



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

July 2, 2025

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

SUBJECT: PENNSYLVANIA STATE UNIVERSITY – U.S. NUCLEAR REGULATORY
COMMISSION SAFETY INSPECTION REPORT NO. 05000005/2025201

Dear Dr. Unlu:

From May 19-22, 2025, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Penn State Breazeale Reactor facility. The inspection results were discussed on May 22, 2025, with you and members of your staff, including members of the Environmental Health and Safety department. The enclosed report documents the inspection results.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed various activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390, "Public inspections, exemptions, requests for withholding," a copy of this letter, its enclosure, and your response (if any) 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 Access and Management System (ADAMS)). ADAMS is accessible from the NRC website at <https://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

If you have any questions concerning this inspection, please contact Brian Lin at (301) 415-2923, or via email to Brian.Lin@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read 'Tony Brown', followed by a horizontal line.

Signed by Brown, Tony
on 07/02/25

Tony Brown, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

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

Enclosure:
As stated

cc w/enclosure: GovDelivery Subscribers

SUBJECT: PENNSYLVANIA STATE UNIVERSITY – U.S. NUCLEAR REGULATORY
COMMISSION INSPECTION REPORT NO. 05000005/2023201
DATED: JULY 2, 2025

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

Docket No.: 50-005

License No.: R-2

Report No.: 05000005/2025202

Licensee: Pennsylvania State University

Facility: Pennsylvania State University Breazeale Research Reactor

Location: State College, PA

Dates: May 19 - 22, 2025

Inspector: Brian Lin

Approved by: Tony Brown, Chief
Non-Power Production and Utilization
Facility Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an inspection at Pennsylvania State University (PSU, the licensee's) Class II research reactor facility in accordance with the research and test reactor inspection program. This is the NRC's program for overseeing the safe operation of licensed research and test reactors. Refer to <https://www.nrc.gov/reactors/non-power.html> for more information.

List of Violations

No violations of more than minor significance were identified.

Additional Tracking Items

None.

REPORT DETAILS

Facility Status

The PSU 1 megawatt research reactor is operated in support of research, education, service irradiations, and reactor operator training. During the inspection, the reactor was operating.

Inspection Scopes

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <https://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Inspections were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter 2545, "Research and Test Reactor Inspection Program." The inspector reviewed select procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

69001 – Class II Non-Power Reactors

This inspection included a review of selected aspects of the research and test reactor, since the last inspection, to verify activities were conducted safely and in accordance with regulatory requirements and licensee commitments.

Procedures (IP Section 02.03)

This inspection included a review of select licensee procedures to verify: administrative controls were in accordance with the technical specifications (TSs), license requirements, and licensee commitments; the procedures in use were current and reviewed and approved, as required; procedures could be implemented as intended; and reactor personnel were observing administrative controls and TS requirements relative to procedural adherence. Specifically, the inspection included a review of the following:

- startup, steady state, and shutdown procedures
- Penn State Breazeale Reactor (PSBR) logbook 2022-1, 2022-2, and 2023-1
- annual operating reports for the PSBR for the period of 2022 through 2024
- select administrative procedures, standard operating procedures, checks and calibration procedures, auxiliary operating procedures, and special procedures
- Reactor Safeguards Committee (RSC) meeting minutes, dated 2023-present

Experiments (IP Section 02.06)

This inspection included a review of select experiments and procedures to verify licensee experiments were reviewed, approved, and conducted in accordance with TS requirements, licensee procedures, and the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59, "Changes, tests and experiments." However, due to the reactor not being operated, the facility performed zero experiments since the last inspection. Specifically, the inspection included a review of the following:

- select experiment procedures
- select sample records of SOP-5, "Experimental Evaluation, and Authorization" for 2023 through 2025
- experimental facilities

Health Physics (IP Section 02.07)

This inspection included a review of the licensee's health physics program to verify that the provisions of 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," and 10 CFR Part 20, "Standards for Protection against Radiation," TSs, and the licensee's procedural requirements were met. The inspection included a review of: licensee's dose limits; required radiation surveys, sampling, and monitoring; calibration of radiological instruments; the personnel dosimetry program; effluent releases; posting requirements; training requirements; the implementation of as low as is reasonably achievable (ALARA) principles; and the radiation protection program's review and approval requirements. Specifically, the inspection included a review of the following:

- select personnel dosimetry records from 2023-present
- continuous air monitor annual calibration reports performed from 2023 – present
- exhaust plenum monitor annual calibration reports performed from 2023 – present
- area radiation monitors annual calibrations performed from 2023 – present
- pocket dosimeter annual calibrations performed from 2023- present
- survey meter annual calibrations performed from 2023 – present
- weekly contamination surveys and swipes performed from 2023 – present
- environmental surveys performed from 2023 - present
- liquid effluent discharge records from 2023 - present
- 2023 annual operating report
- 2024 annual operating report
- select radiation training records from 2023 – present
- University Isotope Committee minutes from 2023 – present
- radiation protection program review for calendar year 2023
- personnel training records for 2023 irradiated sampling handling incident
- results of investigation into Quarter 2 2024 abnormal measured extremity dose
- AP-4, identification, evaluation, reporting and documentation of safety system failures, abnormal events and operational events, revision 6, December 25, 2015

Design Changes (IP Section 02.08)

This inspection included a review of design changes to determine whether they were reviewed, approved, and implemented in accordance with 10 CFR 50.59, the TSs, and the licensee's administrative procedures. The inspector verified that modified equipment would continue to meet regulatory and procedural requirements and licensee commitments. Specifically, the inspection included a review of the following:

- 10 CFR 50.59 screening forms, dated 2023 – present
- AP-12, "Change," revision 7, August 15, 2022
- various AP-12 work packages conducted in 2023 through 2025
- RSC meeting minutes from 2023 through 2025

Committees, Audits and Reviews (IP Section 02.09)

This inspection included a review of the licensee's committees, audits and reviews to verify the safety review committee and audits were conducted in accordance with the TSs and issues identified from reviews were resolved in accordance with TS requirements and the licensee's procedures. Specifically, the inspection included a review of the following:

- RSC meeting minutes from 2023 – present
- RSC member designation letter for 2025 – 2028
- PSBR audit dated December 2022 through 2024

86740 – Inspection of Transportation Activities

This inspection included a review of the licensee's transportation activities to verify they have established and are maintaining an effective management-controlled program, to ensure radiological and nuclear safety in the receipt, packaging, and delivery of licensed radioactive materials. The inspector noted that no radioactive material transportation took place since the last inspection. Specifically, the inspection included a review of the following:

- select records, training materials and certificates for authorized shippers
- select records, radioactive material shipping paperwork
- annual review of the radiation protection program 2023 and 2024
- RPO-SHIP-01, "Radioactive Material Receipt and Shipment Procedure," revision 1

Inspection Results

No violations of more than minor significance were identified.

Exit Meeting and Debriefs

The inspector verified no proprietary information was retained or documented in this report.

- On May 22, 2025, the inspector presented the NRC inspection results to members of licensee management and staff.

Documents Reviewed

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|-----------|-------------|---|-------------------|
| 69001.06 | Procedure | SOP-5 | Experiment, Evaluation, and Authorization | May 3, 2021 |
| | | SOP-6 | Experiment Encapsulation and Irradiation | May 11, 2017 |
| | | SOP-10 | Reactor Operation at the Fast Neutron Irradiator and the Fast Flux Tube | May 15, 2024 |
| | | SOP-11 | Reactor Operation at the Beam Ports | May 4, 2021 |
| 69001.07 | Procedure | AP-18 | Radiation Protection Program | February 10, 2024 |
| | | AP-16 | PSBR ALARA Procedure | February 10, 2024 |
| 69001.09 | RSC | N/A | Meeting Minutes | May 9, 2023 |
| | | | Meeting Minutes | October 16, 2023 |
| | | | Meeting Minutes | April 25, 2024 |
| | | | Meeting Minutes | October 16, 2024 |
| | | | Meeting Minutes | April 10, 2025 |
| | Procedure | AP-6 | Pennsylvania State Reactor Safeguards Committee Charger and Operating Procedure | October 27, 2021 |
| 86740 | Procedure | SOP-8 | Disposition of Irradiated Material | January 16, 2020 |