U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-116/83-01(DRMS); 70-084/83-01(DRMS)

Docket Nos. 50-116; 70-084 Licenses No. R-59; SNM-74 Safeguards Group 5

Licensee: Iowa State University of Science
and Technology
Ames, IA 50010

Facility Name: Iowa State University of Science and Technology

Inspection At: Iowa State University of Science and Technology, Ames, IA

Inspection Conducted: March 22-24, 1983

Date of Last Material Control and Accounting Inspection: January 10-12, 1978

Type of Inspection: Unannounced Routine MC&A

Inspector: Gary Pirtle April 11, 1983
G. L. Pirtle (Date)
Physical Protection Specialist

Approved By: J. R. Creed 4/4/83
J. R. Creed, Chief (Date)
Safeguards Section

Inspection Summary

Inspection on March 22-24, 1983 (Reports No. 50-116/83-01(DRMS); 70-084/8301(DRMS))
Areas Inspected: Nuclear material control and accountability including facility organization and operation; measurement and controls; shipping and receiving; storage and internal control; inventory; and records and reports. The inspection involved 24 inspector-hours by one NRC inspector and was begun during regular hours. Four of the 24 hours was during backshift periods.
Results: The licensee was found to be in compliance with NRC requirements in the areas examined.

(Details - Part 2.790(d) Information)

[redacted]

[redacted]

DETAILS

1. Persons Contacted

*Dr. Bernard Spinrad, Head, Department of Nuclear Engineering
Elden Plettner, Reactor Technician

*Denotes attendance at the exit meeting.

2. Action on Previous Inspection Findings

No items of noncompliance were cited during the previous inspection. Paragraphs 3 and 9 of the previous inspection (Report No. 50-116/78-01; 70-84/78-01) cited a concern pertaining to consolidating procedures for the control and accountability of SNM. The licensee agreed to consolidate SNM control and accountability procedures into one SNM operating procedure. The inspector confirmed by observation that the current SNM control and accountability procedure was published in May 1978. Two revisions to the procedure, dated October 1980 and January 1981, respectively, have been made since the previous inspection. The procedure consolidated SNM control and accountability responsibilities and addressed physical inventory, control of SNM, depletion of uranium record maintenance, shipment of SNM, receipt of SNM, disposal of SNM, and reports pertaining to SNM. This item of concern is considered closed.

3. Exit Meeting

The inspector held an exit interview with the Head of the Department of Nuclear Engineering at the conclusion of the inspection on March 24, 1983. The inspector discussed the scope of the inspection and the inspection findings. In response to the inspector's comments, the licensee:

a. Acknowledged the inspector's comments about closing the item of concern contained in the previous inspection pertaining to consolidating SNM control and responsibilities into a single operating procedure. (Paragraph 2)

b. Agreed to redesignate or confirm the designation of the [redacted] as the licensee's Accountability Custodian. (Paragraph 4)

c. Agreed to correct the computer program for the Annual Physical Inventory Results to accurately show SNM possessed. (Paragraph 8)

4. Facility Organization and Operation

Designation of the SNM Accountability Custodian needs to be confirmed by the current Head of the Nuclear Engineering Department and Chairman of the Radiation Safety Committee.

[redacted]

[redacted]

The [redacted] was designated as the SNM Accountability Custodian in February 1977 by the Head of the Department of Chemical Engineering and Nuclear Engineering and the Chairman of the Radiation Safety Committee. However, in February 1983, a new Department Head for Nuclear Engineering was appointed and the licensee's reactor operations were placed under the responsibility of the Department of Nuclear Engineering. Additionally, subsequent to the February 1977 designation of the Accountability Custodian, a new Chairman of the Radiation Safety Committee was also appointed. When this matter was discussed with the Head of the Department of Nuclear Engineering, he agreed to confirm the appointment or re-appoint [redacted] as the SNM Accountability Custodian.

The responsibility for SNM receiving, shipping, inventory, storage, transfers, uranium depletion and records and reports have been delegated to the [redacted] The [redacted] had prepared an operating procedure which addressed methods of fulfilling the responsibilities designated to him. The procedure appeared to provide sufficient guidance for SNM control and accountability. Additionally, adequate records and internal controls have been established to assure control and accountability of SNM.

5. Measurement and Controls

The licensee's training reactor is a 10 kilowatt heterogeneous light water moderated, graphite reflected, thermal reactor. There are 12 elements [redacted] 6 [redacted] positioned within two parallel [redacted] spaced 24 inches on center. Each fuel element contains [redacted]

The reactor is normally operated [redacted] and the [redacted] is measured in [redacted] The licensee has an [redacted] using certain factors to report [redacted] The inspector reviewed the [redacted] and confirmed that the factors used were:

[redacted]

Base data recorded in [redacted] and at [redacted] is reported on [redacted] kept in the [redacted] From the start of reactor operations in 1959, only slightly more than [redacted] Approximately [redacted]

A [redacted] pertaining to [redacted] is generated each [redacted] The printout includes the [redacted]

[redacted]

[redacted] copies

[redacted] TO BE [redacted] OUT SPECIFIC

6. Shipping and Receiving

The licensee had no receipts or shipments of SNM since the previous inspection. Responsibility for shipment and receipt of SNM under both licenses, R-59 and SNM 74, has been delegated to the [redacted] as the Accountability Custodian. Procedural guidance pertaining to shipment and receipt of SNM appeared adequate.

7. Storage and Internal Control

Internal transfers within the [redacted] and between the [redacted] and the [redacted] area had occurred since the previous inspection. The transfers were recorded in the operating log by pattern and in the Fuel Transfer log by [redacted] In December 1980, three fuel elements were disassembled and stored in the [redacted] pit as spare fuel plates. Thirty-five fuel plates were involved in the disassembly. The inspector confirmed by review of the Fuel Transfer Log that internal movements and the disassembly were properly recorded.

Two fuel status boards were located within the [redacted] to show the current location of fuel [redacted] These boards are changed and updated each time a fuel movement occurs. The inspector confirmed the accuracy of the [redacted] status board during the physical inventory of SNM conducted on March 23, 1983. The accuracy of the [redacted] fuel status board was confirmed by review of the Fuel Transfer Log. The latest internal movement of fuel occurred on November 22, 1982. At the time of the inspection, fuel pattern B was used within the [redacted]

SNM was stored within the [redacted] These locations were authorized by the SNM Material Control and Accounting procedure. SNM by type (U-235 fission foils, fission chambers, Pu-Be sources, and fuel plates) was stored within the designated locations. No deficiencies were noted in storage or control of the licensee's SNM.

The licensee's authorized limits and possession of SNM as of March 24, 1983 is as follows (figures rounded):

License No.	Authorized Limit	Actual Possession (Isotope Wt.)
R-59	4,600 grams U-235 16 grams plutonium as Pu/Be Source	*4,513 grams 15 grams plutonium
SNM-74	117 grams U-235 as foils 80 grams plutonium	117 grams U-235 75 grams plutonium

[redacted]

[redacted]

as Pu/Be Sources
6.9 grams U-235 as foil contained in

5 grams U-235 (serial no. 613503, 613504, and 613501)

*Includes 6 grams for fission counters. remainder in fuel elements and fuel plates.

The above figures were calculated independently of the licensee's calculations using corrected data from the 1982 annual physical inventory printout and results of the physical inventory conducted on March 23, 1983. The licensee's calculations were within one gram. The difference in computations is contributed to rounding of numbers.

Amendment No. 2 to License No. SNM-74 added 6.9 grams of U-235 foils contained in [redacted] Amendment No. 2 was approved by NRC Headquarters on December 21, 1978. No amendments to License No. R-59 were requested or approved since the previous inspection.

License No. SNM-74 expires on December 31, 1983. License No. R-59 expired on ~~September 30~~ 1979. However, the licensee applied for renewal of the license on ~~October 18, 1979.~~ SEPTEMBER 5, 1979.

OCTOBER 12, 1979 is the correct date. Refer to Lic. corr. dtd. of 5-19-83

Inventory

A physical inventory of SNM under License No. SNM-74 and reactor License No. R-59 was conducted by the inspector and licensee representatives on March 23, 1983. Inventory results were as follows:

SNM Type	[redacted]
Fuel Plates	
Pu-Be Sources (M-56, 57, 58, 59, and 60)	
U-235 foils	
Fission Counter (M1058)	
Reuter Stokes fission counters (N-656 and N-657)	
Pu-Be Source (M-566)	
Fission Counters (91702, 613501, 613503, 613504)	

Fuel plates within the [redacted] were accounted for by piece count. Fuel plates within the [redacted] were verified by the Fuel Transfer Log and Fuel Pattern diagram. Pu-Be sources M-56, M-57, M-58, M-59, and M-60 were accounted for by serial number. The most recent leak test

[redacted]

[redacted]

conducted December 3, 19[redacted], was used to verify the presence of Pu-Be source M-566 within the [redacted]. The fission foils were accounted for by serial number. Fission counters 91702, 613501, 613503, 613504, and M1058 were accounted for by serial number. Interviews with the reactor operator and internal records showed that fission counters N-656 and N-657 were in place in the [redacted].

The licensee also verified SNM in the [redacted] by measuring excess reactivity, observing changes in reactor power signals, and observing the effect of startup source removal on reactor power level. Pre-inventory preparation and inventory implementation was conducted in accordance with the SNM Control and Accounting procedure.

During the previous inspection, the licensee possessed [redacted] containing [redacted]. During this inspection, the licensee possessed [redacted].

In December 1980, three fuel elements, consisting of 35 fuel plates, were disassembled and spare fuel plate groupings were created. However, the computer printout for Annual Physical Inventory results for 1981 and 1982 accounted for the three disassembled fuel elements as fuel elements and again as separate fuel plates. This resulted in the Annual Physical Inventory computer listing overstating the amount of SNM possessed. The licensee was aware of the input data error and they ran a supplemental computer listing to reflect the correct possession of SNM. When this issue was discussed with the Head of the Nuclear Engineering Department, he agreed to make the necessary computer program and/or input data changes to accurately reflect the SNM possessed on the Annual Physical Inventory printout for the March 23, 1983 and subsequent annual inventories.

9. Records and Reports

The licensee has confined possession and use of SNM to the locations and purposes authorized by license and has a records system to account for SNM possessed under license. Accountability is maintained on an [redacted] by [redacted] rather than [redacted]. Exhibits A and B reflect the activity by license and material type for the period of inspection.

Forms NRC-742 and 742C were reviewed and a determination made that the forms were prepared and distributed as required for the period of this inspection (October 1, 1977 to September 30, 1982).

The following records were reviewed during this inspection:

Record	Quantity/Dates
Forms NRC 742 and 742C	October 1977 to September 30, 1982
Fuel Transfer Log	October 1977 to September 30, 1982
Annual Fuel Inventory Forms	March 1978 to March 1983
Annual Physical Inventory Computer Printout	March 1978 to March 1982

[redacted]

[redacted]

Record	Quantity/Dates
Burnup Calculation Computer Printout	March 1978 to December 1982
Licenses No. R-59 and SNM-74 and Amendments	Licensee's Copy
Letter Designating Accountability Custodian	February 1977
SNM Control and Accounting Procedure and Revisions	May 1978
NMMSS Report No. SS-2 (Prepared by Union Carbide at Oak Ridge, Tennessee)	February 31, 1983
NMMSS Report I-82 (Prepared by Union Carbide at Oak Ridge, Tennessee)	October 1, 1982

Attachments:
1. Exhibit A - Material Balance Statement - Enriched Uranium
1. Exhibit B - Material Balance Statement - Plutonium

[redacted]

[redacted]

Iowa State University of Science and Technology
Material Balance Statement - Enriched Uranium
License R-59 and SNM-74 for Period 10/1/77 to 3/23/83 1/

	Enriched Uranium In Grams	
	U	U-235
Beginning Inventory 10/1/77	4,976	4,634
Receipts	0	0
Total to Account For	4,976	4,634
Shipments	0	0
Burnup	0	0
Ending Inventory 3/23/83	4,976	4,634

[redacted]

1/ Includes 11 grams U-235 in fission counters, remainder in fuel elements, fuel plates and fission foils.

EXHIBIT A

[redacted]

Iowa State University of Science and Technology
Material Balance Statement-Plutonium
License R-59 and SNM-74 for Period 10/1/77 to 3/23/83[1/]

	Plutonium In Grams	
	Pu	Isotope
Beginning Inventory 10/1/77	96	90
Receipts	0	0
Total to Account For	96	90
Shipments	0	0
Ending Inventory 3/23/83	96	90
Total Accounted For	96	90

[redacted]

1/ Includes Pu-Be sources M-56, M-57, M-58, M-59, M-60, and 566.

EXHIBIT B

COMMITTEE TO BRIDGE THE GAP
1637 BUTLER AVENUE #203
LOS ANGELES, CALIFORNIA 90025
(213) 478-0829

March 24, 1984

Director
Office of Administration
US Nuclear Regulatory Commission
Washington, D.C. 20555

FREEDOM OF INFORMATION ACT REQUEST
FOIA-84-227
Rec'd 4-3-84

Dear Madam/Sir:

This is a request under the Freedom of Information Act, as amended.

I would like to obtain a copy of all inspection reports of physical security and safeguards inspections from 1979 to the present at the following Argonaut research reactor facilities:

University of California at Los Angeles
University of Washington
University of Florida
Virginia Polytechnic Institute
Iowa State University

To expedite this request, I ask only for the letters of transmittal, the cover sheets indicating which areas were inspected, and any non-classified details concerning inspection of protection against radiological sabotage, protection of vital or essential areas and vital or essential equipment

It would be most helpful if you could forward to us any portion of the requested documents as soon as it becomes available.

Because these materials are needed for a study of research reactor safeguards done in the public interest and without profit, I request a waiver on production costs.

Please respond to the following address: Committee to Bridge the Gap, Box 1186, Ben Lomond, CA 95005. Telephone (408)336-5381. Thank you.

Sincerely,

Steven Aftergood

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