cycle 3 will not be less than the Technical Specification minimum of 1.065.

An evaluation of the reload core characteristics has been performed with respect to the ANO-2 safety analyses and design basis. Specific differences in core fuel loadings have been addressed in the current analysis. The results of this evaluation have indicated that either the inputs to previous analyses envelope the new conditions or reanalysis has been performed yielding results which are bounded by design basis analysis.

The CPC software and data base constants implemented for Cycle 2 are applicable for Cycle 3 and the COLSS data base and uncertainties will be updated, as required, to reflect the Cycle 3 core. No CPCS software modifications will be implemented for Cycle 3. The Cycle 3 startup test program will conform to applicable requirements. Arkansas Power & Light Company has determined that Cycle 3 refueling and operation may be performed pursuant to the provisions of 10CFR50.59 without prior NRC review and approval. AP&L has concluded no technical specification changes will be required as a result of the third cycle reload of ANO-2. AP&L has further determined that:

1) The probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report will not increase for Cycle 3 as a result of the reload.

2) The possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report will not be created for Cycle 3 as a result of the reload.

3) The margin of safety as defined in the bases of technical specifications for ANO-2 will not be reduced during third cycle operation.

Therefore, no unreviewed safety questions exist as a result of the third cycle reload.

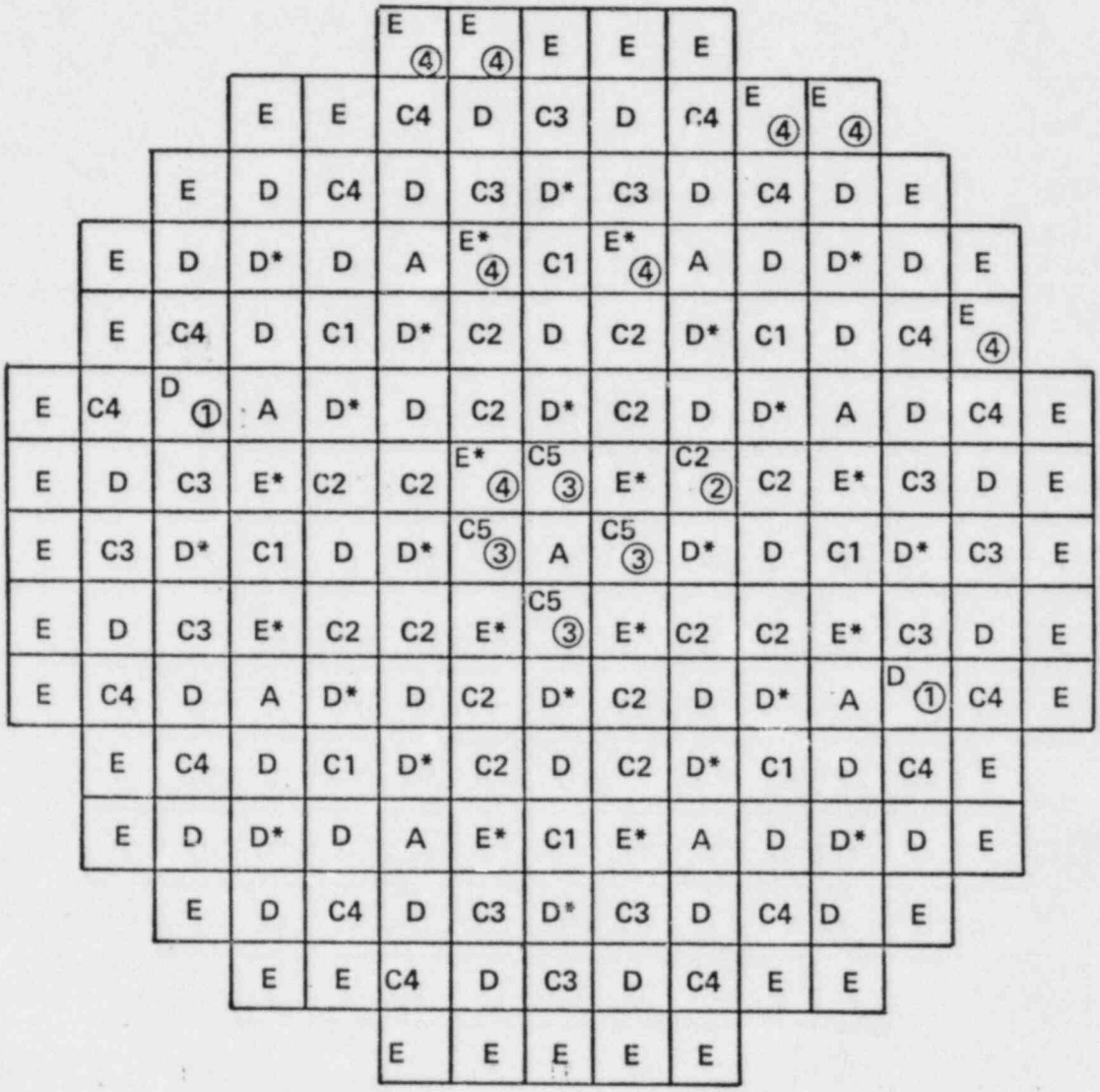
Very Truly Yours,

John R. Marshall

John R. Marshall
Licensing, Manager

JRM:JTE:syl

Attachment



① LOCATION OF DOE BATCH D TEST ASSEMBLIES

② LOCATION OF BATCH C TEST ASSEMBLY

③ LOCATION OF BATCH C BURNABLE POISON TEST ROD ASSEMBLIES

④ LOCATION OF BATCH E ASSEMBLIES WITH DEMONSTRATION GRIDS

ARKANSAS POWER & LIGHT CO. Arkansas Nuclear One - Unit 2	ARKANSAS NUCLEAR ONE - UNIT 2 CYCLE 3 CORE MAP	Figure 1-1