



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 68 TO
FACILITY OPERATING LICENSE NO. DPR-51

ARKANSAS POWER AND LIGHT COMPANY

ARKANSAS NUCLEAR ONE, UNIT NO. 1

DOCKET NO. 50-313

1.0 Introduction

By letter dated July 15, 1982 (Ref. 1), Arkansas Power & Light Company (the licensee or AP&L) requested amendment to the Technical Specifications (TSs) appended to Facility Operating License No. DPR-51 for Arkansas Nuclear One, Unit No. 1 (ANO-1). The amendment would allow the extension of Cycle 5 from 435 ± 10 Effective Full Power Days (EFPD) to 455 ± 10 EFPD and operation from 400 ± 10 EFPD to the end of cycle (EOC) with the Axial Power Shaping Rods (APSRs) fully inserted. The core would continue to be operated in the feed-and-bleed mode.

2.0 Discussion and Evaluation

2.1 Fuel System Design

The licensee has submitted a revised version (Ref. 2) of the Cycle 5 Reload Report to support their current application. The analyses of the fuel system design are identical to those originally submitted with the exception of extending those analyses to higher exposures to support the cycle extension. We have examined those areas of the submittal which are exposure dependent, including cladding stress, cladding strain, creep collapse and end-of-life rod pressure and find that they continue to meet the design and application limits described in our original Safety Evaluation (Ref. 3) supporting Amendment No. 52. We conclude that the proposed Cycle 5 extension presents no unreviewed safety issues.

2.2 Conditions of Previous Evaluation

As part of our review of the proposed ANO-1 cycle extension, we have also reexamined the conditions of our original approval (Ref. 3) of the Cycle 5 submittal. As discussed in that evaluation, the licensee proposed to initiate Cycle 5 with a number of known leaking fuel assemblies. Reinsertion of leaking fuel assemblies is not normally performed, so this proposed action was reviewed carefully. We found the Cycle 5 operation acceptable so long as the licensee would: a) notify the NRC of any additional failures and b) conduct a thorough and timely investigation of the cause of the failures. The licensee agreed to these conditions and further committed to report the results of their investigation to the NRC within six months. This report has been submitted, as discussed below.

For Cycle 5 operation to date, the licensee has continued to keep the NRC staff informed as to the status of the equilibrium reactor coolant system activity levels. Based upon these activity level measurements, no significant additional failures have occurred. In addition, AP&L has submitted a report (Ref. 4) of their investigation into the fuel failure problem. Although the licensee was unsuccessful in identifying the cause of the Cycle 4 ANO-1 fuel failures, we concluded (Ref. 5) that the failure episode was followed up in an acceptable manner. Furthermore, we have no expectation of additional fuel failures during the proposed extension to Cycle 5 and conclude that conditions of our previous evaluation have, and will continue to be met.

2.3 Nuclear Design

There are no significant nuclear parameter differences between the original Cycle 5 design and that proposed for extended Cycle 5 operation. All of the important safety analysis parameters remain bounded by the values used in the Final Safety Analysis Report (FSAR) or previous cycle safety analyses. Analysis of shutdown margin shows that 2.74 percent $\Delta k/k$ exists at EOC compared to the required 1.0 percent $\Delta k/k$ for hot shutdown.

Based on the fact that approved methods have been used to obtain the revised Cycle 5 core characteristics, that margin exists to limiting values of the parameters, and that startup testing was used at the beginning of Cycle 5 to verify important parameters, we find the revised physics parameters for proposed modified Cycle 5 operation acceptable.

2.4 Technical Specification Changes

We have reviewed the proposed TS revisions for the proposed modified operation of Cycle 5 which include the following changes in limiting conditions of operation:

1. Regulating Rod Insertion Limits from 400 to 455 EFPD for four, three, and two-pump operation.
2. Axial Power Shaping Rod Insertion Limits from 400 to 455 EFPD.
3. Axial Power Imbalance Envelope from 400 to 455 EFPD.

Since minor warpage could conceivably cause difficulties in fully inserting the APSRs at EOC in preparation for refueling, the proposed operation during the last 55 EFPD with the APSRs fully inserted is a precautionary measure. All of the APSRs will be replaced at the EOC 5. There would be no loss of shutdown margin since the APSRs are not relied upon and do not automatically insert during a reactor trip. Based on this and the fact that the same techniques and models were used to derive the TSs as were used to derive those for the previous cycles, we conclude that the modified TSs required to operate to 455 EFPD with the full insertion of the APSRs during the last 55 EFPD are acceptable.

Based on our review of the fuel system and nuclear design and of the TS revisions to Cycle 5, we find the extended operation to 455 ± 10 EFPD with insertion of the APSRs during the last 55 EFPD is acceptable.

3.0 Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

4.0 Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated, does not create the possibility of an accident of a type different from any evaluated previously, and does not involve a significant reduction in a margin of safety, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: September 8, 1982

The following NRC personnel have contributed to this Safety Evaluation:
G. Vissing, L. Kopp, J. Vogelwede.

REFERENCES

1. W. Cavanaugh (AP&L) letter to J. F. Stolz (NRC) on "Request to Extend Cycle 5", dated July 15, 1982.
2. "Arkansas Nuclear One, Unit 1, Cycle 5 Reload Report", Babcock and Wilcox Company Report BAW-1658, Revision 2, May 1982.
3. Robert W. Reid (NRC) letter to William Cavanaugh (AP&L) forwarding Amendment 52 to Facility Operating License DPR-51, dated March 9, 1981.
4. D. S. Trimble (AP&L) letter to J. F. Stolz (NRC) on "Failed Fuel Evaluation Final Report", dated January 15, 1982.
5. C. H. Berlinger (NRC) memorandum for J. F. Stolz (NRC) on "Completion of ANO-1 Failed Fuel Investigation", dated March 30, 1982.