

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

INSPECTION REPORT

License/Docket/Report Nos. R-94/50-199/94-02; SNM-1892/70-2951/94-01

Licensee: Manhattan College Corporation  
Riverdale, New York 10471

Facility Name: Zero Power Reactor

Inspection At: Riverdale, New York

Inspection Conducted: July 13-14, 1994

Inspector: E. C. McCabe, Jr., Sr.  
A. Della Ratta, Physical Security Inspector

Approved by: E. C. McCabe, Jr.  
E. C. McCabe, Chief, Safeguards Section

Scope: Announced inspection of nuclear material control and accounting and physical security, including: organization and operation; shipping and receiving; storage and internal controls; inventory; records and reports; and physical protection measures for special nuclear material (SNM) of moderate strategic significance.

Results: The licensee's programs were generally directed toward assuring public health and safety. The following apparent violations of NRC requirements were identified.

- (1) Possession of three fission chambers containing a total of four grams of uranium-235 enriched to more than 20% that was not authorized in the facility licenses (Detail 2.2).
- (2) Failure to notify the Commission within two months of changes made to the NRC-approved physical security plan (Detail 3.1).

## DETAILS

### **1.0 Key Persons Contacted**

W. Duggan, Reactor Administrator  
R. Berlin, Senior Reactor Operator  
J. Gonzalez, Security Officer, Campus Security

### **2.0 Material Control and Accounting**

#### **2.1 Organization and Operation**

Records review and interviews with personnel showed that the licensee maintained written procedures for nuclear material control and accounting and that written statements of responsibility and authority existed for those positions with responsibility for special nuclear material (SNM). Custody of all SNM and management of the nuclear material control and accountability program were the responsibility of the Reactor Administrator.

#### **2.2 Shipping and Receiving**

Record review determined that the licensee maintained procedures to assure accurate accounting of all SNM received or shipped. The licensee had received one shipment of SNM and had made no shipments from October 1, 1991 through March 31, 1994.

The one receipt of SNM was for three fission chambers containing a total of four grams of uranium-235 enriched to more than 20%. These were received on January 14, 1993 per DOE/NRC Form-741 ZWN-ZMH-01. This SNM was shipped to the Manhattan College Corporation license (SNM-251) that had expired on April 30, 1981. The licensee's current licenses, R-94 and SNM-1892, do not authorize possession of this SNM. The unauthorized possession of SNM was identified as an apparent violation of 10 CFR 70.3 (R-94/94-02-01; 70-2951/94-01-01).

#### **2.3 Storage and Internal Controls**

Inspector observations and review of records found that the licensee's system of storage and internal controls included the quantity, identity, and current location of all SNM in the facility. Perpetual inventory records were being maintained for all SNM.

#### **2.4 Inventory**

The inspector reviewed supporting records that showed physical inventories were conducted at least annually as required by 10 CFR 70.51(d). The licensee's last

physical inventory was performed on September 29, 1993. An independent verification of the inventory of stored material was made by the inspector.

The licensee had 16 uranium-aluminum fuel elements in shipping containers stored in the basement of the Reactor Room. One special fuel element containing 18 semi-circular uranium-aluminum fuel plates was in a locked box and stored in the basement. There were also 10 foils containing less than one gram total of U-235 and three fission chambers containing four grams of U-235 stored in the Reactor Laboratory. Other holdings included:

- Two (2) plutonium-beryllium (Pu-Be) neutron sources in a water-moderated subcritical assembly.
- Five (5) Pu-Be neutron sources in a graphite-moderated subcritical assembly.
- One (1) Pu-Be neutron source stored in the basement.

## 2.5 Records and Reports

Material status reports (DOE/NRC Form-742) submitted by the licensee for the period from October 1, 1991 through March 31, 1994, for enriched uranium and plutonium were reviewed for compliance with 10 CFR 70.53. No discrepancies were identified.

The authorized SNM limits and actual possession on July 14, 1994, were as follows:

<u>License No.</u>	<u>Authorized Limit</u>	<u>Possession</u>
R-94	3,900 grams (g) U-235 at enrichments equal to or less than 20%	3,880 grams U-235 at enrichments equal to or less than 20%
	16 g Pu (Pu-Be sources)	16 g Pu (element)
SNM-1892	240 g Pu (Pu-Be sources)	239 g Pu (element)
-0-	-0-	4 grams U-235 enriched to >20% <u>1/</u>

1/ See Detail 2.2

Exhibit I appended to this report summarizes the licensee's nuclear material activity for the period October 1, 1991 to March 31, 1994.

With the exception noted in Detail 2.2, there were no deficiencies identified in the licensee's Material Control and Accounting Program.

### **3.0 General Physical Security Requirements**

The licensee's NRC-approved physical security plan is for SNM of moderate strategic significance, specifically 16 Highly Enriched Uranium (HEU) aluminum fuel elements containing about 3,105 grams of uranium-235. All HEU fuel was shipped from the facility to the DOE on April 3, 1991 as documented on DOE/NRC Form-741, ZMH-FZF-04. On January 25, 1991 and April 1, 1991, the licensee received shipments of SNM of low strategic significance as documented on DOE/NRC Form-741, ZBF-ZMH-1, and ZBF-ZMH-2, respectively. This receipt covered 17 uranium-aluminum fuel elements containing 3,880 grams of 19.8% enriched uranium-235. This SNM of low strategic significance is being protected under the licensee's NRC-approved plan.

The licensee's program for physical protection of SNM of moderate strategic significance was reviewed for conformance to the NRC-approved physical security plan. The inspector examined physical barriers, access controls, procedures and key control, and observed a licensee test of alarm system features. It was found that the licensee's program and its implementation met the general performance requirements and objectives of the governing regulations, except as follows:

#### **3.1 Plan Review**

10 CFR 50.54(p)(2) allows security plan changes that do not decrease plan effectiveness, but licensees must furnish a report containing a description of each such change to the Commission within two months after the change is made.

During the December 1991 safeguards inspection, the licensee stated they were changing the NRC-approved security plan (the Plan) to be more consistent with the requirements for safeguarding SNM inventory of low strategic significance.

On July 14, 1994, inspector found that the licensee had completed the changes to the Plan in April 1992, but had not submitted these changes to the NRC as required by 10 CFR 50.54(p)(2) within two months after the changes were made. Failure to submit these changes to the NRC within two months was an apparent violation of 10 CFR 50.54(p)(2). (50-199/94-02-02)

#### **4.0 Exit Interview**

The inspector met with the Reactor Administrator at the conclusion of the inspection on July 14, 1994. At that time, the purpose and scope of the inspection were reviewed and the findings were presented. The licensee acknowledged the findings.

EXHIBIT I

Manhattan College

Docket No. 50-199 License No. R-94  
Docket No. 70-2951 License No. SNM-1892

Material Balance Period: October 1, 1991 - March 31, 1994

Reporting Identification Symbol: ZMH Reporting Unit: grams

	<u>Enriched Uranium</u>		<u>Plutonium</u>	
	<u>Element</u>	<u>Isotope</u> <u>(U-235)</u>	<u>Element</u>	<u>Isotope</u> <u>(Pu-239)</u>
Beginning Inventory: (October 1, 1991)	19,635	3,880	255	238
Receipts:	<u>4</u>	<u>4</u>	<u>-0-</u>	<u>-0-</u>
Material To Account For:	<u>19,639</u>	<u>3,884</u>	<u>255</u>	<u>238</u>
Removals: Shipments:	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>
Ending Inventory: (March 31, 1994)	<u>19,639</u>	<u>3,884</u>	<u>255</u>	<u>238</u>
Material Accounted For:	<u>19,639</u>	<u>3,884</u>	<u>255</u>	<u>238</u>