

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-166/89-01

Docket No. 50-166

License No. R-70

Licensee: University of Maryland
College Park, Maryland 20742

Facility Name: University of Maryland Nuclear Reactor

Inspection At: College Park, Maryland

Inspection Conducted: November 20, and 21, 1989

Type of Inspection: Routine Unannounced Material Control and Accounting
and Physical Security

Inspectors:

Thomas W. Dexter for
A. Della Ratta, Safeguards Auditor

01/02/90
date

W.T. Olsen
W. Olsen, Reactor Engineer/Physical Security

1/8/90
date

Approved by:

R. R. Keimig
R. R. Keimig, Chief, Safeguards Section
Division of Radiation Safety and Safeguards

1-12-90
date

Inspection Summary: Inspection on November 20 and 21, 1989
(Report No. 50-166/89-01)

Areas Inspected: Nuclear material control and accounting, and physical security, including: organization and operation; storage and internal controls; inventory, records and reports; and physical protection measures for special nuclear material of low strategic significance.

Results: The licensee was in compliance with NRC requirements in the areas examined during this inspection.

DETAILS

1.0 Key Persons Contacted

- *Dr. M. Roush, Chairman, Department of Chemical and Nuclear Engineering
- *Dr. D. Ebert, Director, Nuclear Reactor
- *Dr. F. Munno, Director, Nuclear Engineering Program
- *Dr. B. White, IV, Reactor Operations Manager
- *Mr. T. Long, Assistant Radiation Safety Officer
- Corporal M. Wenstell, Assistant Shift Supervisor, Campus Police
- Mr. M. McGuigan, Crime Prevention Inspector, Loss Prevention Division, Campus Police
- Mr. J. Finn, Crime Prevention Inspector, Loss Prevention Division, Campus Police

*Present at exit interview

2.0 Material Control and Accounting Program

- a. Program Management - The inspectors determined through a review of records that the licensee maintained nuclear material control procedures that are documented in operating procedures entitled "Program for Control and Accounting for Special Nuclear Material at the University of Maryland, College Park, Maryland." Written statements of responsibility and authority had been established for those positions with responsibility for Special Nuclear Material (SNM). The licensee was in the process of revising the procedure to reflect current practices, and plans to have the revision completed and approved by the Reactor Safety Committee by January 31, 1990. The approved revision will be reviewed in a subsequent inspection (IFI 89-01-01). No discrepancies were identified.
- b. Shipping and Receiving

The inspectors determined through a review of records that there were no shipments or receipts of SNM made under the NRC License No. R-70 during the period of October 1, 1983 through September 30, 1989. However, during this period, the licensee received a plutonium calibration source under its Maryland license, No. 83-004-02. The calibration source contained less than one gram of plutonium. No discrepancies were identified.
- c. Storage and Internal Control

The inspectors determined through observations and review of records that the licensee was maintaining a system of storage and internal controls that indicated the quantity, identity, and current location of all SNM within the facility. Perpetual inventory records are maintained for all SNM.

d. Inventory

The inspectors determined, through a review of records, that the licensee has conducted annual physical inventories of SNM as required by 10 CFR 70.51(d).

The inspectors conducted a physical inventory of the facility on November 21, 1989. The results of this inventory verified the listing shown on the licensee's material status reports. The results were as follows:

NRC Licensee No. R-70

- 93 Fuel Elements - Reactor Core
- 1 Fission Chamber - Reactor Core
- 3 Fission Chambers - Reactor Room

The inspectors also inventoried the five plutonium-beryllium neutron sources and the one plutonium calibration source the licensee possesses under Maryland License No. MD-33-004-02.

Records and Reports

The inspectors audited the Material Status Reports (DOE/NRC Form-742) submitted for the period October 1, 1983 through September 30, 1989, to verify compliance with 10 CFR 74.13.

During the previous NRC inspection, the inspector noted that the Material Status Reports for the reporting period October 1, 1979, through September 30, 1983, had been submitted with uranium element and isotope values reported in thousandth of a gram rather than rounding to a whole gram as indicated on DOE/NRC Form-742. Also, four fission chambers (containing a total of 2 grams uranium and 2 grams uranium-235), which are 93% enriched uranium, had been inadvertently included in the totals for fuel elements enriched to less than 20%. The inspectors' review of the Material Status Reports determined that the licensee had corrected the discrepancies on the October 1, 1983 through March 31, 1984 Report.

The inspectors noted that the licensee had failed to submit the DOE/NRC Form-742 for the reporting period ending September 30, 1989, within the required 30 day period (by October 30, 1989) as a result of an oversight. The licensee was in the process of preparing the report during this NRC inspection and submitted the report prior to the completion of the inspection on November 21, 1989.

The material balance summary for the period covered by this inspection is shown in Exhibit I for NRC License No. R-70 and Exhibit II for Maryland License No. MD-33-004-02.

3.0 General Physical Security Requirements for SNM of Low Strategic Significance

The licensee's program for the physical protection of special nuclear material of low strategic significance was reviewed by the inspectors for conformance to the NRC-approved physical security plan. The inspectors examined physical barriers, access controls, procedures, and key control, and observed a licensee test of the security alarm system features. The inspectors found that the licensee's program and its implementation met the general performance requirements and objectives of the governing regulations.

However, the inspectors determined during the functional test of the security alarm system that one perimeter zone alarm signal and one interior zone alarm signal were not received at the alarm panel located in the campus police dispatch office. The licensee stated that the perimeter zone alarm had been recently repaired, due to a faulty relay and had been working satisfactorily. The licensee immediately initiated a work order to repair the affected zones and notified the campus police to increase patrols for the Reactor Facility. The perimeter alarm zone was promptly repaired and a retest of all the perimeter alarm zones was conducted and found to be satisfactory. The interior alarm zone remained out of service awaiting a part from the manufacture of the system. The campus police will continue increased routine patrols of the facility until the interior alarm zone is repaired. This item will be reviewed during a subsequent inspection (IFI 50-166/89-01-02).

4.0 Exit Interview

The inspector met with the licensee representatives indicated in paragraph 1 at the conclusion of the inspection on November 21, 1989, and summarized the scope and findings of the inspection.

EXHIBIT I
UNIVERSITY OF MARYLAND

Docket No. 50-166

License No. R-70

Material Balance for Period: October 1, 1984 - September 30, 1989

Reporting Identification Symbol: ZMR

Reporting Units: grams

Enriched Uranium

	<u>Element</u>	<u>Isotope</u>
Beginning Inventory: (October 1, 1984)	16,360	3,255
Additions:		
Receipts:	<u>-0-</u>	<u>-0-</u>
Material to Account for:	<u>16,360</u>	<u>3,255</u>
Removals:		
Shipments:	-0-	-0-
Fission and Transmutation:	<u>7</u>	<u>7</u>
Total Removals:	7	7
Ending Inventory: (September 30, 1989)	<u>1/ 16,353</u>	<u>3,248</u>
Material Accounted for:	<u>16,360</u>	<u>3,255</u>

1/ = 93 Fuel Elements
4 Fission Chambers

16,351	3,246
2	2
<u>16,353</u>	<u>3,248</u>

EXHIBIT II

UNIVERSITY OF MARYLAND

Maryland License No. MD-33-004-02

Material Balance for Period: October 1, 1984 - September 30, 1989

Reporting Identification Symbol: ZMR

Reporting Units: grams

	<u>Plutonium</u>	
	<u>Plutonium</u>	<u>Pu-239 & 241</u>
Beginning Inventory: (October 1, 1984)	143	133
Additions:		
Receipts: (less than a gram)	<u>*</u>	<u>*</u>
Material to Account for:	<u>143</u>	<u>133</u>
Removals:		
Shipments:	-0-	-0-
Inventory Difference: (Rounding)	(1)	-0-
Ending Inventory: <u>1/</u> (September 30, 1989)	<u>144</u>	<u>133</u>
Material Accounted for:	<u>143</u>	<u>133</u>

1/ Consists of Six Sealed Sources

Mound Lab M-44	16	15
Mound Lab M-45	16	15
Monsanto MR PuBe 222	32	29
Monsanto MR PuBe 223	48	45
Monsanto MR PuBe 384	32	29
Eberline Model 594-1	<u>*</u>	<u>*</u>
	<u>144</u>	<u>133</u>

* = less than a gram