



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

SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 6 TO
LICENSE NUMBER R-87
PURDUE UNIVERSITY
DOCKET NO. 50-182

Introduction

The operating license for the Purdue University research reactor was issued originally in 1962, before a separate section of the license, Appendix A, the Technical Specifications, was formally required. In 1975, in accordance with a request by the Nuclear Regulatory Commission, the licensee submitted a set of Technical Specifications for inclusion in the license. These specifications were developed following the format of ANSI N378-1974 which was still under review by the Commission at that time. Following some changes by mutual agreement, a final set of Technical Specifications was incorporated into License No. R-87 by Amendment No. 3, dated November 28, 1978. In the meantime, the licensee has operated within the license conditions, but has observed that one of the specifications is physically difficult to achieve consistently, and several others require clarification. Therefore, by letter dated May 24, 1982, the licensee requested a license amendment incorporating several changes in the Technical Specifications.

Evaluation

The licensee's requested changes in the Technical Specifications include one related to the drop-times of the shim-safety rods, several related to time intervals between certain meetings or surveillance actions, and several intended to clarify the intent of the specifications as previously approved.

1. The licensee requested that the specification limiting the allowed drop-times of the shim-safety rods upon the receipt of a trip signal be increased from 600 milliseconds to 1 second. The reason for the requested change is that the method of measurement used by the licensee to verify the rod-drop times, for both fast and slow scrams, includes the magnetic-field decay time at the start, and the depression of dash-pot at the end of the rod-drop. For the slow-scram the decay time is approximately 60 msec, instead of the 6 msec for the fast scram. Making the requested change assures that the Technical Specifications apply adequately to both types of scram. The licensee analyzed hypothetical accidental transients in the reactor power caused by either a ramp insertion of excess reactivity, or an instantaneous insertion of the total authorized excess reactivity. The latter, although very improbable, would produce the maximum potential peak power before the dropping safety rods

terminated the excursion. The staff agrees that an upper limit on the possible power level is obtained by evaluating the reactor power increasing on a 1 second period, the trip signal occurring at the set-point of 1.2 kW, and the power continuing to increase at the initial rate until the rods have fallen fully into the core, 1 second later. The computed upper limit for the peak power is 3.3 kW, which is well below the safety limit of 50 kW for this reactor. The principal reason for a specification on maximum scram-time in a small reactor such as this is to assure that there is no degradation in operability of safety rods over a period of several years. The 1 second drop time is acceptable for that purpose, and does not cause a significant decrease in safety.

2. The licensee requested that certain time intervals specified in the current Technical Specifications be changed. These changes do not lengthen the average intervals between the specified actions, but would allow some flexibility in the time between successive accomplishments of the action. This type of change is consistent with recent NRC practice. The intervals incorporated into the revised Technical Specifications are the same, in corresponding actions, as those being proposed in a 1982 draft version of ANS 15.1 "Standard for the Development of Technical Specifications for Research Reactors". NRC has participated in writing this standard, and has recently voted for its approval. These changes do not decrease the safety of operations of the Purdue reactor.
3. The licensee and the staff have agreed on some additional changes in the Technical Specifications required for clarification. These changes are not substantive, and do not change any operational or administrative requirements.

Environmental Consideration

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 § 51.5(a) or (b). Having made these determinations, we have further concluded that, pursuant to 10 CFR § 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.

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 13, 1982

This Safety Evaluation was conducted by Robert E. Carter, Division of Licensing, Standardization & Special Projects Branch.