

[REDACTED]

DOCKET: 70-157

LICENSEE: University of Texas at Austin  
Austin, TX

SUBJECT: SAFETY EVALUATION REPORT - SUBMITTAL DATED MAY 3, 2004,  
AMENDMENT REQUEST TO RECEIVE AND POSSESS [REDACTED] OF  
SPECIAL NUCLEAR MATERIAL (TAC L31830)

BACKGROUND

By cover letter dated May 3, 2004, and supplemental information provided on July 8, 2004, the University of Texas at Austin (UT) [REDACTED] submitted an amendment request for special nuclear materials license number-180 (SNM-180). UT requested a change to allow them to receive, possess, and store [REDACTED] of special nuclear material (SNM). UT is currently licensed to possess up to [REDACTED] uranium-235 ( $^{235}\text{U}$ ) in the form of uranium dioxide in polyethylene, enriched to less than 20 per cent in  $^{235}\text{U}$ . The total amount of SNM would be low strategic significance SNM.

UT's request is to receive, possess, and store [REDACTED] fuel elements and utilize them as sealed sources to support future research, development and the educational mission of the facility. There is no intention to use this material in a critical configuration. The elements are currently stored at Manhattan College (MC) in Riverdale, NY. Previously, MC had used these fuel elements in their low-enriched research reactor for approximately seven hours before the reactor was shutdown and the facility decommissioned in the mid-1990's. According to MC, these fuel elements have been slightly irradiated and consider them as having zero burn-up. The fuel elements are made from a uranium-[REDACTED] that is encased in aluminum and the SNM is not considered dispersible. Because the fuel was used for a short period of time (seven hours) at low power and has been stored several years at MC, the fuel elements are going to be used at UT as a sealed source. The definition in 10 CFR 70.4 states that a sealed source is "any special nuclear material that is encased in a capsule designed to prevent leakage or escape of the special nuclear material". These fuel elements meet that definition. The term fuel element and sealed source are used interchangeably throughout this Safety Evaluation Report (SER). UT has requested that the amendment be approved by July 2004 to accommodate the Department of Energy's (DOE) shipping schedule. The DOE-Idaho office is handling the shipment and anticipates completing the shipment in the summer of 2004.

[REDACTED]

## DISCUSSION

UT submitted an amendment request to acquire, possess, and use [REDACTED] fuel elements for future non-critical experiments that are currently stored at MC that is located in Riverdale, New York. MC is in the final stages of decommissioning the Manhattan College Zero Power Reactor (MCZPR). The MCZPR was designed for full power operation of one-tenth of a watt by the AMF Corporation. The reactor was converted from highly enriched uranium fuel to low enrichment uranium in 1991 under the DOE Reduced Enrichment for Research and Test Reactors program.

In the May 3, 2004, letter to the Nuclear Regulatory Commission (NRC), UT requested the following licensing actions:

1. Receipt and storage of the fuel elements in the U.S. Department of Transportation (DOT) 6M shipping containers.
2. Moving the fuel elements into a separate room for storage.
3. Moving the material into the existing reactor pool where UT's operating TRIGA reactor is located.

This SER discusses the first request only, that is receipt and storage of material in DOT 6M shipping containers. Actions 2 and 3 will be covered under a separate evaluation.

DOE - Idaho is currently scheduling the shipment from MC to UT in the summer of 2004. The material will be shipped in DOT specification 6M containers. The materials will be initially received and stored in the [REDACTED] in the 6M containers. The storage area will be monitored in accordance with 10 CFR 70.24 and ANSI/ANS Standard 8.3 by two separate radiation detector systems capable of detecting a criticality that produces an absorbed dose in soft tissue of 20 rads of combined neutron and gamma radiation at an unshielded distance of two meters from the reacting material within one minute.

The [REDACTED] is within the facility protected area with strict access controls and a silent alarm system. These controls and the facility security systems are detailed in the separate NRC-approved Physical Security Plan for Reactor License R-129.

## CRITICALITY SAFETY

The NRC reviewed the UT submittal dated May 3, 2004, and the March 4, 1998, Safety Evaluation Report for the Renewal Application dated October 24, 1997. Additional material was submitted on July 8, 2004, in response to the NRC staff's June 18, 2004, request for additional information. The NRC reviewed the supplemental material.

Each fuel element will be contained in a DOT Specification 2R inner container within a DOT Specification 6M shipping container. The DOT has approved the use of 6M shipping containers for this material. NRC has authorized the use of 6M shipping containers by a General License in 10 CFR Part 71, with the provision that the user must comply with all the DOT specifications,

[REDACTED]

which are in 49 CFR 178.354. The maximum fissile contents of a 6M shipping container and the minimum Transport Index are defined in 49 CFR 173.417(b)(2). These restrictions ensure criticality safety of arrays of containers in transport.

The [REDACTED] sealed source slightly irradiated reactor fuel elements will remain in the individual 6M shipping containers as the initial storage configuration. While the storage of this material will be subcritical due to containment in the DOT approved shipping containers, the staff reviewed its proximity to the existing licensed sealed sources of SNM. The existing sealed sources are not contained in approved shipping containers for subcriticality. However, the sealed source slightly irradiated reactor fuel elements in the shipping containers will be located a sufficient distance (approximately 25 feet) from the proposed storage location of the fuel elements so that there will be no interaction with the existing sealed sources. In addition the storage area for the new sealed source slightly irradiated reactor fuel elements will have criticality monitoring in accordance with 10 CFR 70.24 and ANSI/ANS 8.3, "Criticality Accident Alarm System," with local and remote alarms.

An exemption from 10 CFR 70.24 that exists in the current license for the storage and use of the existing licensed sealed sources will be continued. License Condition 13 will be revised to state that only material in License Conditions 6 A and B is covered by this exemption and reads as follows:

13. The licensee is exempted from the requirements of 10 CFR 70.24 insofar as this section applies to materials in License Condition 6A and B covered by this license.

Based on having to meet the DOT shipping container requirements, not having any interaction between the two storage areas, and having criticality monitoring in the new initial storage area in accordance with 10 CFR 70.24, NRC concludes that the UT request for receipt and initial storage in the configuration of shipping containers will provide reasonable assurance that a criticality accident will not occur and is acceptable.

#### SECURITY AND MATERIAL CONTROL ACCOUNTING

The licensee has requested to receive [REDACTED] fuel elements containing [REDACTED] of uranium-235 (<sup>235</sup>U) enriched to 19.75 percent in the form of uranium silicides in an aluminum matrix. If approved, the authorized SNM possession limits will be a Category III quantity of SNM of low strategic significance.

##### Physical Security:

Neither the license amendment request, nor the approved Physical Security Plan for Reactor License R-129, specifically cite the regulations (10 CFR Part 73 or 74) that the licensee must meet for physical protection and material control and accounting (MC&A). Therefore, specific license conditions are needed to clearly state the applicable MC&A and physical security requirements.

[REDACTED]

UT possesses a reactor license, No. R-129, Docket No. 50-602. On November 2, 1990, the NRC completed review of the "University of Texas Physical Security Plan for the TRIGA Mark II Reactor," and concluded that the measures identified in the plan meet the fixed site and in-transit requirements specified for facilities with material of low strategic significance. The following license condition is contained in License No. R-129:

"The licensee shall fully implement and maintain in effect all provisions of the physical security plan approved by the Commission and all amendments and changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The approved plan, which is exempt from public disclosure pursuant to the provisions of 10 CFR 2.390(d), is entitled "Physical Security Plan for the UT [University of Texas] TRIGA Mark II Reactor Facility, Revision 1, dated August 1990.

The UT license amendment request dated May 3, 2004, contained a commitment in the Emergency and Security Procedures section that all SNM material would be protected and controlled in accordance with previously approved physical security plans. The material subject to this amendment will be co-located with material licensed under Facility Operating License No. R-129 and will be afforded the same level of protection as described in the approved physical security plan.

#### Material Control and Accounting:

Section 74.11 requires licensees who possess one gram or more of SNM to notify the NRC Operations Center within 1 hour of discovery of any loss or theft or other unlawful diversion of SNM which the licensee is licensed to possess. Section 2.4.3 of the approved physical security plan contains the licensee's commitment to report these events to NRC within 1 hour. However, the physical security plan does not specifically reference compliance with 74.11, nor does their amendment request specify they will meet the requirements contained in 74.11. As such, a license condition requiring compliance with 74.11 is needed.

Section 74.13 requires each licensee authorized to possess SNM in a quantity totaling more than 350 grams to complete and submit Material Balance Reports to the Nuclear Materials Management and Safeguards Systems (NMMSS) within 60 calendar days of the beginning of the physical inventory required by 74.19(c). Section 74.19(c) requires the licensee to conduct a physical inventory of all SNM in its possession at intervals not to exceed 12 months. The record of these inventories shall be retained until the Commission terminates the license that authorized the possession of the SNM. The license amendment request states that annual inventories are performed and reported to NMMSS. Additionally, Section 2.2.1 of the approved physical security plan contains the licensee's commitments to perform both periodic and random inventories. However, the physical security plan does not specifically reference compliance with 74.13 or that the inventory results are reported to NMMSS, and their amendment request does not specifically state that they will meet the requirements contained in 74.13. As such, a license condition requiring compliance with 74.13 is needed.

[REDACTED]

Section 74.15 requires each licensee who transfers and each licensee who receives SNM to complete a Nuclear Material Transaction Report and submit the data to NMMSS for each transfer containing one gram or more of SNM. Section 3.1 of the approved physical security plan contains the licensee commitment to complete material transaction reports for shipment and receipt of materials. However, the physical security plan does not specifically reference compliance with 74.15 or that these reports will be submitted to NMMSS, and their amendment request does not specifically state that they will meet the requirements contained in 74.15. As such, a license condition requiring compliance with 74.15 is needed.

In addition to the annual physical inventory mentioned above, 74.19 contains specific record keeping requirements for all MC&A related documents. These commitments were not provided in either the physical security plan or the license amendment request. However, in a telephone call held on July 22, 2004, the licensee stated that those records are maintained and have been periodically audited by NRC during inspections. As such, a license condition requiring compliance with 74.19 is needed.

Conclusion:

The staff concludes that the currently approved physical security plan provides the necessary commitments to meet the requirements of 10 CFR 73.67 for the protection of special nuclear material of low strategic significance. With the exception of 10 CFR 74.19, the licensee's submittal and approved physical security plan contains the basic elements required for MC&A. Neither the license amendment request nor the approved physical security plan specifically state the physical protection or MC&A regulations that the licensee must meet. The staff recommends that specific license conditions be issued, clearly stating the physical security and MC&A regulations applicable to the license. Approval of this amendment is recommended, with the following conditions added to the license:

- 14 The licensee shall control the quantity of special nuclear material in its possession such that the total quantity in the facility does not exceed a Category III quantity of special nuclear material of low strategic significance as defined in 10 CFR 73.2, "Definitions," and 10 CFR 74.4, "Definitions."
- 15 The licensee shall comply with the material control and accounting general reporting and record keeping requirements contained in 10 CFR 74.11, 10 CFR 74.13, 10 CFR 74.15 and 10 CFR 74.19.
- 16 The licensee shall comply with the physical protection requirements contained in 10 CFR 73.67 for the protection of special nuclear material of low strategic significance.
- 17 With respect to the material received from Manhattan College: The shipping containers stored in [REDACTED] will have a tamper safe seal with a unique identification number applied. On a weekly basis, the number of drums, the integrity of the tamper safe seal, and the number on the tamper safe seal will be verified.

[REDACTED]

### DECOMMISSIONING

The SNM being shipped to UT is considered a sealed source. Sealed sources are outside the scope of 10 CFR 70.25. Therefore, a decommissioning cost estimate is not required.

### ENVIRONMENTAL REVIEW

The NRC staff has evaluated the impacts at UT of the receipt, possession and storage of [REDACTED] of <sup>235</sup>U that are contained in the sealed sources. An Environmental Assessment (EA) was prepared pursuant to NRC regulations 10 CFR Part 51 which implement the requirements of the National Environmental Policy Act (NEPA) of 1969. Based on its review, the staff concluded that the environmental impacts of the proposed action would not be significant and do not warrant the preparation of an Environmental Impact Statement. Accordingly, the Commission made a Finding of No Significant Impact which was published in the Federal Register on July 28, 2004 (69 FR 45089).

### CONCLUSION

Based on the previous discussion, the staff concludes that there is reasonable assurance that the activities to be authorized by the issuance of an amended license to UT will not constitute an undue risk to the health and safety of the public, workers, and the environment.

Approval of the amendment application is recommended.

NRC Region IV inspection staff has no objection to this proposed action.

### PRINCIPAL CONTRIBUTORS

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