

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

IE Inspection Report No. 50-142/75-03)
70-223/75-01) IE-V-62

Licensee University of California Docket No. 50-142
at Los Angeles License No. R-71
SNM-974

Facility Nuclear Energy Laboratory Priority R-71/F-5
Category SNM-974/4-5

Location Los Angeles, California

Type of Facility Academic Institution

Type of Inspection Announced

Dates of Inspection May 20, 1975

Dates of Previous Inspection January 14, 1971

Principal Inspector *Y. Kobori* 6/18/75
Date
Y. Kobori, Auditor

Accompanying Inspectors *B. L. Brock* 6/17/75
Date
B. L. Brock, Chemist

G. L. Hamada 6/17/75
Date
G. L. Hamada, Chemist/Statistician

Other Accompanying Personnel: None

Reviewed by *Y. Kobori* 6/18/75
Date
for V. N. Rizzolo, Chief, Materials & Plant Protection
Branch

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REPORT OF INSPECTION OF SAFEGUARDS
CONTROL OF NUCLEAR MATERIALS
ATUNIVERSITY OF CALIFORNIA
LOS ANGELES, CALIFORNIA

(IE-V-62)

A. INTRODUCTION

1. The inspection was made on May 20, 1975 at the University of California, Los Angeles (UCLA).
2. The inspection covered the status of safeguards controls as of the inspection dates.
3. UCLA, a nonprofit educational institution, has limited quantities of special nuclear materials (SNM) for use in training and research. These quantities include primarily fuel for a research reactor, Pu-Be neutron sources, and alpha sources for instrument calibrations.

The University has an Argonaut-type research reactor with an authorized power level of up to 100 kilowatts (thermal). The reactor is a heterogeneous light water graphite reflected type which uses Materials Test Reactor (MTR) type uranium aluminum alloy fuel elements. Each element contains 11 aluminum clad U-Al alloy fuel plates. When loaded, the core contains 24 fuel elements which are distributed in six water filled aluminum boxes surrounded by graphite.

4. UCLA has two NRC licenses for SNM, R-71 and SNM-974.
5. In addition to the NRC licenses, UCLA has a State of California License No. 1335-70, authorizing possession and use of SNM (in locations not licensed by NRC) and source materials for research and educational activities.

B. SCOPE OF INSPECTION

1. UCLA is designated a Group V license for safeguards purposes and is exempt from certain requirements of 10 CFR 70.51 and 70.58. This inspection therefore covered only the applicable requirements of Part 70 and the NRC licenses.

2. The inspection included the following:
- a. A review of the records, reports and source documents.
 - b. A review of the written material control procedures.
 - c. A physical inventory of SNM.
 - d. A determination of compliance with applicable requirements of 10 CFR 70, "Special Nuclear Material."
- C. SUMMARY OF FINDINGS
1. Determined that the licensee was in full compliance with applicable requirements of 10 CFR 70, "Special Nuclear Material."
 2. Enforcement Action
None.
- D. LICENSEE ACTION ON PREVIOUSLY IDENTIFIED ENFORCEMENT ITEMS
Not applicable.
- E. UNUSUAL OCCURRENCES
None.
- F. OTHER SIGNIFICANT FINDINGS
- Current Findings
None.
- Status of Previously Reported Unresolved Items
None.
- G. MANAGEMENT INTERVIEW
- The results of the inspection were discussed with Mr. H. V. Brown, Director, Environmental Health and Safety, and Mr. J. Evraets, Radiological Safety Officer, at the conclusion of the inspection on May 20, 1975.

H. REPORT DETAILS1. Individuals Contacted

H. V. Brown, Director, Environmental Health and Safety (EHS)
 J. Evraets, Radiological Safety Officer, EHS
 J. Horner, Health Physicist
 C. E. Ashbaugh, III, Reactor Supervisor
 B. Reyes, Physicist

2. Physical Inventory of Special Nuclear Material (SNM)

The Argonaut Reactor is operated by the Nuclear Energy Laboratory which is under the direction of Dr. T. E. Hicks. The reactor is located in Boelter Hall, and Mr. C. E. Ashbaugh, III, Reactor Supervisor, serves as custodian.

The inventory held under License R-71 was as follows:

	<u>Element (g)</u>	<u>Isotope (g)</u>
<u>Enriched Uranium</u>		
(Irradiated)	3805	3540
Pit (Irradiated)	793	738
(Unirradiated)	<u>4909</u>	<u>4571</u>
Total	9507	8849
Plutonium	32	30

The inventory held under SNM-974 consisted of a single 32 gram Pu-Be neutron source.

3. Inventory Verification

The unirradiated SNM was stored in the _____, and the serial numbers were verified on each of the 23 fuel elements and 11 separate fuel plates (each fuel element contains 11 fuel plates). The additional instrumented fuel element was accepted on the basis of its container label along with 11 containers of enriched uranium in various forms. The single 32 gram Pu-Be neutron source held under License R-71 was verified by its serial number along with the similar Pu-Be source held under state license.

The reactor core of 24 fuel elements was accepted based on the core map. The storage pit was opened in part to confirm the high radiation levels of the fuel contained therein (two of the four in use storage locations were checked using a Teletor gamma detector with a telescoping probe or a Juno Model 8 detector). One of the two remaining in use locations contained three fuel plates and the other contained a Co-60 source. These were also accepted on the basis of the record.

The 32 gram Pu-Be source held under License SNN-974 was removed from its howitzer and verified by piece count in that the holder retention material obscured the serial number.

No samples were taken to independently determine the SNM content of the items inventoried.

4. Reactor Thermal Output

The reactor is authorized to operate at up to 100 kilowatt hours thermal. The power level is checked annually through a heat balance determination. An additional check makes use of a reference ion chamber that is fixed relative to the core.

5. Nuclear Material Depletion and Production

Revised burnup calculations since reactor startup indicate 16.69 grams U-235 burned through December 31, 1974 with 0.37 grams of the U-235 burnup occurring during the last six months reporting period (July 1, 1974 - December 31, 1974).

Although the burnup calculations consider U-236 production, Pu production and burnup is not calculated. If Pu production during a reporting period exceeds 10 grams, then the code requires that it be reported. Pu production per reporting period to date has been significantly less than 10 grams and is not expected to increase at the authorized power level.

6. Internal Control

The licensee's procedures for internal control were minimal and were a part of the Radiation Safety Procedures. The need for a specific inventory procedure was emphasized during the close-out meeting. The licensee has indicated in the interim that such a procedure has been prepared and its existence facilitated location of 19 grams of U-235 previously reported as MUF loss (December 31, 1974 Material Status Report (MSR)) which will be reported as a MUF gain in the ensuing MSR.

7. Records and Reports

The licensee maintains files of Forms AEC-741, "Nuclear Material Transaction Report," and Forms AEC-742, "Material Status Report," supplemented by inventory listings and user reports as his formal record. Although no ledger type records were maintained, the licensee's files of documentation were determined adequate for material control and accounting purposes.

All Forms AEC-742 issued by the licensee were signed by the Vice Chancellor for Administration.

The University of California has satisfactorily complied with 10 CFR 70, Parts 70.51(b) and (c) with respect to records and procedures and Parts 70.52, 70.53a, and 70.54 with respect to reporting.

8. Authorized Uses of SNM

UCLA holds two NRC licenses, R-71 and SNM-974 and a California State License No. 1335-70. The SNM inventory held under these licenses, all reported under reporting identification symbol (RIS) YEU, was as follows:

<u>License R-71</u>	<u>Element (g)</u>	<u>Isotope (g)</u>
Enriched Uranium	9507	8849
Plutonium	32	30
<u>License SNM-974</u>		
Enriched Uranium	-0-	-0-
Plutonium	32	30
<u>Calif. License 1335-70</u>		
Plutonium	32	29

The University of California was in compliance with 10 CFR 70.41, "Authorized Use of Special Nuclear Material," as of the inspection date.

9. Nuclear Material Balances (May 20, 1975)
 RIS: YEU

Enriched Uranium (g)

<u>Less than 20% U-235</u>		<u>Greater than 20% U-235</u>	
<u>Element</u>	<u>Isotope</u>	<u>Element</u>	<u>Isotope</u>
<u>-0-</u>	<u>-0-</u>	<u>9507</u>	<u>8849</u>

Plutonium (g)

<u>Element</u>	<u>Isotope</u>
<u>96</u>	<u>89</u>