

U.S. NUCLEAR REGULATORY COMMISSION
REGION I
INSPECTION REPORT

License/Docket/Report Nos. R-2/50-05/94-02; SNM-95/70-113/94-01

Licensee: The Pennsylvania State University

Facility: The Pennsylvania State University Brazeale Reactor

Inspection At: University Park Campus

Dates: April 13-15, 1994

Inspectors: E. C. McCabe, Jr., for 4/29/94
A. Della Ratta, Physical Security Inspector Date
E. B. King, Physical Security Inspector

Approved By: E. C. McCabe, Jr. 4/29/94
E. C. McCabe, Chief, Safeguards Section Date

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 low strategic significance.

Results: The licensee's programs were found to be directed toward the protection of public health and safety. No safety concerns or violations of NRC requirements were identified in the areas inspected.

DETAILS

1.0 Key Persons Contacted

- *C. Yekel, Director, Office for Regulatory Compliance
- M. Voth, Director, Penn State Breazeale Reactor
- *A. Phillips, University Professor of Biochemistry
- *R. Granlund, University Health Physicist
- *P. Boyle, Reactor Supervisor
- *T. Flinchbaugh, Operations Manager
- E. Augustine, Health Physicist Assistant
- M. Wurst, Dispatcher, Campus Police

*Present at the exit interview on April 15, 1994

2.0 Material Control and Accounting

2.1 Organization and Operation

The inspectors verified, through a review of records, that the licensee maintained nuclear material control procedures. The procedures were documented in a manual entitled "Rules and Procedures for the Use of Radioactive Material", and was dated November 27, 1990. Custody of all special nuclear material (SNM) and management of the nuclear material control and accountability program were the responsibility of the University Health Physicist.

Inspector review of the annual audit of the licensee's nuclear material control practices noted that the audit report, dated February 15, 1993, documented six recommendations. Overall, the audit was found comprehensive in scope, and its results were reported to the appropriate levels of management. A review of the licensee's response to the audit recommendations indicated that proposed corrective actions were adequate and that the nuclear material control and accountability program was being properly administered.

2.2 Shipping and Receiving

The inspectors determined through a review of records that the licensee maintained procedures to assure that all nuclear material shipped or received was accurately accounted for.

The inspectors performed a review of all DOE/NRC Forms-741 generated during the period April 1, 1992 through March 31, 1994. Based on the review, it was determined that each form was properly signed, timely dispatched, and contained accurate data.

2.3 Storage and Internal Control

The inspectors determined through observations and record reviews that the licensee was maintaining a system of storage and internal control which provided knowledge of the quantity, identity, and current location of all SNM within the facility. Perpetual inventory records were being maintained for all SNM.

2.4 Inventory

The licensee had conducted a physical inventory of all special nuclear material in its possession at intervals not exceeding twelve months. That was substantiated by the inspectors by review of the physical inventory results for the years 1992 and 1993.

The inventories consisted of: (1) enriched uranium in the form of fuel elements, element sections, fission counters, samples and standards; (2) plutonium in the form of standards and sources; and, (3) uranium-233 in the form of foil scrap. All inventory items were identified by a unique number assigned by the licensee. Each inventory item was located in a locked area or was in the nuclear reactor.

On April 14, 1994, the inspectors verified the presence of selected items in the licensee's inventory by piece count, compared the results to the licensee's inventory listing, and reconciled them to the control records. Additionally, on April 14, 1994, the inspectors witnessed the licensee weigh the balance of the SNM that was discovered on campus. (NRC Inspection Report No. 070-03052/93-001, conducted on July 8-29, 1993, refers.)

The total uranium-235 value for these 16 SNM items was approximately 2 grams. The licensee was in the process of booking this amount to the SNM Ledger; no inadequacies in that process were identified.

2.5 Records and Reports

The inspector reviewed the licensee's records, reports and source data. All Material Balance Reports (DOE/NRC Form-742) submitted by the licensee for the period April 1, 1992 through March 31, 1994, were reviewed for compliance with 10 CFR 70.53. Total uranium and uranium-235 depletion records were also reviewed. Leak test records for the plutonium beryllium (PuBe) sealed sources were reviewed for completeness and timeliness. No discrepancies were noted.

Exhibits I and II of this report summarize the licensee's nuclear material activity for the period April 1, 1992 - March 31, 1994.

In summary, no Material Control and Accounting Program deficiencies were identified.

3.0 General Physical Security Requirements for SNM of Low Strategic Significance

The licensee's program for the physical protection of SNM of low strategic significance was reviewed by the inspectors and found to conform to NRC requirements and the licensee's implementing procedures. Specific components of the program that were reviewed included: records and reports; security organization; access controls; key control; detection aids; physical barriers; written procedures; and observation of licensee testing of alarm system features. No deficiencies were noted.

4.0 Exit Interview

The inspectors met with the licensee representatives indicated in paragraph 1.0 at the conclusion of the inspection on April 15, 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

The Pennsylvania State University
Docket No. 50-05, License No. R-2
Docket No. 70-113, License No. SNM-95
Material Balance for Period April 1, 1992 - March 31, 1994
Reporting Identification Symbol: ZRV
Reporting Unit: Grams

ITEM	ENRICHED URANIUM	
	Element	Isotope
Beginning Inventory (4/1/92)	936,818	69,147
Receipts	26	25
Material to Account For	936,844	69,172
Removals		
Shipments	1	1
Fission and Transmutation	35	38
Inventory Difference	-0-	-0-
Ending Inventory (3/31/94)	936,808	69,133
Material Accounted For	936,844	69,172

EXHIBIT II**The Pennsylvania State University**

Docket No. 70-113, License No. SNM-95

Material Balance for Period April 1, 1992 - March 31, 1994

Reporting Identification Symbol: ZRV

Reporting Unit: Grams

ITEM	ENRICHED URANIUM-233		PLUTONIUM	
	Element	Isotope	Element	Isotope
Beginning Inventory (4/1/92)	2	2	173	167
Receipts	-0-	-0-	3	3
Material to Account For	2	2	176	170
Removals				
Shipments	-0-	-0-	3	3
Inventory Difference	-0-	-0-	-0-	-0-
Ending Inventory (3/31/94)	2 ¹	2	173 ²	167
Material Accounted For	2	2	176	170
¹ Metal Foil Scraps	2	2		
² Sources and Standards				
PuBe Neutron Source M-102			15	15
PuBe Neutron Source M-103			15	15
PuBe Neutron Source M-104			16	16
PuBe Neutron Source M-105			16	15
PuBe Neutron Source M-106			16	16
PuBe Neutron Source M-187			15	14
PuBe Neutron Source M-317			80	76
Alpha Standard 83/70			*	*
Alpha Source 260			*	*
Alpha Source 261			*	*
Sources and Standards Total			173	167

Note: * indicates less than 1 gram.