UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 24

FACILITY OPERATING LICENSE NO. R-77

BUFFALO MATERIALS RESEARCH CENTER

STATE UNIVERSITY OF NEW YORK AT BUFFALO

DOCKET NO. 50-57

1.0 INTRODUCTION

By letter dated July 23, 1996, (Ref. 1) as supplemented by letter dated February 14, 1997, (Ref. 2) the State University of New York at Buffalo (SUNY) applied for an amendment to the Pulstar Reactor license. The requested amendment would permit possession of the reactor and associated materials but would prohibit operation and use. The Technical Specifications (TSs) would be revised to eliminate operating related requirements and clarify monitoring requirements and surveillances for the long-term storage of reactor fuel and by-product material from previous reactor operation. The application as amended by the February 14, 1997, letter from SUNY to the Nuclear Regulatory Commission (NRC) (Ref. 2) included proposed TSs for the requested action and revised bases for these TSs.

2.0 EVALUATION

The SUNY reactor is a pool type facility, fueled with Pulstar type fuel enriched to approximately 6 percent in U-235. The fuel is clad in Zircaloy. The SUNY reactor ceased operation in June 1994, and requested withdrawal of its operating license on July 23, 1996. The fuel would remain onsite until such time as offsite storage facilities are available and decommissioning of the reactor could proceed.

2.1 Reactor Fuel and Fuel Storage

The SUNY reactor fuel, including the Fission Plate, is to be stored in accordance with the specifications found in Section 10.0 of the TSs in reference 2 on February 14, 1997.

2.1.1 Unirradiated Fuel

Unirradiated fuel will be stored within the containment building in the manner described in the TSs, Section 10.1. The proposed TSs for unirradiated fuel storage requirements have been reviewed and since the storage rack designs are identical to the storage rack designs in the existing TSs (Ref. 3) there is no decrease in the margin of safety associated with the storage of unirradiated fuel.

Unirradiated fuel that has been packaged for shipment in accordance with NRC and Department of Transportation (DOT) regulations may be stored within the containment providing that other fissionable material is not stored within one (1) meter of the packages. This will ensure that the material will always be subcritical.

2.1.2 Fission Plate

The fission plate storage requirements of the proposed TS (Section 10.2) were identical to those in the existing TS; therefore, unsafe nuclear coupling of the fission plate and other fissionable materials will not occur. In addition the fission plate may be packaged for shipment in accordance with NRC (and DOT) regulations and administratively held no closer than one (1) meter to other fissionable material while awaiting shipment. This will ensure that no nuclear coupling will occur.

2.1.3 Irradiated Fuel Storage

The storage of irradiated fuel, in TS Section 10.3, is limited as was approved in the TS in existence on July 23, 1996, (Ref. 3) with the exception that no more than 15 fuel assemblies may be stored on the reactor grid plate. The licensee has committed in their letter of February 14, 1997, (Ref. 2) to store fuel assemblies on the reactor grid plate in alternate rows and to plug the unused grid locations with plugs such that fuel assemblies cannot physically be placed in those positions (TS Section 10.3.1.1). A theoretical minimum of 17 unirradiated fuel assemblies in an ideal geometry are needed to form a critical array. The NRC staff (hereafter the staff) has reviewed the arrangement for the grid plate and find it an acceptable alternative to fuel storage racks. Alternative storage, either in a hot cell or other facility within containment, is acceptable as long as the storage requirements of TS Sections 10.3.2 and 10.3.3 are met. Also, it is noted that irradiated fuel storage and transfer will be limited to that fuel which was present within the reactor tank on June 30, 1994, (see Table 1 of the TSs).

The licensee has requested a 30-day delay in the implementation of TS Section 10.3.1.1 following issuance of the new TSs in order to permit the movement of fuel on the grid plate into alternate rows and permit the fabrication of additional grid plate plugs. It is recognized that some additional time is needed to prepare the grid plate, and based on the licensee's commitment that no additional fuel will be added to the grid; the staff has allowed a delay of 30 days in the effectiveness of TS Section 10.3.1.1.

2.1.4 Fuel Handling and Transfer

TS requirements for the handling and transfer of fuel has been reviewed (TS Sections 10.3.4 and 10.3.5). The methods, procedures, requirements, and independent reviews that are specified in the TSs (Ref. 2) are sufficient to ensure that safe handling and transfer of fuel can be accomplished.

2.1.5 Conclusions

With regard to fuel storage and handling, the staff concludes that appropriate measures, storage facilities, and administrative controls are available so that all fuel permitted to be possessed by SUNY can be stored safely.

2.2 Instrumentation

Since the SUNY Pulstar reactor will not continue to operate, instrumentation that must be operational is limited to what is important to the safe storage of fuel. During fuel handling, additional instrumentation is required to be in operation.

2.2.1 Reactor Tank Instrumentation

The tank instrumentation must be capable of detecting water level (for shielding and cooling), tank water temperature, and primary pump suction valve position (prevent primary system damage). Based on the review of the tank instrumentation, the staff concludes that the tank instrumentation in Section 3.1 of the TSs is adequate for the storage of fuel.

2.2.2 Radiation Effluent Monitoring During Fuel Storage

Irradiated fuel elements that are stored in the reactor pool or that may be long-term stored at other locations within containment could become the source of radioactive effluents that could be exhausted from the containment building. As a part of the licensee's response to the "Request for Additional Information" (Ref. 2), the licensee has committed to a continual air monitor on the containment effluent. An allowed outage time for the containment air effluent monitor of 10 days is reasonable provided that no fuel handling occurs during this outage. The staff finds that the air effluent monitoring specified in TS Section 3.2 is adequate.

Liquid effluent monitoring requirements during fuel storage are specified in Section 7.0 of the TSs (Ref. 2). All potentially radioactive liquids are collected and before release, are monitored. Monitoring and release shall be in accordance with 10 CFR Part 20 (TS Section 7.3). Based on the staff's review of the liquid effluent system and the administrative controls specified by the licensee, we conclude, that liquid effluents can be stored and released in accordance with 10 CFR Part 20.

2.2.3 Area Radiation Monitoring During Fuel Handling

In addition to the containment effluent monitoring requirements discussed in Section 2.2.2 of this document, the licensee will provide area monitoring by use of the reactor bridge monitor or equivalent, whenever fuel is being handled in the tank, including the "pass-through" tube (TS Section 3.3). The staff observed the actual layout of the facility, and concludes that the TS for area monitoring during the in-tank fuel handling is adequate.

2.2.4 Radiation Effluent Monitoring During Fuel Handling

During fuel handling operations, radiation effluent air monitoring shall consist of stack particulate, stack gas, building particulate, and building gas. This monitoring will ensure that any releases will be monitored and can be quantified.

It will also ensure that the fuel handling staff will be notified of any abnormality. The airborne activity effluent limits of proposed TS Section 6.0 are also acceptable. The staff has reviewed the effluent monitoring system and effluent limits required during fuel handling operations in TS Section 3.4 and concludes that they are adequate.

2.3 Reactor Tank Water Conditions

One of the important safety aspects of long-term irradiated fuel storage in water is the purity of the water. Water which is in contact with stored fuel cladding must have certain purity specifications so that corrosion of the stored fuel cladding will be held to a minimum. Another aspect associated with tank water purity is to maintain water clarity so that visual monitoring of fuel elements and other in-tank components will be possible. The given pH and resistivity limit are similar to those in use at other non-power reactors. The pH range and the resistivity limit given in TS Section 5.0 have been reviewed and the staff concludes that they are acceptable.

2.4 Administration

The licensee has revised the administrative section of its TSs, Section 11 (Ref. 2) to include the administrative organization and responsibilities that are appropriate for a fuel storage-only type of operation. Included in Section 11 is an "on-call" (11.3) staffing requirement that ensures that adequately trained persons are available to respond to potential events at the facility. Events at a fuel storage facility normally would not require a rapid response; however, the licensee has proposed a specification (11.3.2) that requires one knowledgeable person to be within 50 miles of the facility at all times and be reachable by phone, pager, or radio. Based on our review, the staff concludes that this is acceptable. Other aspects of the Administration Section (12) of the TSs have been reviewed and the staff concludes that they are acceptable. These TSs include Organizational Structure, Minimum Staffing, Operational Requirements (fuel handling), and Review Functions.

2.5 Reports, Procedures, and Records

The TSs (Ref. 2) contain the following additional administrative sections:

Section 12.0	"Actions to be Taken in the Event of a Reportable Occurrence"
Section 13.0	"Written Procedures"
Section 14.0	"Record Keeping"
Section 15.0	"Reporting Requirements"

The above sections of the TSs (Ref. 2) contain all of the same specifications as the existing TS (Ref. 3) with the exception of TS that specifically address "operating reactor" requirements. The staff has reviewed Sections 12, 13, 14, and 15 and concludes that the licensee has correctly retained the necessary requirements for the SUNY facility to handle and store licensed material that was used during reactor operation.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes in inspection and surveillance requirements. The staff has determined that this amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site, and there is no significant increase in individual or cumulative occupational radiation exposure. Accordingly, this amendment conforms to the eligibility criteria for categorical exclusion presented in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The staff has 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 evaluated, or create the possibility of a new or different kind of accident from any accident previously evaluated, 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 the proposed activities, 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 the health and safety of the public.

5.0 REFERENCES

1. Application to Amend State University of New York at Buffalo's Pulstar Reactor License, Louis G. Henry to NRC, July 23, 1996.

2. Response to Request for Additional Information, Louis G. Henry to NRC, February 14, 1997.

3. Technical Specifications in existence as of July 23, 1996, SUNY, R-57.

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