

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No: 50-05

License No: R-2

Report No: 50-05/97-01

Licensee: Pennsylvania State University

Facility: Penn State Breazeale Reactor (PSBR)

Location: University Park, Pennsylvania

Dates: April 28 - May 2, 1997

Inspector: Stephen W. Holmes, Radiation Specialist

Approved by: Marvin M. Mendonca, Acting Director
Non-Power Reactors and Decommissioning Project Directorate

EXECUTIVE SUMMARY

This routine, announced Health Physics (HP) inspection consisted of the review of selected conditions and records since the last inspection, and related discussions with licensee personnel. The PSBR HP program was being maintained as required by the license and applicable regulations.

The licensee committed to review the calibration procedures/check sheets, determine which need formal written procedures, and provide such. Review of the University's portion of the Radiation Safety Program will be completed this year by the Office for Regulatory Affairs who will continue to be responsible for the review.

Report Details

Summary of Facility Status

During the onsite inspection period, the facility was completing the installation of a new in-pool heavy water tank experimental facility. The pool had been refilled and testing at power was in progress. The PSBR was also operated several hours a day to allow for the conduct of various experiments.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 Radiation Protection Postings

a. Scope (Inspection Procedure 40750)

The inspector reviewed radiological signs and postings and routine radiation surveys.

The inspector observed the facility and equipment during unaccompanied tours.

b. Observations and Findings

Postings at the PSBR were acceptable for the hazards involved. Surveys by the inspector confirmed that the radiation signs and postings properly reflected the radiological conditions in the facility. PSBR facility and radioactive material storage areas were secured and posted as required. No unmarked or unsecured radioactive materials were evident. NRC Forms-3 were posted in appropriate areas in the facility as were current notices to workers required by 10 CFR Part 19.

c. Conclusions

Radiological postings satisfied regulatory requirements.

R1.2 Effluent Monitoring and Release

a. Scope (Inspection Procedure 40750)

The inspector reviewed annual reports, release records, counting and analyses results.

The inspector interviewed PSBR and HP staffs.

b. Observations and Findings

Gaseous releases were calculated from integrated power as outlined in the Final Safety Analysis Report (FSAR) and license procedures. The licensee maintained environmental monitoring devices on the facility boundary fence. The exposures to these monitors also indicated that both gaseous releases and exposure to the public were within regulatory limits. Liquid releases were infrequent as most liquid wastes are evaporated and the resulting solid, along with any non-evaporated liquid, was disposed of through the campus byproduct license. Releases, including the infrequent liquid ones, were acceptably documented and well within the annual dose constraint of 10 CFR 20.1101(d) and the Appendix B, table 2 & 3 concentration limits.

c. Conclusions

Effluent monitoring satisfied license and regulatory requirements.

R1.3 Radiation Worker Training

a. Scope (Inspection Procedure 40750)

The inspector reviewed PSBR training records, campus training records, training program content, and licensee procedures.

The inspector interviewed HP personnel, senior reactor operators (SROs), and the university health physicist (UHP).

b. Observations and Findings

Training was provided by individual lectures, slide and video presentations, and formal four-hour classes and exams. Three levels of training are given based on the workers access needs. Review of the training records of a new PSBR staff member and a randomly picked research staff member confirmed that the required training had been provided.

c. Conclusions

Radiation worker training met license requirements, conformed to licensee procedures, and satisfied 10 CFR 19.12 for instruction to workers.

R1.4 Radiation Protection Surveys

a. Scope (Inspection Procedure 40750)

The inspector reviewed HP and PSBR surveillances/survey procedures and survey records, and interviewed staff.

The inspector measured radiation levels during an unaccompanied tour.

b. Observations and Findings

Daily, weekly, and monthly contamination or radiation area surveys were performed by PSBR and university staffs as required by licensee procedures. Results were evaluated and corrective actions taken and documented when readings/results exceeded set action levels. Survey sheets were detailed and were used acceptably as survey procedures themselves.

c. Conclusions

Surveys were performed and documented in a manner acceptable to evaluate, as required by 10 CFR Part 20, the radiation hazards that might exist.

R1.5 Personnel Dosimetry

a. Scope (Inspection Procedure 40750)

The inspector reviewed dosimetry records, licensee procedures, observed issuance of dosimetry, and interviewed staff.

b. Observations and Findings

The licensee used a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited vendor to process personnel thermoluminescent dosimetry. The UHP maintained and reviewed both the exposure records of the PSBR staff and the campus staff. An examination of records for the past two years indicated that all exposures were within NRC limits, with most showing no exposure above background.

c. Conclusions

Doses were in conformance with licensee limits and 10 CFR Part 20. The dosimetry program was conducted in accordance with 10 CFR 20.1501, 20.1502, and licensee procedures.

R2 Status of RP&C Facilities and Equipment

a. Scope (Inspection Procedure 40750)

The inspector reviewed calibration, periodic checks, quality control, and test source certification records for radiation monitoring and counting lab instruments.

The inspector interviewed HP and PSBR personnel.

b. Observations and Findings

The calibration of the portable survey meters was performed in-house by the licensee. Calibration procedures were consistent with American National Standards Institute (ANSI) or the manufacturers' recommendations. Calibration and check sources were traceable to the National Institutes of Standards and Technology (NIST) directly, or by secondary/transfer standards. Radiation monitoring and counting lab instruments were also calibrated as recommended by ANSI or the manufacturer. All instruments checked were in calibration. Calibration records were in order.

c. Conclusions

RP&C equipment was being maintained and calibrated according to industry and equipment manufacturer standards. Calibration satisfied TS and licensee requirements.

R3 RP&C Procedures and Documentation

a. Scope (Inspection Procedure 40750)

The inspector reviewed Radiation Safety Program documentation and various HP procedures.

The inspector interviewed HP personnel and the UHP.

b. Observations and Findings

The formal radiation safety program (RSP) is shared between the PSBR and university staffs. The licensee's RSP consists of a collection of procedures and policies. These documents are delineated in the licensee's administrative procedures to be their RSP. During the last year the PSBRs staff's portion of the program had been reviewed as required by 10 CFR 20.1101(c). Review of the University's staff's portion of the program will be completed this year by the Office for Regulatory Affairs who will continue to be formally responsible for this review.

HP procedures were available for those tasks and items required by the TS, license, and facility directives. Calibration procedures for a number of items consisted solely of a calibration check sheet. The UHP stated that the HP staff would review the calibration procedures/check sheets, determine which would enhance their program by having formal written procedures, and then provide such.

c. Conclusions

The RSP satisfied the requirements of 10 CFR 20.1101. Oversight and review was provided by the PSBR and university staffs as required by TS and licensee procedures. HP procedures meet TS, license, and facility directives.

R6 RP&C Organization and Administration

a. Scope (Inspection Procedure 40750)

The inspector interviewed HP personnel and the UHP.

The inspector reviewed RSP documentation, the FSAR, and the TS.

b. Observations and Findings

The university radiation safety staff consisted of the UHP, an associate health physicist, and a number of HP technicians. Their training and experience, met the qualifications required by TS. Normal day to day PSBR surveys and activities involving radiation safety were performed by the PSBR staff. The university staff provided independent surveys, on-call support surveys, required safety oversight surveys, and specialized training to the PSBR staff. No lapse in coordination between the HP and PSBR staffs was noted.

c. Conclusions

The HP staffing met regulatory requirements and licensee commitments.

R7 Quality Assurance in RP&C Activities

a. Inspection Scope (Inspection Procedure 40755)

The inspector reviewed University Isotope Committees' minutes, experiment request forms, and licensee procedures.

The inspector interviewed the UHP.

b. Observations and Findings

The meeting schedule and membership satisfied licensee requirements. Examination of records confirmed that the committee was reviewing HP operation as required. The committees provided acceptable guidance, direction and oversight to the radiation safety program.

c. Conclusions

Oversight of the radiation safety program by the committee satisfied licensee requirements.

R8 Radioactive Material Transfer/Disposal

a. Inspection Scope (Inspection Procedure 86740)

The inspector reviewed transfer checklists, shipping records, and disposal records.

The inspector interviewed HP personnel, SROs, and the UHP.

b. Observations and Findings

Radioactive materials produced by the PSBR for use by either the university staff or outside organizations were tracked as required. The PSBR staff properly packaged and released materials to on-campus investigators, while shipments to entities outside the university were signed off by the university HP staff. Transfer documentation was kept on file in the health physics office. Transfer documentation was acceptable.

Production of radioactive waste at the facility was minimal. The small amount produced was handled under the campus waste disposal program. All transfers were recorded on the appropriate liquid or dry solid waste forms.

c. Conclusions

Radioactive material was transferred and disposed of in accordance with licensee procedures, TS, 10 CFR 49 and 10 CFR 20 requirements.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on May 2, 1997. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

E. Boeldt, Associate Health Physicist
P. G. Boyle, PSBR Supervisor/Nuclear Education Specialist, Penn State
Breazeale Reactor (PSBR)
C. C. Davison, Reactor Supervisor/Nuclear Education Specialist, PSBR
T. L. Flinchbaugh, Manager of Operations and Training, PSBR
R. W. Granlund, University Health Physicists (UHP)
D. E. Hughes, Manager of Engineering Services, PSBR
W. F. Witzig, interim Director, Radiation Science and Engineering Center

INSPECTION PROCEDURE (IP) USED

IP 40750: CLASS II NON-POWER REACTORS
IP 86740: TRANSPORTATION

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-05/97-01 IFI Review the calibration procedures/check sheets and revise as
needed to insure regulatory requirements continue to be met.

Closed

None