

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-05/84-03

Docket No. 50-05

License No. R-2 Priority -- Category F

Licensee: The Pennsylvania State University
University Park, Pennsylvania

Facility Name: Breazeale Nuclear Reactor

Inspection At: University Park, Pennsylvania

Inspection Conducted: July 16-17, 1984

Inspectors: J. Robertson, Reactor Engineer
T. Elsasser, Chief, Reactor Projects Section
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8/17/84
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Approved by: Ebe McCabe, Sr.
E. C. Wenzinger, Chief, Projects Branch No. 3, DPRP

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date

Inspection Summary: Inspection on July 16-17, 1984 (Report No. 50-05/84-03)

Areas Inspected: Routine, unannounced region-based facility tour and inspection (24 hours) of facility organization, action on previous NRC findings, logs and records, reviews and audits, procedures, surveillance, experiments, radiation control, and requalification training. No violations were identified. The licensee committed to correct haphazard storage of potentially contaminated components in two shielded "caves" near the main pool (Detail 3), and to review the policy of exempting SRO's who give written exams from taking a written exam (Detail 11).

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DETAILS

1. Persons Contacted

*Dr. S. H. Levine, Director, Breazeale Nuclear Reactor
*Mr. I. B. McMaster, Deputy Director, Breazeale Nuclear Reactor
Mr. R. W. Granlund, Health Physicist
Mr. R. E. Totenbier, Operations Supervisor
Mr. D. S. Vonada, Reactor Operator

The inspector also interviewed reactor supervisors and a health physics technician during the inspection.

*Denotes those present at the exit interview.

2. Organization

The organization operating the Pennsylvania State University Breazeale Nuclear Reactor (PSBR) is as follows:

Director - H. S. Levine (Senior Reactor Operator)
Deputy Director - I. B. McMaster (Senior Reactor Operator)
Operations Supervisor - R. E. Totenbier (Senior Reactor Operator)
Reactor Supervisors - D. C. Raupach (Senior Reactor Operator)
 J. J. Bonner (Senior Reactor Operator)
Reactor Supervisors and Training - J. L. Penkala (Senior Reactor Operator)
 T. L. Finchbaugh (Senior Reactor Operator)
Electronic Designer - D. S. Vonada (Reactor Operator)
Service Engineering Aide/Mechanical Services - K. E. Rudy (Reactor Operator)
Reactor Operator - D. R. Shaulis (Reactor Operator)

No violations were identified.

3. Tour

During a tour of the facility, the inspector noticed that an annunciator for the Reactor Bay radiation level was energized. The licensee explained that the annunciator had not cleared after performing alarm checks that morning. This condition was determined to be the result of a loose relay connection and was repaired immediately.

During this inspection the licensee was testing a digital indexing system which they plan to use for rod position indication. The system was installed on the fission chamber used as a startup source. No problems were encountered with this new system.

On the main floor in the vicinity of the reactor pool, two shielded "caves" have been designated for the storage of potentially contaminated components. During the tour it was noted that the components stored in these areas were

done so in a haphazard manner, with equipment not completely contained within the designated areas. No radiological hazard existed as a result of the poor storage; however, the licensee acknowledged the potential for problems to arise. At the exit interview, the licensee agreed to correct this haphazard storage in the near term (IFI 84-03-01).

4. Licensee Action on Previous Inspection Findings

(Closed) Inspector Follow Item (05/83-02-02): The licensee was to make experimenters aware of any conditions for approval of experiments. A change was made to the PSBR experiment approval form. Step 17 was added which provides a space for the approval conditions or Nuclear Reactor Safety Committee restrictions.

(Closed) Inspector Follow Item (05/83-02-03): The licensee was to evaluate the possible release of radioactivity to unrestricted areas via the dryer used for contaminated clothing. The inspector has evaluated the administrative controls for the use of the dryer and found them adequate to meet the requirements of 10 CFR 20.106, Radioactivity in Effluents to Unrestricted Areas.

(Open) Inspector Follow Item (05/83-02-01): Assure the safety channel scram is at or below 110 percent of full power. The licensee has drafted a revision of the procedure for Reactor Thermal Power Calibration (CCP-2). This revision will insure that indicated reactor power will be set 2 to 3% below that determined by thermal power calibration. Once implemented, this change will provide additional insurance that actual core power does not exceed 110% when the safety channel scram activates. The inspector will review implementation of this change during a future inspection.

(Closed) IE Circular (05/79-SC-07): Scott Air Pack respirator problems. The licensee does not have Scott Air Pack respirators, therefore, no action was required.

5. Logs and Records

The inspector examined the following logs and records:

- Penn State Breazeale Reactor (PSBR) Logs No. 36 and 37, 11/17/83-7/24/84.
- Daily Checkout Lists, 6/1/84-7/16/84.
- Monthly and Quarterly Operating Statistics, 4/83-6/84.

Operational and experimental data log entries were made to document equipment malfunctions and personnel errors. In each case, the cause and/or the corrective action was also documented. The logs were also reviewed to verify that for each pulsing operation the peak neutron flux was recorded and the power level during the pulsing operation did not exceed 2800 Mw as required by Technical Specification E.4.

The Daily Checkout Procedure is a comprehensive checklist completed daily prior to the initial startup. The checklist contains acceptance criteria for applicable parameters. All checklists reviewed were properly completed and signed, and the data was within the limits specified.

6. Review and Audits

The inspector reviewed the minutes of the Reactor Safeguards Committee meetings of September 7, 1983; December, 14, 1983; March 8, 1984, and June 12, 1984. The meeting minutes were very detailed, with all meetings lasting at least 3 hours. The committee has demonstrated diligent concern for those matters associated with reactor operations which have the potential to affect reactor safety.

The inspector also reviewed the results of the last annual facility audit performed by an outside auditor which was conducted on July 5, 1983. No major problems were identified during this audit.

7. Procedures

As a result of a procedure review started in late 1983 the licensee has revised 32 out of 38 of their procedures in 1984. Although the majority of changes were minor in nature, it does demonstrate a commitment to keep procedures up to date.

The inspector performed a walkthrough of Emergency Procedure EP-1, "Evacuation." This included the verification of stored emergency equipment. Battery operated equipment such as flashlights and radiation survey meters were checked to ensure the batteries were not depleted. Oxygen masks were checked to verify adequate oxygen pressure on the tanks. Respirators had seals intact on the filters and the masks were clean. All of the equipment appeared to be in good condition and the evacuation route was clearly marked on the walls and stairwells. This procedure had been revised April 5, 1984 and was approved by the Deputy Director. No concerns were identified.

8. Surveillance

The inspector reviewed the performance of the following surveillance requirements:

<u>Tech Spec</u>	<u>Description</u>	<u>Frequency</u>	<u>Time Period</u>
E.6	PSBR Fuel Inspection	Annually	7/82-5/84
F.11.b	Control Rod Drop Times	Semi-annually	1/83-5/84
F.12	Calibrate the Linear Power Level Instrumentation	Annually	1/83-5/84

F.13	Inspect, Clean and Lubricate the Transient Rod Drive Cylinder and Air Supply	Annually	5/83-5/84
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No concerns were identified.

9. Experiments

The inspector selected a random sample of 6 completed and 2 uncompleted experiments to verify conformance with Standard Operating Procedure SOP-5, "Experiment Evaluation and Authorization." Documentation was available to verify proper review and approval of experiments, potential hazards, and predicted or measured reactivity effects.

Controls for the release of samples after irradiation are contained in SOP-8, "Sample Release." The release of samples by Health Physics Technicians is governed by activity level limits set by the University Isotopes Committee or the NRC license.

10. Radiation Protection

a. Personnel Radiation Exposure

The inspector examined the exposure records for all personnel routinely associated with the reactor during the period July, 1983 through June, 1984. In general, exposures were below detection limits; however, in cases where higher than normal exposures were reported, the licensee took prompt action to investigate the cause of the unusual exposure. Exposure of all personnel were well within regulatory requirements.

b. Smear Surveys

The inspector reviewed the records of all smear samples taken between July, 1983 and June, 1984. Location, frequency, and number of smears was in accordance with current radiation protection practices. When necessary, corrective actions were taken promptly to clean up areas with detectable surface contamination. The licensee has placed additional emphasis on the responsibility of experimenters to adequately clean up and smear work areas after completion of their experiments. This has resulted in less frequent instances of loose surface contamination being found during routine surveys.

c. Gaseous and Liquid Radioactive Effluents

Records of radioactive effluent monitoring (gaseous and liquid) for the period July, 1983 to June, 1984 were reviewed. Frequency and location of samples were in accordance with applicable requirements. No unacceptable conditions were noted.

11. Requalification Training

In accordance with Administrative Policy AP-3, "Operator and Senior Operator Requalification" records were maintained of the biennial written exams, the biennial walkthrough oral exam, the annual oral exam on Abnormal and Emergency Procedures, and reactor manipulations. A summary of the test results for all of the SRO's and RO's was also on file. Documentation was found to be complete and readily accessible. The inspector verified that for one reactor operator the reactor manipulations in the training file were consistent with the operations in the PSBR Log.

The inspector expressed a concern that Administrative Policy AP-3 allows for the two persons conducting a given evaluation to be exempt from it. As a result, the two senior reactor operators responsible for giving the written exam have not taken a written exam in over 10 years. The licensee stated that this policy was being reviewed for a revision prior to the next written exam scheduled for the end of 1985. This will be examined during a future inspection (IFI 84-03-02).

12. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on July 17, 1984. The inspectors presented the scope and findings of the inspection including their concerns over radiation material storage areas and requalification exams for persons responsible for administering tests. The licensee acknowledged the inspectors concerns and indicated that corrective actions would be taken.