

AUG 17 1982

DOCKET NO.: 70-600

LICENSEE: Seattle University (SU)

SUBJECT: SAFETY EVALUATION REPORT

I. Background

Materials License No. SNM-589, originally issued to Seattle University (SU) in 1961, authorizes the possession and use of 2190 kilograms of clad uranium slugs enriched to 0.947% in the U-235 isotope in a subcritical assembly core and of 80 grams plutonium (an encapsulated Pu-Be neutron source). The assembly core and neutron source are used for educational purposes, teaching and research related to basic nuclear physics. The licensee requested renewal of SNM-589 by letter dated January 6, 1981; accordingly, the license has remained effective pursuant to the timely renewal provisions of subsection 70.33(b) of 10 CFR 70.

Since the renewal application requested authorization for three additional encapsulated Pu-Be neutron sources, which were formerly authorized under their Washington State license, and because personnel changes had occurred since the last renewal, the licensee was asked to resubmit a comprehensive application covering their total SNM status. The updated application requests authorization to possess and use 2190 kilograms of uranium enriched to 0.947% in the U-235 isotope and 155.33 grams of plutonium encapsulated as Pu-Be neutron sources.

II. Scope of Review

The review of SU's application for renewal included an examination of previous applications and amendments, a review of the application and addenda dated January 6, 1981, January 22, March 29, and June 25, 1982, a review of the compliance history, and discussion with Region V staff. The findings are discussed below.

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III. Discussion of Review

A. Administrative

Seattle University uses its subcritical assembly (SA) for educational purposes in a structured organization which teaches the same course (HP 475) and conducts the same laboratory experiments each year.

The Radiation Safety Officer (RSO) and course (HP-475) instructor, Dr. Valente, fulfills the stated requirements of education, training and experience, which are minimally those of a Nuclear Engineering Professor and are commensurate with similar licensees. Dr. Valente, whose curriculum vitae demonstrates his qualifications, has the responsibility to teach radiation safety and to conduct the surveillance program.

Review of the application revealed that there is no requirement for written procedures to use the SA or for radiological protection of personnel during use of the assembly. It is the reviewer's opinion that written procedures should be required; accordingly, the following condition is recommended:

Condition 11: Written procedures shall be prepared prior to the use of the special nuclear material authorized under this license. The procedures shall describe the experimental methods to be used and the radiation safety precautions to be followed. Procedures shall be approved in writing by Dr. Frank A. Valente and the Dean of Engineering and Science. The procedures shall be provided to all users prior to the start of any experimental operation, and the users shall acknowledge in writing that they have read and understand the procedures to be followed.

B. Radiation Safety

1. External Radiation

External radiation is monitored with personal film badges which are commercially processed and are sensitive to X, gamma and beta radiation and neutrons. Since 1974, the RSO reports that only two badges had readings greater than zero, and both were well below regulatory limits of 10 CFR 20. Monitoring records show average readings of

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.07 mR/hr, slightly above background; this level in an area which is used infrequently represents an insignificant exposure of personnel to external radiation.

2. Internal Exposure

The clad slugs used in the assembly are sealed, and there is no destructive use of the material; therefore, there is no probability of internal exposure.

3. Surface Contamination

Since the licensed material is contained and is limited to non-destructive use of the clad slugs, the potential for surface contamination is unlikely. The sealed sources are leak tested, and the laboratories are surveyed semiannually.

After reviewing the licensee's radiation program for the control of surface contamination, this reviewer found two deficiencies. The program does not include:

- a. Criteria for releasing contaminated equipment or material from the facility for unrestricted use, or
- b. A procedure for leak testing of the sealed licensed material.

In order to correct these deficiencies, the FCUP staff has proposed the following license conditions:

Condition 12. The release of facilities or equipment for unrestricted use shall be in accordance with the attached Annex A, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source or Special Nuclear Material," dated July 1982.

Condition 13. The licensee shall comply with the enclosed Annex B, dated September 1980, "License Condition for Leak Testing Sealed Plutonium Sources."

4. Waste Disposal

The subcritical assembly is used as an instructional tool only, and no power is generated; therefore, no special nuclear material waste will be generated from the authorized activities.

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C. Nuclear Safety

The uranium fuel consists of clad hollow slugs which are threaded on rods for insertion and removal from the assembly pit, where the fuel is normally stored.

Attached is the criticality assessment made by George Bidinger of the FCUP staff. There is currently an exemption from the criticality alarm system as required by 10 CFR 70.24, and because the subcritical assembly cannot be made critical, a continuing exemption is appropriate; accordingly, the following condition is recommended:

Condition 14: The licensee is exempt from the requirements of Section 70.24, 10 CFR 70, insofar as this section applies to the material held under this license.

D. Environmental Impact

No fuel is consumed in the operation of the subcritical assembly and no waste is created in any of the three physical forms; therefore, no effluent is released to the environment.

Based on this information, it is concluded that the proposed renewal application is non-substantive and insignificant from the standpoint of environmental impact, and therefore pursuant to subparagraph 51.5 (d)(3) of 10 CFR 51, no environmental impact statement, negative declaration or environment impact appraisal need be prepared.

IV. Compliance History

A review of the Inspection and Enforcement record of the licensee since the license was first issued shows only one item of noncompliance, and it was administrative in nature. Overall, the licensee's compliance history appears to be excellent. Discussion with Region V people who inspected SU rendered no objection to the license renewal, and no additional conditions or changes in the license were suggested.

V. Conclusion

Upon completion of the radiation safety review and the compliance history, the staff concludes that the basis of the radiation safety program is sound. Conformance by Seattle University with their proposed conditions as well as those developed by the FCUP staff should insure a safe operation.

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VI. Recommendations

Based on the discussion above, it is recommended that the license be renewed for a 5-year period in accordance with the application and subject to the above listed conditions.

original signed by  
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Uranium Process Licensing Section  
Uranium Fuel Licensing Branch  
Division of Fuel Cycle and  
Material Safety, NMSS

Original Signed By:  
W. T. Crow  
Approved by: W. T. Crow, Section Leader

Enclosure: Criticality Assessment

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