U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-27/82-02

Docket No. 50-27 License No. R-76 Safeguards Group

Licensee: Washington State University

Pullman, Washington 99163

Facility Name: Research Reactor, Nuclear Radiation Center

Inspection at: Pullman, Washington

Inspection conducted: July 14-16 and telephone conversation on August 10, 1982

Inspectors: E. M. Garcia — Sep. 30 1982
E. M. Garcia, Radiation Specialist — Date Signed

Approved by: F. A. Wenslawski — 9/30/82
F. A. Wenslawski, Chief, Reactor Radiation Protection Section — Date Signed

Approved by: H. E. Book — 9/30/82
H. E. Book, Chief, Radiological Safety Branch — Date Signed

Summary:

Inspection on July 14-16 and August 10, 1982 (Report No. 50-27/82-02)

Areas Inspected: Routine unannounced inspection by a regional based inspector of radiation control program including posting and labeling, personnel monitoring, training of non-licensed personnel, instrument calibration; effluent monitoring; emergency preparedness including procedures, training, equipment, and test. The inspection included a facility tour and a radiation survey. This inspection involved 19 hours onsite by one inspector.

Results: No items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

*W. E. Wilson, Associate Director, Nuclear Radiation Center
*J. Neidiger, Reactor Supervisor
D. Rosenberg, Reactor Technician
D. Lemke, Technical Assistant

*Denotes the individuals present at the exit interview.

2. Radiation Control

a. Posting and Labeling

Copies of NRC Form-3 and notice stating where copies of 10 CFR 19 and 20 were available were posted at several locations. The inspector toured the facility both when the reactor was operating and shutdown. The inspector performed independent dose rate measurements using a NRC Keithley Model 36100 survey meter. The instrument's serial number is 11108 and was calibrated on December 7, 1981, due for calibration on December 7, 1982. Radiation areas in the facility were properly posted. Radioactive materials were appropriately labeled. No high radiation areas were identified. From discussions with the licensee's staff it appears that during the calibration of portable instruments, the calibration sources would generate a high radiation area. The conditions for access control to high radiation areas as required under 10 CFR 20.203(c)(2) were discussed with the licensee's staff.

No items of noncompliance or deviations were identified.

b. Personnel Dosimetry

The personnel radiation dosimetry program for reactor personnel and users is overviewed by the reactor supervisor. Monthly film badges are used to measure x-ray, beta and gamma exposures and NTA film for neutron exposures. Visitor's exposure is monitored with pocket ion chambers. The film badge service is provided by Siemens Gammasonics Inc. The Reactor Supervisor prepares quarterly occupational exposure summaries that are posted to inform individuals of their exposure. Review of the records for the period of January 1981 to March 1982 indicates that quarterly exposures were in the range of 0 to 140 mrem. These values are consistent with those reported in the annual report for the year of July 1, 1980 to June 30, 1981. No exposures above regulatory limits were noted.

No items of noncompliance or deviations were identified.

c. Training

The primary means by which non-licensed personnel receive training pursuant to the requirements of 10 CFR 19.12 is by preparing to successfully complete the "Experimenter Certification Exam." To prepare for the exam, students are provided with copies of the following Standard Operating Procedures (SOP).

SOP #	Title
1	Standard Procedure for Use of the Reactor
2	Standard Procedure for Performing Irradiations Using the Reactor
6	Standard Procedure in the Event of an Emergency Situation
12	Standard Procedure for Specific Activity - Dose Rate Calculations and Sample Failure Analysis

The individuals are also provided with copies of the core diagram, an outline of 10 CFR 20 and a three page handout entitled "Radiation Safety Guidelines." The inspector discussed the apparent limited coverage in the training of the health protection problems associated with exposure to radioactive materials or radiation. The Associate Director stated that the University was going through a change in the position of Radiation Safety Officer (RSO), and that with the new RSO an extended training program was to be initiated. The inspector was provided with a copy of the outline of the proposed training program. The new RSO will assume responsibilities with the fall 1982 term. The inspector concluded that the current training program marginally meets the requirements of 10 CFR 19.12.

No items of noncompliance or deviations were identified.

d. Instrument Calibration

The inspector reviewed the following standard operating procedures related to radiation detection instrument calibrations.

SOP #	Date	Title
17	3-22-79	"Standard Procedure for Checkout and Calibration of the Area Radiation Monitors, Continuous Air Monitor and Stack Gas Monitor"
18	9-1-76	"Standard Procedure for A^{41} (sic) Monitor Calibrations"
23	Proposed	"Standard Procedure for Calibration of Portable Instruments"

The inspector made the following observations:

SOP #17 requires the recording of the observed count rate of the Continuous Air Monitor (CAM) when exposed to a series of natural uranium standards. However the procedure does not require nor is the licensee determining the actual efficiency of the monitor, and thus the actual concentration of airborne contaminants cannot be determined. The procedure also does not consider sample loss due to the collection method. (A long pipe approximately 2" in diameter with at least three 90° turns). The licensee's representative stated that the CAM was intended as a fail fuel detector and as such was a "go, no-go" monitor not requiring a rigorous calibration.

SOP #18 is the procedure used to calibrate the Argon-41 monitor. The monitoring system consists of a sodium iodide (NaI) scintillation detector and single channel analyzer (SCA). The procedure describes a Calibration, a Calibration Check, and a Calibration Alignment. The procedure states "Once the initial absolute calibration has been completed, a calibration check as outlined, performed on an annual basis, and within the check limits specified, shall fulfill the calibration requirements." Review of records from January 1979 to June 1982 indicate that the licensee has performed monthly the calibration check and the calibration alignment at least annually. According to the licensee representative the "absolute calibration" has not been performed in many years.

The inspector reviewed a proposed procedure for control of the calibration of portable radiation detection instruments, SOP #23. The proposed procedure is consistent with the current calibration program but not with some of the recommendations of the American National Standards Institute (ANSI) standard N323-1978, "Radiation Protection Instrumentation Test and Calibration." The inspector discussed this matter with the reactor supervisor.

Review of records for the years 1979 through 1982 indicates that the Area Radiation Monitors and the Continuous Air Monitors have been calibrated on an annual basis as required by technical specification 5.3.3. The inspector selected four portable radiation detection instruments and reviewed their calibration records. These instruments were not overdue for calibration. The licensee has portable radiation detection instruments calibrated quarterly.

No items of noncompliance or deviations were identified.

3. Effluent Monitoring

a. Airborne Releases

The principal airborne radionuclide released from the facility is Argon-41 (Ar-41). The licensee's monitoring system and calibration procedures were described in the previous paragraph. The inspector reviewed the Reactor Operations Summary Log for the period of January 1981 to June 1982. The recorded activity concentration in this log differs from the values reported in the July 1, 1980 to June 30, 1981 annual report. According to the reactor supervisor the difference is due to the log values not being corrected for background. The licensee is using a factor of 8 cpm for background. Once this correction is made the values are comparable. These releases and those noted in the log through June 1982 are within the technical specification limits.

No items of noncompliance or deviations were identified.

b. Liquid Releases

The licensee collects the liquid effluents from the facility in liquid retention tanks. SOP #11, "Standard Procedure for Analysis of Hold Up Tank Samples", describes the method of determining the radioactivity of liquids prior to release to the sanitary sewer system. The inspector reviewed records of releases in 1981 and 1982. A total of ten releases occurred in 1981 and 7 had occurred in 1982 through July 6. The values reported on the 1980-1981 annual report were comparable to those in the records. The radioactivity released to the sanitary sewer is within regulatory limits.

No items of noncompliance or deviations were identified.

4. Emergency Preparedness

The licensee has a one page sheet titled "Short Form Emergency Procedure" posted throughout various locations in the reactor facility. This form is an abridged version of SOP #6, "Standard Procedure in the Event of an Emergency Situation." The short form includes a list of responsible individual's phone numbers. Records indicate that the facility staff received yearly training on the emergency plan in 1980 and 1981. Orientation tours for the volunteer fire department and campus police have been conducted in 1980 and 1981. The fire department has participated in the orientations in 1982. The campus police have not yet had their yearly orientation. Review of the preventive maintenance log for the period August 1980 to June 1982 indicates that the building evacuation alarm has been tested quarterly. The Pullman Memorial Hospital has an emergency room policy to handle radioactive contaminated individuals. The inspector reviewed the contents of the emergency supply kit. It contained adequate supplies. The GM instrument in it was within calibration. Extra film badges were those from a previous contractor. The licensee had forgotten to change them when they changed contractors. 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. Transportation Activities

The licensee transfers possession of any material to be shipped to the University, State of Washington, Materials License prior to shipment.

No items of noncompliance or deviations were noted.

6. Facility Tour and Radiation Survey

The inspector accompanied a radiation technician during a routine daily survey. The inspector took independent dose rate measurements using an NRC ion chamber. The NRC instrument used was identified in paragraph 2 above. The licensee's measurements were comparable to those taken by the inspector.

SOP #10, "Standard Procedure for Health Physics Surveys," appears to be adequate for the control of radiation surveys. The monthly neutron surveys records were reviewed. Neutron dose rates are recorded as less than 1.0 mrem/hr except for the PuBe source drum which is 1.0 mrem/hr. The inspector reviewed selected survey records for the previous three months. Those 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.

7. Exit Interview

The inspector met with the individuals denoted in paragraph 1. The extent and findings of the inspection were presented. The licensee was informed that no items of noncompliance had been identified.