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

REGION V

Report No. 50-288/82-02

Docket No. 50-288 License No. R-112 Safeguards Group

Licensee: Reed College

Portland, Oregon 97202

Facility Name: Reed Reactor Facility

Inspection at: Portland, Oregon - Reed College

Inspection conducted: September 8-10 and telephone conversation on September 29, 1982

Inspectors: E. M. Garcia — October 15, 1982
E. M. Garcia, Radiation Specialist — Date Signed

Approved by: F. A. Wenslawski — 10/18/82
F. A. Wenslawski, Chief, Reactor Radiation Protection Section — Date Signed

Approved By: H. E. Book — 10/18/82
H. E. Book, Chief, Fuel Facility and Material Safety Branch — Date Signed

Summary:

Inspection on September 8-10 and Telephone Conversation on September 29, 1982

Areas Inspected: Routine announced inspection by a regionally based inspector of the radiation control program including posting and labeling, personnel monitoring, training of non-licensed personnel, instrument calibration; effluent monitoring; emergency planning including procedures, training, equipment, test and drills. The inspection included a facility tour and a radiation survey. This inspection involved 17 hours onsite by one inspector.

Results: No items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

*M. A. Kay, Director, Reed Reactor Facility
*C. Grant, Supervisor, Reed Reactor Facility
*D. Griffiths, Secretary of Reactor Operations Committee

*Denotes the individuals present at the exit interview.

2. Radiation Control

a. Posting and Labeling

The inspector reviewed the licensee's compliance with posting and labeling requirements. 10 CFR 19.11 specifies certain documents that must be available for the workers to examine. That section also requires the posting of Form NRC-3, "Notice to Employees". Copies of Form NRC-3 are posted through out the facility. A notice on the control room bulletin board lists the documents noted in 10 CFR 19.11 and states where they may be examined.

The inspector toured the facility and conducted an independent radiation and contamination survey. The results of the survey are described in paragraph 5 below. 10 CFR 20.203 states requirements for the posting and labeling of radiation areas, high radiation areas and radioactive materials. During the survey the inspector noted that radiation areas and radioactive materials were properly identified, posted and labeled. 10 CFR 20.203 also specifies conditions for controlling access to high radiation areas. Although during the inspector's tour no high radiation areas were identified, it appears that some may develop under certain conditions. The licensee's standard operating procedures (SOP) 01, "Start up Check List" and SOP 18, "High Radiation Areas", specify actions to be taken when a high radiation area is identified. According to the facility's Director these procedures accurately describe the access control used by the licensee when high radiation areas are identified. In the inspector's view the licensee's provisions for high radiation area access control appear not to be consistent with the requirements of 10 CFR 20.203(c)(2). However, since no high radiation area existed at the time of the inspection, noncompliance could not be clearly established. The licensee agreed to carefully review 10 CFR 20.203(c)(2) and 10 CFR 20.203(c)(4) and to revise their procedures and practices appropriately. This matter was discussed at the exit interview.

No item of noncompliance or deviations were identified.

b. Personnel Radiation Dosimetry

10 CFR 20.202 establishes the requirements for providing personnel radiation dosimetry monitoring devices. 10 CFR 20.101 and 10 CFR 20.104 establish the requirements for maximum permissible external radiation exposures of radiation workers. The licensee has a program to meet these requirements. Permanent employees, students and other facility users are monitored with thermal luminescence dosimeters (TLD's). These TLDs are used to monitor whole body x-ray, beta and gamma exposures. Individuals handling irradiated samples are provided with TLD finger rings to monitor their extremity exposure. TLDs are changed on a quarterly schedule. Health Physics Northwest is the contractor providing the TLD service. Visitors are monitored with capacitor type pocket dosimeters. The licensee does not have a program to periodically test and calibrate the pocket dosimeters. After discussions with the inspector the facility's Director agreed to establish a program and a procedure for the test and calibration of the capacitor type pocket dosimeters. The licensee stated that Regulatory Guide 8.4, "Direct-Reading and Indirect-Reading Pocket Dosimeters" and American National Standards Institute (ANSI) Standard N13.5 1972 "Performance Specifications for Direct Reading and Indirect Reading Pocket Dosimeters" will be used in the preparation of this procedure.

The inspector reviewed personnel dosimetry records for the period of January 1980 to June 1982. The exposures recorded for the whole body, extremity and skin of whole body are within the regulatory limits as specified in 10 CFR 20.101(a) and 10 CFR 20.104. The matter of the test and calibration of pocket dosimeters was discussed at the exit interview.

No items of noncompliance or deviations were identified.

c. Training

10 CFR 19.12 describes the instructions that must be provided to individuals frequenting the restricted area. The licensee's training program for non-licensed personnel is geared toward the facility's users and experimenters. According to the facility's Director other individuals such as maintenance, janitorial, and security personnel are under direct supervision while in the restricted area. The main components in the training program consist of: 1. Attendance by non operator trainees in the Lecture on "Introduction to Health Physics". This lecture, lasting about one hour, is part of the Reactor Operating

Training Seminar. A written essay examination is part of this portion of the training. 2. Discussions and reading of Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure", and 8.27 "Instruction Concerning Risks from Occupational Radiation Exposure". A sign up sheet dated November 3, 1981 indicates that 19 individuals had received training on these guides on that date. 3. All students are provided with a copy of Reed's "A Manual for Chemical Safety". Section 7 of this manual deals with radiation safety. The inspector concluded that the training program meets the requirements of 10 CFR 19.12.

No items of noncompliance or deviations were identified.

d. Portable Instruments Calibration

10 CFR 20.201, "Surveys", requires that the licensee perform evaluations of the radiation hazard that may be present. Further, it requires that when appropriate such evaluations include measurements of levels of radiation. Although not specifically required, good practice suggests that instruments used for measurements be calibrated. ANSI N-323-1979 "Radiation Protection Instrumentation Test and Calibration" makes recommendations for a calibration program. A description of the licensee's calibration program for portable instruments was provided to the inspector by the facility Director. In the past portable instruments were calibrated every two months and their response checked each day they are used. In January 1982 the calibration interval was changed to every six months. A response check is still performed each day they are used. The licensee maintains a log entitled "Portable Monitors Log". This log includes records of the calibrations and occasional descriptions of the calibration methods used. Review of the log for the period of March 23, 1982 to July 20, 1982 indicates that the calibrations were performed as described by the facility Director. The inspector discussed the lack of an existing SOP to control the calibration of portable instruments and the associated lack of specificity in methods described in the log. Among the conditions not described are: an acceptance criteria, checking of batteries, identification of calibration source and actual exposure rates, check source response, and a calibration sticker. Although there is no specific requirement, the licensee agreed to establish a SOP to control the calibration of portable instruments and to consider the recommendations of ANSI N-323-1978 when preparing the SOP. This matter was discussed at the exit interview.

No items of noncompliance or deviations were identified.

e. Fixed Instrumentation

Reed College license requires that the reactor be operated in accordance with Technical Specifications appendaged to the license. Technical Specification G, "Radiation Monitoring" requires that during reactor operations the radiation levels be monitored with a Radiation Area Monitor (RAM). The temporary use of a ion-chamber in place of the RAM is permitted. The specification also requires that the alarm set points be verified weekly and the instrument calibrated annually. Review of the start up check list from February 25 to September 3, 1982 indicated that the alarm set points have been checked at least weekly. Review of the RAM calibration log for the period January 16, 1980 to January 12, 1982 indicated that the instrument has been calibrated annually. SOP 21 "Calibration of the RAM" controls the calibration of the RAM.

Technical Specification G also requires a reactor room continous air monitor (CAM), with annual calibrations and weekly verification of alarm set points. SOP 01 "Start Up Check List" provides for assigning the gaseous stack monitor as a temporary replacement for the CAM. There is no existing SOP for the calibration of the CAM. Review of the Cam Log from January 17, 1980 to July 12, 1982 indicated that the CAM has been calibrated at least annually. The review of the start up check list records described above indicated that the CAM alarm set points have been checked at least weekly. No records were available regarding the selection of the alarm set points for the CAM. The licensee intends to prepare a SOP for the CAM. This SOP will include the calibration procedure and the method for determining the alarm set points. Since the licensee may occassionally need to use the particulate and gaseous stack monitors in place of the CAM, a procedure will be established to specify the conditions for this substitution and to relate the stack monitor's reading to those of the CAM. The licensee also informed the inspector that the circuit design for the alarm set points tends to cause drifting of the set point. The licensee intends to have an improved design installed by February 1983. These matters were discussed at the exit interview.

No items of noncompliance or deviation were identified.

3. Effluent Monitoring

The principal airborne radionuclide released from the facility is Argon-41(Ar-41). The licensee monitors airborne releases with an Ar-41 gaseous stack monitor. SOP 31 "Gaseous Stack Monitor" describes the calibration of the monitor and the selection and setting of alarm points. The calibration of the monitor includes the determination of the operating voltage for the Geiger-Muller (GM) detector and the determination of

counting efficiency for Ar-41. The Licensee uses known quantities of Ar-41 that have been prepared in the reactor. The alarm set points are based on the maximum permissible concentration of Ar-41 (10 CFR 20, App. B, Table II, Column 1) for 4 hours a week and the measured efficiency for Ar-41. The licensee currently maintains records of releases by keeping the strip charts from the monitor output. After discussions with inspector the licensee agreed to reduce the data and maintain records of the activity released in microcuries per milliliter and total curies. Review of the stack monitor log from January 16, 1980 to July 21, 1982 indicated that the monitor has been calibrated every six months. The matter of data reduction was discussed at the exit interview.

No items of noncompliance or deviations were identified.

4. Emergency Planning

The inspector discussed with the licensee staff the facilities emergency preparedess program. Based on these discussions and review of available records it appears that the licensee is fulfilling the requirements of their current emergency plan. Tours and briefing have been provided to members of the Portland Police Department and to the Chief of Physical Plant for Reed College. The alarm system has been tested several times a year (1980, 1981 and 1982). An agreement exists to take contaminated and/or exposed individuals to Good Samaritan Hospital. With the most recent drill the licensee has begun to keep a description of the scenario and comments from the after drill critique. The licensee intends to increase the number of drills conducted. The emergency preparedness of the licensee is adequate under current requirements. The licensee is aware of the requirement of 10 CFR 50.54(r) to submit a revised emergency plan to the NRC for approval by November 3, 1982.

No items of noncompliance or deviations were identified.

5. Facility Tour and Radiation Contamination Survey

The inspector conducted an independent radiation and contamination survey. Radiation levels measured were less than 1 mr/hr. Contamination levels were not detectable above background except in places known to be contaminated where contamination was found to be less than 300 dpm/100 cm^2. The inspector used a NRC Keithly Ion Chamber Model 36100 serial number 10444 calibrated on October 23, 1981 and due for calibration on October 23, 1982. The smears were counted on NRC's NMC PC-55 windowless gas porportional counter serial number 77-2712-05. The instruments efficiencies for Pu-239 (46%) and Tc-99 (28%) were used in determining the activity.

The inspector reviewed the Health Physics Log and startup check list for surveys. The licensee conducts wipe test every two weeks. Radiation surveys are part of the start up procedure. These records indicate comparable contamination and radiation levels to those observed during the inspection. Contamination and radiation levels were generally low and consistent with the use of the facility.

No items of noncompliance or deviations were identified.

6. Exit Interview

The inspector met with the individuals denoted in paragraph 1. The extent and findings of the inspection were presented. Specific areas discussed are described in paragraphs 2.a, b, d, e and 3 of this report. The licensee was informed that no items of noncompliance were identified.