June 24, 2016

Dr. Kenan Unlu, Director
The Pennsylvania State University
Breazeale Nuclear Reactor
Radiation Science and Engineering Center
University Park, PA 16802-2301

SUBJECT: PENNSYLVANIA STATE UNIVERSITY - U.S. NUCLEAR REGULATORY COMMISSION SAFETY INSPECTION REPORT NO. 50-5/2016-201

Dear Dr. Unlu:

From May 16-18, 2016, the U.S. Nuclear Regulatory Commission (NRC, or the Commission) conducted an announced safety inspection at your Pennsylvania State University Breazeale Research Reactor facility. The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

During the inspection, the NRC staff examined activities conducted under your license as they relate to public health and safety to ensure compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. Based on the results of this inspection, no findings of non-compliance were identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public inspections, exemptions, requests for withholding," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document system (Agencywide Documents and Access Management System (ADAMS)). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Mr. Ossy Font at (301) 415-2490 or by electronic mail at Ossy.Font@nrc.gov.

Sincerely,

/RA/

Anthony J. Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-5
License No. R-2

Enclosure:
As stated

cc: See next page

cc:

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/RA/

Anthony J. Mendiola, Chief
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Enclosure:
Inspection Report

cc: See next page

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

Docket No:	50-5
License No:	R-2
Report No:	50-5/2016-201
Licensee:	The Pennsylvania State University
Facility:	Penn State Breazeale Reactor
Location:	University Park, Pennsylvania
Dates:	May 16-18, 2016
Inspector:	Ossy Font
Approved by:	Anthony J. Mendiola, Chief Research and Test Reactors Oversight Branch Division of Policy and Rulemaking Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

The Pennsylvania State University
Penn State Breazeale Reactor Facility
NRC Inspection Report No. 50-5/2016-201

The primary focus of this routine, announced operations inspection was the on-site review of selected aspects of the Pennsylvania State University (the licensee) Class II research reactor facility safety program, including: (1) organization and staffing, (2) operations logs and records, (3) requalification and training, (4) surveillance and limiting conditions for operation, (5) emergency planning, (6) maintenance logs and records, and (7) fuel handling logs and records since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

Organization and Staffing

- The Penn State Breazeale Reactor (PSBR) organization and staffing was consistent with Technical Specification (TS) requirements.

Operation Logs and Records

- No deficiencies were noted with logbook records, retention met or exceeded the retention requirements of the PSBR TS.

Requalification and Training

- The requalification program was being conducted consistently with the TS and Administrative Procedure 3. Staff not meeting conditions of the license were not allowed to assume control of the reactor until they satisfied the requirements of their license.

Surveillance and Limiting Conditions for Operation

- Operations were found to be generally in compliance with the limiting conditions for operation and surveillances requirements as stated in the TS.

Emergency Planning

- The records reviewed by the inspector indicated that the PSBR Emergency Preparedness plan, oversight, and training were generally being implemented as required.

Maintenance Logs and Records

- The licensee maintained records documenting principal maintenance activities in compliance with TS requirements.

Fuel Handling Logs and Records

- The fuel handling program continues to comply with the TS.

REPORT DETAILS

Summary of Facility Status

The Pennsylvania State University (the licensee) continues to operate the one megawatt Penn State Breazeale Reactor (PSBR) in support of routine experiments, reactor operator training, and periodic equipment surveillances. During the inspection, the reactor was operated to support experiments.

1. Organization and Staffing

a. Inspection Scope (Inspection Procedure (IP) 69001-02.01)

To ensure that the requirements of Technical Specification (TS) 6.1, "Organization," were being met, the inspector reviewed the following:

- PSBR organizational structure and staffing, dated January 27, 2016
- PSBR Annual Operating Report, Fiscal Year (FY) 13-14
- PSBR Annual Operating Report, Fiscal Year FY 14-15
- PSBR Logbooks 97-98
- Standard Operating Procedure (SOP)-1, "Reactor Operator Procedure"

b. Observations and Findings

Since the previous U.S. Nuclear Regulatory Commission (NRC) inspection (Inspection Report No. 50-5/2014-201), there have been no changes in the organization at the PSBR.

A list of facility personnel is posted in the control room in accordance with TS 6.1.3 b. NRC staff found the list to contain the names and contact information for management, operations, radiation safety, and other support personnel. The list was found to have current management and operational personnel listed.

The PSBR staffing satisfied TS 6.1.3 a. with console logbook entries.

c. Conclusion

The PSBR organization and staffing was consistent with TS requirements.

2. Operations Logs and Records

a. Inspection Scope (IP 69001-02.02)

To ensure that the requirements of TS 6.7, "Records," were being met, the inspector reviewed the following:

- PSBR Logbooks 97-98
- SOP-1, “Reactor Operating Procedure,” Revision (Rev.) 23
- Administrative Procedure (AP)-3, “Operator and Senior Operator Requalification,” Rev. 1, dated June 26, 1997
- AP-4 Event Evaluation Log Sheet, “Identification, Evaluation and Documentation of Safety System Failures, Abnormal Events, and Operational Events,” Rev. 5, including Appendix A-C, 2015-present

b. Observations and Findings

Logbook entries were maintained in accordance with approved procedures and uniformity. By PSBR procedures, certain items were to be entered in the console logbook, such as on the requalification requirements, completed compliance checks, maintenance items, and core position. Compliance checks were observed to be stamped with retention in accordance with TS 6.7.

c. Conclusion

No deficiencies were noted with logbook records, retention met or exceeded the retention requirements of the TS.

3. Requalification and Training

a. Inspection Scope (IP 69001-02.04)

To ensure that the requalification and training requirements of TS 6.1.4, 6.2.4, and TS 6.7.2 and Title 10 of the *Code of Federal Regulations* (10 CFR) 55.53(h), were being met, the inspector reviewed the following:

- AP-3, “Operator and Senior Operator Requalification,” Rev. 1, dated June 26, 1997
- AP-4 Event Evaluation Log Sheet, “Identification, Evaluation and Documentation of Safety System Failures, Abnormal Events, and Operational Events,” Rev. 5, including Appendix A-C, 2015-present
- PSBR logbooks 97-98
- Training lectures’ attendance sheets, 2014-2016
- Annual key-on hours and manipulations spreadsheet 2015-present
- Requalification training record sheet

b. Observations and Findings

The requalification plan is captured in AP-3 and contains annual on the job training, oral test, and operational test. Continuous lectures were done throughout the year. To prevent reoccurrence of events documented in AP-4, discussion and training were completed. Written, operations and the biennial medical exams were completed, as required. Those that did not take or failed the exams were removed from duty until the issue was addressed.

c. Conclusion

The requalification program was being conducted consistently with the TSs and AP-3. PSBR staff not meeting conditions of the license were not allowed to assume control of the reactor until they satisfied the requirements of their license.

4. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001-02.08)

To ensure that the requirements of TS 3.0, "Limiting Conditions for Operation," (LCO) and TS 4.0, "Surveillance Requirements," were being met, the inspector reviewed the following:

- PSBR Logbook 97
- Check and Calibration Procedure (CCP):
  - Annual-CCP-1, 3, 11, 15, 31
  - Semi-annual-CCP-4;
  - Daily-SOP-2
- CCP-16, "Inspection of Fuel Elements," dated May 14, 2012
- CCP-21, "Emergency Support Center Supplies Check," dated April 17, 2012
- CCP-28, "Review of Emergency Preparedness Plan"
- CCP status matrix

b. Observations and Findings

The inspector selected a sample of the TS surveillances and LCO to verify implementation and determined that the frequency and outcome met TS requirements. The LCOs were maintained in accordance with the licensee's procedural requirements.

c. Conclusion

Operations were found to be in compliance with the LCO and surveillance requirements as stated in the TS.

5. Emergency Planning

a. Inspection Scope (IP 69001-02.10)

To ensure that the emergency preparedness requirements of 10 CFR 50.34, Appendix E, and TS 6.3.u. were being met, the inspector reviewed the following:

- PSBR Emergency Preparedness Plan (EPP), Rev. 4, September 21, 2000
- Emergency Procedure (EP)-1, "EPP Implementation," Rev. 16, dated September 25, 2012
- EP-11, "Unauthorized Intrusion"
- CCP-20, "University Police Training," Rev. 4

- CCP-21, “Emergency Support Center Supplies Check,” Rev. 6, dated April 17, 2012
- CCP-22, “Emergency Drill and Preparedness”
- CCP-28, “Review of Emergency Preparedness Plan”
- Emergency Contact List, dated December 2015
- Memorandum of Understanding with Mount Nittany Medical Center including Hospital Procedures, dated September 28, 2015
- Audit Report dated December 2012

b. Observation and Findings

The inspector reviewed the current EPP, which had not changed since the previous inspection; revisions typically were reviewed and approved through the individual implementing procedures. The EPP and implementing procedures were current and readily available in several locations for use as required. The biennial audit was also completed.

The inspector visually inspected the emergency supply cabinets and reviewed the equipment check semi-annual surveillance. Also, fixed and portable monitoring equipment were inspected for calibration and availability and were determined to be appropriately maintained.

Reactor staff and Penn State University police required training were being completed annually as required. Additionally, the facility is required to perform an annual emergency drill in accordance with TS. Drills for 2014 and 2015 included actual events resulting in evacuations and off-site organizations. The 2014 drill were discussed during this module’s previous inspection (No. 50-5/2014-201). The 2015 drills involved a fire on the roof of the adjacent building. All evacuation, when required, and responder actions were performed as expected.

Lastly, the inspector met with the hospital staff, toured their decontamination room, and discussed their radiological accident procedures, and determined that they are equipped to assist in the case of an emergency.

c. Conclusion

The records reviewed by the inspector indicated that the PSBR EPP, oversight, and training were generally being implemented as required.

6. Maintenance Logs and Records

a. Inspection Scope (IP 69001-02.11)

To ensure that the maintenance requirements of TS 6.7.1.c. and 6.7.1.g. were being met, the inspector reviewed the following:

- AP-4 Event Evaluation Log Sheet, "Identification, Evaluation and Documentation of Safety System Failures, Abnormal Events, and Operational Events," Rev. 5, including Appendix A-C, 2015-present
- EP-11, "Unauthorized Intrusion"
- Electronic Maintenance Log

b. Observations and Findings

The inspector reviewed a selection of maintenance logs. One activity involved the replacement of relays in the intrusion alarm system performed in December 2014. The inspector determined that the selected maintenance items reviewed had not been facility modifications of systems, as described in the Safety Analysis Report, and that records were being retained for at least five years.

c. Conclusion

The licensee maintained records documenting principal maintenance activities in compliance with TS requirements.

7. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001-02.12)

To ensure that the requirements of TS 3.1.6 and TS 4.1.3, "TRIGA Fuel Elements," were being met, the inspector reviewed the following:

- CCP-16 "Inspection of Fuel Elements"
- CCP-17 "Inspection of Control Rods and Rod Drives"
- SOP-3, "Core Loading and Fuel Handling"
- Current core configuration Map
- Current fuel element storage location map

b. Observations and Findings

The inspector reviewed the fuel movement and surveillance records and determined that none have occurred since this module was previously inspected (No. 50-5/2014-201). The core configuration remains the same and the surveillance was due after this inspection.

c. Conclusion

The fuel handling program continues to comply with the TS.

8. Exit Interview

The inspector reviewed the inspection results with members of licensee management and the Vice President of Research at the conclusion of the inspection on May 18, 2016. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspectors during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Davison, Research and Education Specialist
S. Herman, Senior Reactor Operator (SRO)
B. Schmoke, SRO
C. Jones, Reactor Operator

Others

B. Buck, Director, Safety and Security, Mount Nittany Medical Center
L. Brungard, V.P., Facilities and Plant Operations, Mount Nittany Medical Center

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened	None
Closed	None
Discussed	None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
AP	Administrative Procedure
CCP	Checks and Calibrations Procedures
EP	Emergency Procedure
EPP	Emergency Preparedness Plan
IP	Inspection Procedure
LCO	Limiting Conditions for Operation
NRC	U.S. Nuclear Regulatory Commission
PSBR	Penn State Breazeale Reactor
RO	Reactor Operator
Rev.	Revision
SOP	Standard Operating Procedure
SRO	Senior Reactor Operator
TS	Technical Specifications