



**PennState**

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US Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

50-005

June 25, 2019

Re: Minor change to License Amendment Request for PSU Breazeale Reactor

To Whom It May Concern,

On March 24, 2019, PSU submitted a license amendment request (LAR) to allow for the irradiation of up to 1 gram of U-235 and 1 gram of U-235 in any enrichment in "any physical form" for use in experiments. (See ADAMS accession number ML19094A260). This LAR was accepted for review in a letter from the NRC dated 6/23/2019 (EPID No. L-2019-LLA-0090).

In subsequent communication the NRC requested that PSU consider changing the request to irradiate U-233 and U-235 "in any physical form" into a more specific request to irradiate the same quantity and enrichment of material in "solid or liquid form." I.e., gases are not intended to be irradiated, and were not considered in the safety analysis performed at the facility. PSU agrees that the wording of the revised license should be amended to read "up to 1 gram of uranium-233 and up to 1 gram of uranium-235 of any enrichment in solid or liquid form for use in experiments" and we request that wording in the revised license. This change is reflected in clause 2.b of the updated proposed license revision, attached.

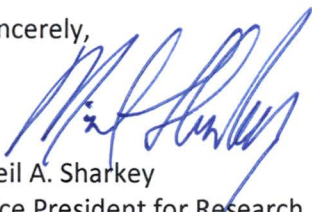
This change was approved by the Reactor Safeguards Committee via electronic vote on 6/24/2019.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 6/25/19

AD2D  
NRR

Sincerely,

  
Neil A. Sharkey  
Vice President for Research  
cc (electronic)

Michael Balazik (NRC)  
Stephen Lynch (NRC)  
Xiaosong Yin (NRC)

Attachments

Proposed license as amended, markup copy  
Proposed license as amended, clean copy

State of Pennsylvania  
County of Centre

This record was acknowledged before me on  
June 25, 2019

by Neil A. Sharkey (name of individual)  
as Vice President for Research (type of authority)  
who represents that he is authorized to act on behalf  
of The Pennsylvania State University (name of party  
on behalf of whom record was executed).  
Signature of notarial officer

Stamp

Diane K. Keshvari

My commission expires **COMMONWEALTH OF PENNSYLVANIA**

**NOTARIAL SEAL**  
**DIANE K. KESHVARI, Notary Public**  
**State College Boro., Centre County**  
**My Commission Expires July 26, 2019**

UNITED STATES NUCLEAR REGULATORY COMMISSION

PENNSYLVANIA STATE UNIVERSITY

DOCKET NO. 50-005

PENN STATE BREAZEALE REACTOR

RENEWED FACILITY OPERATING LICENSE

License No. R-2

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for renewal of Facility Operating License No. R-2 filed by the Pennsylvania State University (the licensee) dated December 6, 2005, as supplemented by letters dated October 31, 2008, and April 2, June 11, September 1, and October 21, 2009, (the application) , complies with the standards and requirements of the Atomic Energy Act of 1954 , as amended (the Act), and the Commission's rules and regulations set forth in Title 10, Chapter 1, of the *Code of Federal Regulations*;
  - B. Construction of the Penn State Breazeale Reactor (the facility) was completed in substantial conformity with Construction Permit No. CPRR-71 dated October 2, 1962, the provisions of the Act, and the rules and regulations of the Commission ;
  - C. The facility will operate in conformity with the application , the provisions of the Act, and the rules and regulations of the Commission;
  - D. There is reasonable assurance that (i) the activities authorized by this renewed license can be conducted at the designated location without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the rules and regulations of the Commission;
  - E. The licensee is technically and financially qualified to engage in the activities authorized by this license in accordance with the rules and regulations of the Commission;



~~CONTROLLED~~PROPOSED LICENSE - MARKUP

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- F. The licensee is a nonprofit educational institution and will use the facility for the conduct of educational activities, and has satisfied the applicable provisions of 10 CFR Part 140, "Financial Protection Requirements and Indemnity Agreements," of the Commission's regulations;
  - G. The issuance of this renewed license will not be inimical to the common defense and security or to the health and safety of the public;
  - H. The issuance of this renewed license is in accordance with 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," of the Commission's regulations and all applicable requirements; and
  - I. The receipt, possession and use of byproduct and special nuclear materials as authorized by this renewed license will be in accordance with the Commission's regulations in 10 CFR Part 30 and 10 CFR Part 70.
2. Facility Operating License No. R-2 is hereby renewed in its entirety to read as follows:
- A. This renewed license applies to the TRIGA Mark III nuclear reactor (the reactor) that is owned by Pennsylvania State University (PSU or the licensee), located at University Park, Pennsylvania, and described in the licensee's application, as supplemented.
  - B. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses Pennsylvania State University:
    - 1. Pursuant to subsection 104c of the Act, and Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," of the *Code of Federal Regulations* (10 CFR Part 50), to possess, use, and operate the reactor as a utilization facility at the designated location in accordance with the procedures and limitations described in the application and this renewed license.
    - 2. Pursuant to the Act and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," to receive, possess, and use in connection with operation of the reactor:
      - a. up to 9.0 kilograms of contained uranium-235 enriched to less than 20% in the form of fuel elements ~~and~~ up to 50 grams of contained uranium-235 of any enrichment in forms such as fission detectors or fission foils; ~~and~~
      - a.b. up to 1 gram of uranium-233 and up to 1 gram of uranium-235 of any enrichment in solid or liquid form for use in experiments; and
      - b.c. to possess and use, but not to separate such special nuclear material as may be produced by operation of the reactor.

~~CONTROLLED~~

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3. Pursuant to the Act and 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," to receive, possess, and use in connection with operation of the reactor: (1) two sealed 50-curie antimony-beryllium neutron sources, either or both of which may be used for reactor start-up, (2) a sealed 0.235 milligram californium-252 neutron source, and (3) a sealed 3-curie americium-beryllium neutron source.
  4. Pursuant to the Act and 10 CFR Part 30 to possess, use, and transfer but not to separate, except for byproduct material produced in non-fueled experiments, such byproduct material as may be produced by operation of the reactor.
- C. This renewed license shall be deemed to contain and is subject to the conditions specified in Parts 20, 30, 50, 51, 55, 70, and 73 of the Commission's regulations; is subject to all applicable provisions of the Act and rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

Maximum Power Level

1. The licensee is authorized to operate the reactor at a steady-state power level of 1.0 megawatt (thermal). The maximum power level shall not exceed 1.1 megawatts (thermal) when operated in the manual control mode, the automatic control mode, or the square wave mode. In pulsing mode, reactivity insertions shall not exceed  $2.45\% \Delta k/k$ .

Technical Specifications

2. The technical specifications contained in Appendix A are hereby incorporated in the license. The licensee shall operate the reactor in accordance with the technical specifications.

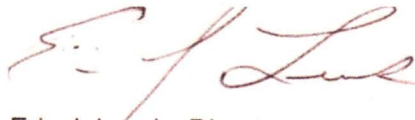
Additional Conditions

3. The licensee shall fully implement and maintain in effect all provisions of the Commission-approved physical security plan, including amendments and changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The approved physical security plan consists of a Pennsylvania State University document, withheld from public disclosure pursuant to 10 CFR 73.21, entitled, "The Physical Security Plan for the Pennsylvania State University Breazeale Reactor," dated June 11, 1990, as revised.

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- D. This renewed license is effective as of the date of issuance and shall expire at midnight twenty years from the date of issuance .

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in red ink, appearing to read "E. J. Edwards", is written over a horizontal line.

Eric J. Edwards, Director  
Office of Nuclear Reactor Regulation

Attachment:  
Appendix A, Technical Specifications

Date of Issuance : November 19, 2009



# PROPOSED LICENSE

## UNITED STATES NUCLEAR REGULATORY COMMISSION

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#### DOCKET NO. 50-005

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  - D. There is reasonable assurance that (i) the activities authorized by this renewed license can be conducted at the designated location without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the rules and regulations of the Commission;
  - E. The licensee is technically and financially qualified to engage in the activities authorized by this license in accordance with the rules and regulations of the Commission;

## PROPOSED LICENSE

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  - G. The issuance of this renewed license will not be inimical to the common defense and security or to the health and safety of the public;
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      - b. up to 1 gram of uranium-233 and up to 1 gram of uranium-235 of any enrichment in solid or liquid form for use in experiments; and
      - c. to possess and use, but not to separate such special nuclear material as may be produced by operation of the reactor.



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2. The technical specifications contained in Appendix A are hereby incorporated in the license. The licensee shall operate the reactor in accordance with the technical specifications.

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FOR THE NUCLEAR REGULATORY COMMISSION

Eric J. eds, Director  
Office of Nuclear Reactor Regulation

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