U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No.	50-05/94-01
Docket No.	50-05
License No.	R-2
Licensee:	The Pennsylvania State University University Park, Pennsylvania 16802
Facility Name:	Pennsylvania State University Breazeale Reactor
Inspection At:	State College, PA
Inspection Conducted:	March 28 - April 1, 1994

Inspector: Stephen M Holmes — 15 APR 94
Stephen Holmes, Radiation Specialist — date

Approved By: Judith A Joustra — 4/13/94
Judith Joustra, Chief — date
Effluents Radiation Protection Section

Areas Inspected: The areas examined included reactor staffing, reactor logs, operating procedures, operator requalification program, surveillances, control of experiments, maintenance and design changes, oversight, radiation safety staffing, radiation surveys, postings, radiation worker training, portable survey meter, counting lab and radiation monitoring instruments, personnel dosimetry, radioactive material transfer, effluent releases, emergency planning, procedures and policy, and new 10 CFR 20 implementation.

Results: Documentation, and record keeping were excellent. Committee participation and oversight were good, and the detailed minutes of committee meetings were noteworthy. No safety concerns or violations of regulatory requirements were identified.

DETAILS

1.0 Persons Contacted

* T. Flinchbaugh, Operations Manager
  E. Boeldt, Associate Health Physicist (AHP)
  P. Boyle, Reactor Supervisor & Physical Security Specialist
* C. Davison, Reactor Supervisor & Emergency Plan Coordinator
* R. Granlund, University Health Physicist (UHP)
* A. Phillips, Chairman, Pennsylvania State University Reactor Safeguards Committee (PSURSC)
  K. Rudy, Maintenance Supervisor
* M. Voth, Reactor Director

* Attended the Exit meeting on April 1, 1994.

2.0 Reactor Staffing

The current staff consists of seven permanent staff and three interns. Eight members hold Senior Reactor Operator (SRO) licenses, one a Reactor Operator license, and another is in training. The staff is qualified and possesses the technical expertise to perform the duties required by the license. No safety concerns or violations of regulatory requirements were identified.

3.0 Reactor Logs

Reactor operating records are required by Section 6.7.1 of the Technical Specifications (TSs). The inspector audited these records, interviewed operators, and observed uses of logs during reactor operations. Reactor scrams and subsequent SRO approval for restart were logged and tracked as required. Reactor operating records and logs were being maintained as required by TS and written procedures. No safety concerns or violation of regulatory requirements were noted.

4.0 Operating Procedures

Written operating procedures are required by Section 6.3 of the TS, and such procedures are required to be reviewed and approved prior to use. The inspector reviewed the operational procedures, interviewed staff members, and observed reactor start-ups, shut-downs and operators' use of check sheets. Written procedures were available for all items required by TS. The procedures were clear, concise, and, through the use of a standard format, easily followed. Each page of the procedures was signed by the proper persons to indicate review and approval. Authority to approve changes was delineated in the procedure book introduction section. Procedure changes were being reviewed as required. Implementation of and adherence to the procedures was good. Overall the licensee maintained excellent written procedures. No safety concerns or violations of regulatory requirements were identified.

5.0 Operator Requalification Program

An examination of the training records and exams, and interviews with operators indicated that all current operators were participating in the NRC approved requalification plan as required. Exam questions demonstrated good technical depth. The most recent requalification exam taken was the NRC administered qualification exam given to new personnel at the facility. The use of a matrix for tracking qualifications, medical exams, and license renewal was good. Documentation of operator hours, reactor manipulations, and training was good. The requalification program was being implemented adequately to ensure appropriate training of the operators. No safety concerns or violations of regulatory requirements were identified.

6.0 Surveillances

The inspector reviewed selected records and procedures for the conduct of surveillances required by TS Section 4.0. All surveillances were completed at the required intervals. Additionally, a matrix was used to track required surveillance intervals and their completion. Surveillances were conducted under actual operating conditions and provided a high confidence that the system would operate as designed. The inspector noted that tolerances were now specified for the computer displayed parameters. The licensee's program for surveillances was effective.

7.0 Control of Experiments

The licensee's program for the control of experiments was reviewed. The inspector reviewed the approvals and precautions incorporated in experiments. The technical assessments were found to have imposed good controls and limitations, and achieved a high level of safety. Forms used to approve experiments were safety oriented and provided guidance to the reviewer on experiment limitations. New experiments or classes of experiments of safety significance were reviewed by the Pennsylvania State University Reactor Safeguards Committee (PSURSC) as required. No safety concerns or violations of regulatory requirements were identified.

8.0 Maintenance and Design Changes

The inspector examined maintenance and design change records applicable to procedures AP-12 (changes) and AP-13 (maintenance). No design changes had been made since the last inspection. Procedures and documentation logs for both changes and maintenance were adequate. Changes were reviewed by the facility director or, if of safety significance, referred to the PSURSC as required by procedures. Changes were properly noted in the reactor log book as required. No safety concerns or violations of regulatory requirements were identified.

9.0 Oversight

The inspector reviewed the PSURSC's minutes for the past year and the last independent audit. The committee's quarterly meeting schedule and membership satisfied TS and facility procedure requirements. Review of the minutes indicated the committee was active in providing appropriate guidance, direction and safety oversight to the reactor program. Participation in reviews and evaluation of the quarterly operations summary was good. Follow-up on committee questions and recommendations was excellent. The audit was pertinent and technically suitable. Recommendations were evaluated and followed-up as needed. The committee minutes were clear, detailed, and provided an excellent record of the safety oversight of reactor operations. The committee performed it's duties as required by the license and TS.

10.0 Radiation Safety Staffing

TS Section 6.1.2 states that the responsibility for the safe operation of the reactor facility and safeguarding the public and facility personnel from undue radiation exposures shall be within the chain of command shown in the organization chart. The chart showed the UHP as providing direct support to the reactor. The radiation safety staff consisted of the UHP, an AHP, and a number of health physics technicians. Their training and experience, met the qualifications required by TS Section 6.1.1. Normal day to day reactor surveys and activities involving radiation safety were performed by the reactor staff. The university staff provided independent surveys, on-call support surveys, required safety oversight surveys and specialized training to the reactor staff. No safety concerns or violations of regulatory requirements were identified.

11.0 Radiation Worker Training

The licensee's program to provide training required by 10 CFR 19.12, "Instructions to Workers", was reviewed through discussions with the UHP, the Operations Manager, interviews with staff, and observation of the HP orientation slide lecture. Training records and material were also reviewed by the inspector. AP-8 delineated three user levels of orientation to insure that applicable training was given to each individual. This training was given by individual lectures, slide presentations, or formal four-hour classes and exams through the radiation safety office. Review of the training program documentation indicated that the requisite training was being given as required. Observation of and discussions with staff evidenced that relevant safety training had been given. The licensee had implemented a pertinent training program appropriate for the hazards present.

12.0 Radiation Postings

The inspector conducted tours of the reactor controlled areas, accompanied staff on a general area walk-through, and performed an independent confirmatory radiation area

survey. General housekeeping of the facility was good. The radiation signs and postings properly reflected the radiological conditions in the facility. Reactor facility and radioactive material storage areas were secured and properly posted as required. NRC Form-3s were conspicuously posted in appropriate areas throughout the facility. No safety concerns or violations of regulatory requirements were identified.

13.0 Surveys

The licensee is required to perform such surveys as required to comply with the applicable regulations and insure that these surveys are reasonable to evaluate the radiation hazards that may be present. .The inspector reviewed the procedures and records of the daily and weekly smear surveys, the new monthly radiation area surveys, and the primary and secondary water analyses. The results were evaluated by the technicians and/or supervisors as appropriate and corrective actions were taken and documented when readings/results exceeded set action levels. Contamination surveys were performed when conditions dictated or when required by the Reactor Safeguards Committee for specific experiments. The use of individual survey sheets was good. Within the scope of this inspection, the surveys were being performed and documented as required to evaluate the potential radiation hazards that might exist. No safety concerns or violations of regulatory requirements were identified.

14.0 Portable Survey Meter, Counting Lab and Radiation Monitoring Instruments

The inspector reviewed the use, availability, and calibration of the portable survey meters. The inspector also reviewed calibration, quality control, and test source certification records for radiation monitoring instruments and counting lab instruments. The inspector determined that sufficient amounts and appropriate types of portable survey meters were available to the staff. 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. Additionally, control charts were being used for background and check source counts. All instruments checked were in calibration. Calibration records were in order. No safety concerns or violations of regulatory requirements were identified.

15.0 Personnel Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited vendor to process personnel thermoluminescent dosimetry. The UHP maintained both the records of the reactor facility staff and the campus staff. The program included action levels for investigation of elevated exposures, lost dosimetry badges, and procedures for requesting and responding to requests for records. The exposure reports were reviewed by the UHP. An examination of records for the past

two years indicated that all exposures were within NRC limits, with most showing no exposure above background. ALARA considerations were addressed by the licensee's procedure, AP-6. The licensee had implemented an effective personnel monitoring program.

16.0 Radioactive Material Transfer/Disposal

All solid and liquid radioactive waste was transferred to the campus byproduct materials license through the radiation safety group. All transfers were recorded on the appropriate liquid or dry solid waste forms. Radioactive materials produced by the reactor for use by either the university staff or outside organizations were tracked as required. The reactor 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. Within the scope of this inspection no safety concerns or violations of regulatory requirements were identified.

17.0 Effluent Releases

Tables two and three of Appendix B, of the new 10 CFR 20 provide the limits for release of liquid and gaseous radioeffluents. The inspector reviewed the release records and instrumentation calibrations for both liquids and gases, interviewed the staff, and toured related facility areas. The gaseous releases were within the required limits and adequately documented. The inspector noted that the licensee maintained environmental monitoring devices on the facility boundary fence. The exposures to these monitors confirmed that both gaseous releases and exposure to the public were within regulatory limits. Liquid radioeffluents were released under the campus byproduct material license. Calibration of related instrumentation was acceptable as were the written procedures. Within the scope of this inspection no safety concerns or violations of regulatory requirements were identified.

18.0 Emergency Planning

Since the emergency plan had been inspected within the last six months, the inspector focused on changes and previous commitments. Respiratory equipment was on hand for use during emergencies only. In conjunction with implementation of the new 10 CFR 20, the licensee issued a directive that, until an approved respiratory program is in place as required, respirators would not be used. A new storage room had been completed for housing the emergency equipment. The licensee stated that the equipment would be transferred from the present storage cage to the new room by the end of April 1994. Access to the phone and computer was clear of obstructions. No safety concerns or violations of regulatory requirements were identified.

19.0 Procedures and Policy

Numerous procedures had been or were being updated to implement the new 10 CFR 20 requirements and incorporate recent operational changes. Specialized training had been given to the reactor and health physics staff on the new requirements. The new 10 CFR 20 requires formal, documented Radiation Protection and ALARA programs. The Pennsylvania State University Breazeale Reactor Radiation Protection and ALARA Programs implementation and responsibilities were split between the reactor and radiation safety staffs. This included individual procedures, surveys training, ALARA programs, etc. To clarify the program documentation, the Reactor Director and UHP committed to identify in writing those manuals, books, instructions, procedures, etc., that constitute the reactor radiation protection program. This will also include information as to the specific persons responsible for the individual components of the program. A copy of this document would be forwarded to NRC Region I upon completion. The licensee's use of procedures and policies was adequate. No safety concerns or violations of regulatory requirements were identified.

20.0 New 10 CFR 20 Implementation

In general, the implementation of the new 10 CFR 20 requirements had not been functionally difficult for the facility to implement. Dosimetry, surveys, postings, calibrations, and training continued to be performed as normal. Personnel exposures, effluent releases, and area radiation levels at the facility were extremely low or consistent with background. No internal exposures or planned special exposures would normally occur. The new public and fetal exposure limits were already being complied with. The actual impact was on written procedures and program guidance. The inspector identified a few lapses in converting to the new 10 CFR 20. The items were minor and of the type expected during such a conversion of written procedures and policy documents (i.e, using MPC limits in the EP, inadvertently referencing an old 10 CFR 20 table, etc). The licensee committed to correcting these oversights and performing an ongoing review of the procedures. No safety concerns or violations of regulatory requirements were identified.

21.0 Exit Interview

The inspector met with the licensee representatives listed in Section 1.0 of this report on April 1, 1994, and discussed the scope and findings of this inspection. The licensee acknowledged the inspection findings and commitments.