



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

SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 4 TO
FACILITY LICENSE NO. R-62
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
DOCKET NO. 50-124

Introduction

By letter dated September 17, 1980, the Virginia Polytechnic Institute and State University (the licensee) requested an amendment to Appendix A of Facility License No. R-62. The requested amendment would grant a temporary waiver of the Technical Specifications to permit tests of one 13-plate element. The proposed testing would be carried out at low power (power level less than 1 Kw), the reactivity would not exceed the technical specification limit of $\Delta k/k$ of 0.6% $\Delta k/k$ and should not require more than 30 days (1 to 31 December, 1980). The objective of the specific tests involved is to measure the change in K_{eff} when the 13-plate element is changed for a 12-plate element. These tests will provide data for preliminary analysis for operation at 500 KW, as the present configuration will have to be modified by adding an additional plate in each subassembly in order to operate at the higher power level.

Background

The current Technical Specifications for the reactor core (p. 4, No. 6.1.1) require that "standard fuel elements shall be of the flat-plate type with twelve plates to each element" and (p. 4, No. 6.1.3) "Maximum excess reactivity above cold clean critical shall be limited to 0.6% $\Delta k/k$ including positive reactivity from experiments." These measurements are classified as a "New Experiment." One or more dummy fuel plates must be substituted in the 12-plate elements as necessary to satisfy the excess reactivity requirement.

Evaluation

To support the request for operation with one 13-plate subassembly, the applicant performed an approximate calculation of the reactivity change (based on thermal utilization only) associated with a loading consisting of 12 subassemblies of 13 plates each. This calculation indicates that the total reactivity worth change should be less than 0.4%. This amendment will allow the determination of the reactivity addition due to one 13-plate

element at various positions in the core. The licensee will remove the appropriate number of plates elsewhere to counteract the reactivity increase. In addition, subcritical multiplication measurements will be performed during the approach to critical to insure that the limit on $k(\text{excess})$ is not exceeded. During the proposed measurements, the reactor will be operated at a power level less than 1 Kwt, hence it is not expected that any other technical specifications related to the thermal quantities will be exceeded.

Environmental Considerations

We have determined that this amendment will not result in any significant environmental impact and that it does not constitute a major Commission action significantly affecting the quality of the human environment. We have also determined that this action is not one of those covered by 10 CFR Section 51.5(a) or (b). Having made these determinations, we have further concluded that, pursuant to 10 CFR Section 51.5(d)(4), an environmental impact statement or environmental impact appraisal and negative declaration need not be prepared in connection with issuance of this amendment.

Conclusions

We conclude that the proposed technical specifications waiver for the experiment with one 13-plate fuel subassembly is acceptable. We base this conclusion on the following:

- (1) the $\Delta k/k$ (excess) will not be exceeded from that required by the technical specifications;
- (2) the power during the measurements will be less than about 1 Kwt;
- (3) the technical specification waiver is of limited duration and applicable only to these measurements; and
- (4) subcritical multiplication measurements will be made during the approach to critical.

We have further determined that this amendment will not increase the probability of occurrence of an accident analyzed in the Safety Analysis Report, nor does it increase the consequences of such an accident. 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 accidents previously considered, and does not

involve a significant decrease in a safety margin, 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: November 21, 1980