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

REGION III

Report No. 50-116/78-04

License No. R-59

12 Jenny 1979

Docket No. 50-116

Licensee: Iowa State University Department of Nuclear Engineering Ames, Iowa 50010

Facility Name: UTR-10 Training and Research Reactor

Inspection At: Iowa State University, Ames, Iowa

Inspection Conducted: December 12-13, 1978

M. E. DuBry

Inspector:

Approved By: W. L. Fisher, Chief Fuel Facility Projects and Radiation Support Section

Inspection Summary:

Inspection on December 12-13, 1978 (Report No. 50-116/78-04)

Areas Inspected: Routine, unannounced radiation protection and radwaste management inspection, including: facilities and equipment; radioactive effluent releases; solid radioactive waste; qualifications and training; licensee audits; radiation protection procedures; instruments and equipment; exposure control; posting, labeling, and control; materials control; surveys; and notifications and reports. The inspection involved 12 inspector-hours onsite by one NRC inspector. Results: No items of noncompliance or deviations were identified.

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### DETAILS

#### Persons Contacted 1.

\*Emery E. Sobottka, Radiation Safety Officer \*Dr. Adolph F. Voight, Chairman, Radiation Safety Committee \*Dr. George Burnet, Department Head of Nuclear Engineering Dr. Richard A. Hendrickson, Reactor Supervisor James F. Hrabak, Health Physics Technician Richard W. Houser, Health Physics Technician

\*denotes those present at the exit interview

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This inspection, which began with a visual observation of the reactor facility and health physics counting room at 11:00 a.m. on December 12, 1978, was conducted to examine the radwaste management and radiation protection programs at the UTR-10 Training and Research Reactor. A detailed tour of the facility was conducted on the same date after contacting Mr. E. E. Sobottka, Radiation Safety Officer. Records and logs were found to be current and survey meters and radiation area monitors were found to have had timely calibrations, alarm test, and functional tests as required. Housekeeping appears to be good.

### Facilities and Equipment 3.

Access to the Nuclear Engineering Laboratory is by entry through one of three doors, one of which is an equipment transfer door which is shut and locked unless use is required. The other two personnel doors were found to be open only between 8:00 a.m. and 5:00 p.m. Entry to the reactor facility is through one of two doors with a combination lock mechanism. Dosimeter and entry information is recorded in a log book. The Radiation Area Monitor (RAM) was found operable and with the proper alarm set points. Housekeeping was good.

No items of noncompliance or deviations were identified.

# Organization, Qualification, and Training

A recent change, which divided the Department of Chemical Engineering and Nuclear Engineering, now places the responsibility for the UTR-10 reactor program with the Department of Nuclear Engineering, of which Dr. G. Burnet is the Department Head. Dr. Richard Hendrickson is the Reactor Supervisor.

The Radiation Safety Committee (RSC) is responsible for all uses of radiation and radioactive material on campus. Dr. Adolf Voight is the chairman of this committee. No recent changes in staffing or organization have occur ed in the Radiological Services Group (RSG). This group is responsible for radiation protection service on campus. Two full time technicians and the University RSO compose the RSG, which operates within the Department of Environmental Health and Safety.

Those responsible for radiation safety are judged to be qualified by training and lengthy experience. The RSO holds informal meetings with the Radiological Services Group to provide on-going training. The technicians also attend off-site training periclically. Interviews with the Health Physics personnel indicated that evacuation seminars and tests are conducted quarterly; also, all personnel working in the building attend an annual review session covering health physics.

No items of noncompliance or deviations were identified.

Licensee Audits 5.

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The Reactor Safety Subcommittee performs a comprehensive semiannual audit of the UTR-10 facilities and reactor operations. The minutes of the two 1978 meetings revealed that followup action is being taken on items of concern identified through the audit.

No items of noncompliance or deviations were identified.

### Radiation Protection Procedures 6.

The licensee is not required to have formalized radiation protection procedures. Procedures of a general type, which include areas of radiation protection, are contained in the Radiation Safety Committee's Radiation Safety Manual, revised January 1977. This manual has rules for the use of radiation producing machinery and radioactive material

The proposed Reactor Technical Specifications, being reviewed by NRC licensing, have not been implemented into the ISU license. The licensee is following the current license pending renewal in October 1979.

No items of noncompliance or deviations were identified.

Instruments and Equipment

The licensee has an adequate number of operable and calibrated survey meters and monitoring equipment of sufficient types and ranges. Survey meters used to measure gamma and neutron radiation levels are calibrated quarterly. The licensee has recently changed to a radiation area monitoring (RAM) system, manufactured by General Atomic Company, which consists of five halogen quench detectors. Alarm and trip functions are performed each Wednesday at 1:00 p.m., and calibrations are done quarterly.

A review of the records and observations made during the inspection revealed neither items of noncompliance nor deviation.

#### Exposure Control 8.

Monthly film badge service from Health Physics Services, Inc. is used by the licensee. Records were reviewed for calendar year 1978 to present. Monthly beta-gamma doses are generally less than 10 mrema. The maximum dose, according to film badge records, for any individual associated with the reactor was 203 mrems, of which 70 mrems was attributed to neutrons. A major portion of the individual exposures are due to sealed source checks and instrument calibrations.

#### ALARA 9.

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To minimize personal exposure, the licensee requires a member of the Radiological Services Group to monitor potential radiation exposure situations. The licensee also has a thorough evaluation procedure for sample irradiation requests. An example of the process was reviewed by the inspector for the July-August 1978 material activation.

# Radioactive Effluent Releases and Solid Radwaste

The only gaseous waste identified by the licensee is argon-41. Reactor power generation from October 1, 1977, to September 30, 1978, was 100.8 KWh. Based on a time integration of reactor power as related to measured concentrations, 0.24 Ci of argon-41 was released. Releases are by diffusion through the building; there is no ventilation system at this facility.

No radioactive liquid is released from this facility. Liquid losses are from evaporation and sampling. A monthly four-liter sample of reactor coolant is evaporated to dryness and counted for gross alpha and gross alpha-beta activity. The concentration range from February 1978 to November 1978 was 5.8E-10 to 6.8E-9 µCi/ml gross alpha-beta, and 1.0E-11 to 2.0E-11 µCi/ml gross alpha.

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The licensee has provisions for transferring solid radwaste to Ames Laboratory for disposal. The ISU Waste Log and the RSG-UTR-10 198 showed the last major transfer was 14 pounds of depleted resin.-

No items of noncompliance or deviations were identified.

## 11. Materials Control and Surveys

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The semiannual test records for 1978 were reviewed with attention being given to the 1-curie Pu-Be UTR-10 Start-Up Source. This source revealed no detectable contamination (NDC) with minimum sensitivity of 3.0E-6 microcuries for the test. Written procedures for opening packages require surveys to be done and the results recorded. The licensee also maintains records of the receipt and disposal of radioactive materials.

Contamination and radiation surveys are conducted monthly. A review of these survey records for the period of January 1978 to the present indicates no significant levels. In addition, special radiation surveys are conducted when the reactor is at full power. The special survey conducted on October 30, 1978, gave readings from 0.06 mR/hr to 16 mR/hr with a mean of 7 mR/hr in the restricted area. In the unrestricted area the range was 0.05 mR/hr to 1.8 mR/hr

The records indicated no significant radiation or contamination levels.

# 12. Posting, Labeling, and Control

The inspection reveal d no problems regarding posting or labeling required by 10 CFR 19. 1 and 10 CFR 20.203. Surveys are required when handling fuel or when items are inserted or removed from the reactor, and the Health Physicist is required to be present.

## 13. Notification and Reports

Statements made by the licensee and records reviewed by the inspector indicate that no theft or loss of material, no personal overexposure, or excessive levels of radiation or concentration of radioactive materials have occurred.

### 14. Exit Interview

The inspector met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on December 13, 1978. The following items were discussed:

1/ Refer to Report No. 50-116/78-03.

a. The inspector stated that no items of noncompliance or deviations were identified. 2/ ...

b. The inspector noted that during a previous inspection<sup>2/</sup> the equation used by the licensee to determine minimum sensitivity was incorrect. The correction had been accomplished by this inspection.

. <u>2/</u> Ibid.

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