



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

SAFETY EVALUATION BY THE  
OFFICE OF NUCLEAR REACTOR REGULATION  
SUPPORTING AMENDMENT NO. 4 TO  
FACILITY OPERATING LICENSE NO. R-127  
MEMPHIS STATE UNIVERSITY  
DOCKET NO. 50-538

Introduction

By letter dated May 14, 1982, Memphis State University (MSU or the licensee) requested that Facility Operating License No. R-127 be amended to authorize:

- (1) Operation of the reactor at steady-state power levels not in excess of 100 milliwatts (thermal).
- (2) The licensee to operate the reactor in accordance with the Technical Specifications contained in Appendix A of the original issue of this license dated December 10, 1976.

Discussion

By letter dated April 11, 1975, as supplemented, Memphis State University applied for a permit to construct an AGN-201 training and research reactor facility on the campus in Memphis, Tennessee. The requested Construction Permit was issued by NRC, dated June 15, 1976. Following satisfactory completion of construction, as authorized, and acquisition of a formerly used AGN 201 reactor from the Argonne National Laboratory, Memphis State was issued Facility Operating License No. R-127 on December 10, 1976. Among other license conditions, this license authorized Memphis State to operate the reactor at steady-state power levels up to 100 milliwatts. The license also included, as Appendix A, a set of Technical Specifications which provided for the safe operation through technical performance standards and management controls. This maximum authorized power level was typical of several other AGN-201 reactors already licensed by NRC and in operation at that time.

After approximately two years of uneventful routine operation of the reactor, as authorized, Memphis State University requested by letter dated March 23, 1979 an amendment to License No. R-127. The request proposed that the reactor be authorized to operate at steady-state power levels up to 20 Watts (thermal) with intermittent 1000 Watt operation. Appropriate changes in the Technical Specifications were also required and requested. In order to operate safely at these higher power levels, some modifications to instrumentation and shielding would be required, and the licensee promised to make the modifications before implementing the proposed license conditions. The applicant justified and supported the requested changes in operating parameters in two ways:

- (1) A licensed AGN-201 reactor had been modified in a similar way and operated at the higher power levels for approximately 8 years at the U. S. Naval Post Graduate School.
- (2) The applicant provided a Safety Analysis of the operation of the reactor in the upgraded modes.

The NRC found these justifications acceptable and issued Amendment No. 1 to license No. R-127, dated March 28, 1980. Furthermore, in order to acquire spare fuel for the reactor, the licensee had requested, and in the same amendment (No. 1) NRC approved, an increase in authorized Special Nuclear Material.

During the two years since Amendment No. 1 was issued, the licensee has continued to operate the reactor in accordance with the conditions of the initial license but has not found the funds, nor the timely opportunity to make the modifications required for operation at the higher authorized power levels. On the other hand, the Technical Specifications approved as part of Amendment No. 1 anticipated early modification, and contain some parameters, limitations, and instrumentation which do not apply to the unmodified AGN 201. When this status was brought to the licensee's attention by inspection personnel from USNRC Region III, the licensee applied to NRR to have the license and Technical Specifications changed back as they were in the initial license, before Amendment No. 1.

#### Evaluation

- (1) The licensee's request involves no changes in instruments, equipment, operating conditions, surveillance, or management controls. The reactor would continue to be operated as it has been since the initial license was issued in 1976. Therefore, the staff considers that the amendment is purely administrative in nature, and no unreviewed technical, safety, or environmental issues are raised. Accordingly, the staff concludes, based on the consideration discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by continued operation in the proposed manner, and (2) 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.
- (2) The licensee has requested that the license, as amended, continue to authorize the possession and use of up to 1400 grams of U-235, enriched to less than 20%. Since the excess reactivity loaded into the core is governed by the Technical Specifications, and not by the amount of enriched uranium authorized or in inventory, approval of the request does not involve a safety consideration,

but is administrative in nature. Furthermore, Amendments No. 2 and 3 to License No. R-127 continue to provide for adequate safeguarding of the 1400 grams of U-235 when acquired. Therefore, the staff finds acceptable the request for continuation of the authorization to possess and use not more than 1400 grams of the low enrichment U-235.

Dated: AUC 24 1982