July 27, 2001

Dr. Eva J. Pell
Vice President for Research
Dean of the Graduate School
The Pennsylvania State University
304 Old Main
University Park, PA 16802-1504

SUBJECT: NRC ROUTINE, ANNOUNCED INSPECTION REPORT NO.50-05/2001-201

Dear Dr. Pell:

This letter refers to the inspection conducted on June 11-15, 2001, at the Pennsylvania State University Breazeale Research Reactor. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress.

Based on the results of this inspection, no noncompliance of NRC requirements or safety concerns was identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/NRC/ADAMS/index.html. If you have any questions, please contact Thomas Dragoun at 610-337-5373.

Sincerely,

/RA/

Ledyard B. Marsh, Chief
Operational Experience and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-005
License No. R-2

Enclosure: NRC Inspection Report No. 50-005/2001-201

cc w/enclosure: Please see next page

cc:

Mr. Eric J. Boeldt, Manager of
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Dr. C. Frederick Sears, Director
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Mr. William P. Dornsife, Director
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Department of Environmental Protection
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Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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U. S. NUCLEAR REGULATORY COMMISSION

Docket No:	50-005
License No:	R-2
Report No:	50-005/2001-201
Licensee:	Pennsylvania State University
Facility:	Breazeale Research Reactor
Location:	University Park, Pennsylvania
Dates:	June 11-15, 2001
Inspector:	Thomas F. Dragoun
Approved by:	Ledyard B. Marsh, Director Operational Experience and Non-Power Reactors Branch Division of Regulatory Improvement Programs Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

This routine, announced inspection included onsite review of selected aspects of the operations program, organizational structure and functions, reportable occurrences, radiation protection program, environmental protection program, operator requalification program, surveillance program, procedural control program, emergency preparedness, and safeguards program since the last NRC inspection of this program.

The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

ORGANIZATIONAL STRUCTURE AND FUNCTIONS

The organizational structure and functions were consistent with Technical Specification requirements.

OPERATIONS

The operations program satisfied Technical Specification requirements.

REPORTABLE OCCURRENCES

The reportable occurrence program satisfied Technical Specification requirements.

RADIATION PROTECTION

The radiation protection program satisfied NRC requirements.

ENVIRONMENTAL PROTECTION

The environmental protection program satisfied NRC requirements.

OPERATOR REQUALIFICATION

Operator requalification was conducted as required by the Requalification Program.

SURVEILLANCE

The surveillance program satisfied Technical Specification requirements.

PROCEDURES

The procedural control and implementation program satisfied Technical Specification requirements.

EMERGENCY PREPAREDNESS

The emergency preparedness program was conducted in accordance with the Emergency Plan.

SAFEGUARDS

Special Nuclear Materials were acceptably controlled and inventoried.

SECURITY

The NRC-approved security program was acceptably implemented.

Report Details

Summary of Plant Status

During the inspection the reactor was operated daily for experiments and service work. A new Butler building was erected on site for storage. Housekeeping in the reactor facility was improved. Several modifications improved industrial safety.

1. ORGANIZATIONAL STRUCTURE AND FUNCTIONS

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- organization and staffing
- qualifications
- management responsibilities
- administrative controls

b. Observations and Findings

The organizational structure has been stable since the major realignment noted during the last inspection. One staff retirement was expected soon but should not disrupt operations. A full time electronics technician and a computer engineer have been added to the staff. There are 11 licensed reactor operators and 10 student assistants. The Associate Dean of Engineering stated that University management firmly supports operations at the reactor. This support was recently demonstrated by significant salary increases and expenditures to enhance industrial safety.

The organizational structure and staffing at the facility was as required by Technical Specification. Qualifications of the staff met Technical Specification requirements. Review of records verified that management responsibilities were administered as required by Technical Specifications and applicable procedures.

c. Conclusions

The organizational structure and functions were consistent with Technical Specification requirements.

2. OPERATIONS

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- operational logs and records
- staffing for operations
- selected operational, startup, or shutdown activities

b. Observations and Findings

The operating logs and records were clear and provided an indication of operational activities. The logs and records indicated that shift staffing including on-call personnel was as required by Technical Specifications. Names of duty personnel were prominently posted. Logs and records also showed that operational conditions and parameters were consistent with license and Technical Specification requirements. Observation of operational activities further confirmed that these conditions and requirements were satisfied.

c. Conclusions

The operations program satisfied Technical Specification requirements.

3. REPORTABLE OCCURRENCES

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- licensee initial corrective actions
- actions to prevent recurrence

b. Observations and Findings

The following reportable occurrences were reviewed:

Event Date	Description
2/9/1998	Operator not present in control room for 5 seconds while reactor was critical.
10/1/1999	Transient Rod failed drop test.
3/30/2000	Console key was not in off position and removed while the reactor was shutdown but no operator at the console for 3 minutes.
5/15/2000	Failure of Wide Range power indicator pre-amplifier. (Determined to be not reportable.)
10/4/2000	Failure of power range channel during reactor operation.
2/1/2001	Daily measurement of pool conductivity missed one day.
6/7/2001	Console key not removed while control room unoccupied for 75 seconds.

Short term and long term corrective actions described by the licensee in the event reports to the NRC were complete and satisfactory.

c. Conclusions

The reportable occurrence program satisfied Technical Specification requirements.

4. RADIATION PROTECTION

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- organization and staffing
- the Radiation Protection Program
- peer review implementation
- radiological signs and posting
- routine surveys and monitoring
- dosimetry and survey records
- maintenance and calibration of radiation monitoring equipment
- radiation worker training.
- As Low As Reasonably Achievable (ALARA) reviews

b. Observations and Findings

After completion of the personnel turnover and reorganization noted during the last inspection, all positions in the Environmental Health and Safety - Radiation Protection Office have been filled by qualified personnel. The reactor radiation protection program had not changed since the last inspection and remains a subset of the campus program with oversight provided by the University Isotopes Committee (UIC). This program was documented and its status was reviewed annually by the RSO as required by 10 CFR 20.1101. The reactor staff also conducts radiation protection activities in accordance with reactor procedures AP-16, 17, and 18 and conducts an annual review.

In response to NRC concerns regarding developing program weakness during the last inspection, the licensee requested a peer review by the National Organization of Test, Research, and Training Reactors (TRTR). The inspector determined that actions on the TRTR team recommendations were completed.

Caution signs and postings were as required by 10 CFR 20, Subpart J. The RSO stated that unnecessary postings were removed to reduce clutter since the last inspection.

Routine surveys were completed on a weekly, monthly, and quarterly basis in accordance with program requirements. Equipment used for these activities were maintained, calibrated and used acceptably. Personnel dosimetry records indicated doses were well below NRC limits. Since the last inspection, all records required by Technical Specifications or 10 CFR 20 were consolidated in Academic Project Building were the radiation protection staff was located. Records were orderly and readily retrievable.

Radiation worker training regarding hazards and protective measures was conducted in two parts. Basic training was developed by the RSO staff and placed on the Internet. Candidates must pass a written test on this material. Job specific training was provided by persons designated by the RSO. Training requirements specified by 10 CFR 19 were satisfied.

A documented ALARA management policy was in effect as required by 10 CFR 20.1101. Reviews were acceptably performed during experiment approvals and during the routine surveys.

The licensee did not require a respiratory protection program or planned special exposure program.

c. Conclusions

The radiation protection program satisfied NRC requirements.

5. ENVIRONMENTAL PROTECTION

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- annual environmental doses
- solid waste disposal
- liquid waste disposal

b. Observations and Findings

Direct shine environmental doses from the reactor were below NRC limits. The annual dose from reactor stack emissions was below the constraint specified in 10 CFR 20.1101. Solid waste was transferred to the broad scope license for disposition.

There was no liquid effluent. Reactor pool water needing to be drained was stored and reused. An evaporator was available for solidification of liquid waste but has not been used for this purpose for many years. Instead, the evaporator was routinely used to produce distilled water for reactor pool makeup.

c. Conclusions

The environmental protection program satisfied NRC requirements.

6. OPERATOR REQUALIFICATION

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- the Requalification Program
- operator licenses
- operator training records
- operator physical examination records
- operator examination records
- operator active duty status

b. Observations and Findings

The Requalification Program was revised in 1997 and documented in procedure AP-3 revision 1. Operator licenses were current for all watch-standers noted in the console log. Records showed that lectures were conducted about twice each month and selected from one of the nine areas specified in AP-3 section C. Physical examinations of the operators were conducted as required. Records showed that written and operating examinations of the operators were acceptably implemented. Logs showed that operators maintained active duty status as required.

c. Conclusions

Operator requalification was conducted as required by the Requalification Program.

7. SURVEILLANCE

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- surveillance and calibration procedures,
- surveillance, calibration and test data sheets and records

b. Observations and Findings

The surveillance program was highly organized. Procedure AP-15 cross referenced each TS with a surveillance procedure (CCP series). A “CCP Matrix” provided a fixed annual completion schedule. Records were well maintained, complete and showed that surveillance, test and LCO verifications and calibrations were completed on schedule and in accordance with licensee procedures. All the recorded results were within the TS and procedurally prescribed parameters.

c. Conclusions

The surveillance program satisfied Technical Specification requirements.

8. PROCEDURES

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- administrative controls
- records for changes and temporary changes
- procedural implementation
- logs and records

b. Observations and Findings

Procedures are reviewed biennially and updated as required. The Safeguards Committee reviewed new procedures and major revisions as required by TS 6.2.3. However, the inspector noted that many revisions were not major and there was no documented policy for the control of these. The Director stated that this matter would be reviewed.

Training of personnel on procedures and changes was acceptable. Personnel conducted activities in accordance with applicable procedures.

c. Conclusions

The procedural control and implementation program satisfied Technical Specification requirements.

9. EMERGENCY PREPAREDNESS

a. Scope (IP 69001)

The inspector reviewed selected aspects of:

- the Emergency Plan
- emergency response facilities, supplies, equipment and instrumentation
- training records
- offsite support
- emergency drills and exercises

b. Observations and Findings

A revised Emergency Plan (E-Plan revision 4) was implemented in September 2000 with changes made by the licensee under the provisions of 10 CFR 50.54(q). The changes did not decrease the E-Plan effectiveness. Reactor operators, support staff, and campus police were trained in the changes.

Emergency response facilities and equipment were as specified in the E-Plan. In addition, the licensee installed a computer terminal just inside the reactor building emergency exit. This terminal, always active, echoes the reactor parameter data from the control console and includes reading from the area radiation monitors.

Agreements for offsite support were in effect but due for review and renewal later this year.

Exercises and drills were conducted as specified in the E-Plan.

c. Conclusions

The emergency preparedness program was conducted in accordance with the Emergency Plan.

10. SAFEGUARDS

a. Scope (IP 85102)

The inspector reviewed selected aspects of:

- nuclear material inventory and locations
- accountability records

b. Observations and Findings

Records indicated that all nuclear material was accurately accounted for. All Material Balance Reports (DOE/NRC Form-742 and 742c) submitted by the licensee for this period satisfied the requirements specified in 10 CFR 70.53.

All SNM was stored and used in designated areas.

Physical inventories were conducted annually as required by 10 CFR 70.51(d).

c. Conclusions

Special Nuclear Materials were acceptably controlled and inventoried.

11. SECURITY

a. Scope (IP 81431)

The inspector reviewed:

- annual audit
- key control
- detection aids
- physical barriers

b. Observations and Findings

Audits were detailed and noted improved security performance. The reactor staff periodically tests the security system as required. A modification separated intrusion alarms from the fire alarms. Facility keys were properly controlled. All lock cores and keys were changed in July 1999.

The licensee's physical protection program was found to conform to NRC requirements and the licensee's implementing procedures.

c. Conclusions

The NRC-approved security program was acceptably implemented.

12. EXIT INTERVIEW

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on June 15, 2001. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

E. Boeldt, Manager, Radiation Protection
M. Bryan, Research Engineer/Supervisor RSEC
L. Burton, Dean of Engineering
M. Claver, Director, Environmental Health and Safety
C. Davison, Research and Education Specialist/Supervisor RSEC
T. Flinchbaugh, Manager, Operations and Training RSEC
M. Morlang, Reactor Engineer/Supervisor RSEC
E. Pell, Vice President for Research
F. Sears, Director, Radiation Science & Engineering Center

INSPECTION PROCEDURES USED

IP 69001	CLASS II NON-POWER REACTORS
IP 81431	FIXED SITE PHYSICAL PROTECTION OF SNM OF LOW STRATEGIC SIGNIFICANCE
IP 85102	MATERIAL CONTROL AND ACCOUNTING

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED:	None
CLOSED:	None

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
LCO	Limiting Condition for Operation
NRC	Nuclear Regulatory Commission
RP	Radiation Protection
RSO	Radiation Safety Officer
SNM	special nuclear material
TS	Technical Specifications
UIC	University Isotopes Committee