

October 12, 2012

Dr. Henry C. Foley
Vice President for Research
Dean of the Graduate School
Pennsylvania State University
304 Old Main
University Park, PA 16802

SUBJECT: PENNSYLVANIA STATE UNIVERSITY – ISSUANCE OF AMENDMENT NO. 38
TO FACILITY OPERATING LICENSE NO. R-2, BREAZEALE REACTOR
(TAC NO. ME9067)

Dear Dr. Foley:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 38 to Facility Operating License No. R-2 for the Pennsylvania State University (Penn State) Breazeale Reactor. The amendment consists of a change to the facility license in response to the request as stated in your letter dated July 9, 2012. The amendment makes a change to Technical Specification 3.5 a. to clarify operation of the facility exhaust fan.

Per 10 CFR 170.11(a)(4), this amendment request is exempt from fees as specified in 10 CFR 170.21.

A copy of the safety evaluation supporting Amendment No. 38 is also enclosed.

Sincerely,

/AAdams for RA/

Xiaosong Yin, Project Manager
Research and Test Reactors Licensing Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-5

Enclosures: 1. Amendment No. 38
2. Safety Evaluation

cc w/encls: See next page

Pennsylvania State University

Docket No. 50-5

cc:

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PENNSYLVANIA STATE UNIVERSITY

DOCKET NO. 50-5

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 38
Licensee No. R-2

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for an amendment to Facility Operating License No. R-2, filed by the Pennsylvania State University (the licensee) on July 9, 2012, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the regulations of the Commission as stated in Chapter I of Title 10 of the *Code of Federal Regulations* (10 CFR);
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted 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;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public;
 - E. This amendment is issued in accordance with the regulations of the Commission as stated in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," and all applicable requirements have been satisfied; and
 - F. Prior notice of this amendment was not required by 10 CFR 2.105, "Notice of proposed action," and publication of notice for this amendment is not required by 10 CFR 2.106, "Notice of issuance."

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the enclosure to this license amendment, and paragraph 2.C.2. of License No. R-2 is hereby amended to read as follows:

Technical Specifications

2. The Technical Specifications contained in Appendix A, as revised by Amendment No. 38, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.
3. This license amendment is effective on the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Alexander Adams Jr., Acting Chief
Research and Test Reactors Licensing Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Enclosure: Facility Operating License
and Technical Specifications
changes

Date of Issuance: October 12, 2012

ENCLOSURE TO LICENSE AMENDMENT NO. 38

FACILITY LICENSE NO. R-2

DOCKET NO. 50-5

Replace the following pages of the Facility Operating License No. R-2 and the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of changes.

Facility Operating License

Remove

Page 3

Insert

Page 3

Technical Specifications

Remove

Page 26

Insert

Page 26

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, as revised by Amendment No. 38, 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.

TECHNICAL SPECIFICATIONS: PENN STATE BREAZEALE REACTOR (PSBR)
FACILITY LICENSE NO. R-2

3.5 Engineered Safety Features - Facility Exhaust System and Emergency Exhaust System

Applicability

This specification applies to the operation of the facility exhaust system and the emergency exhaust system.

Objective

The objective is to mitigate the consequences of the release of airborne radioactive materials resulting from reactor operation.

Specification

- a. If the reactor is operating, at least one facility exhaust fan SHALL be operating and, except for periods of time less than 48 hours during maintenance or repair, the emergency exhaust system SHALL be operable.
- b. If irradiated fuel or a fueled experiment with significant fission product inventory is being moved outside containers, systems or storage areas, at least one facility exhaust fan SHALL be operating and the emergency exhaust system SHALL be operable.

Basis

During normal operation, the concentration of airborne radioactivity in unrestricted areas is below effluent release limits as described in the Safety Analysis Report, Chapter 13. In the event of a substantial release of airborne radioactivity, an air radiation monitor and/or an area radiation monitor will sound a building evacuation alarm which will automatically cause the facility exhaust system to close and the exhausted air to be passed through the emergency exhaust system filters before release. This reduces the radiation within the building. The filters will remove $\approx 90\%$ all of the particulate fission products that escape to the atmosphere.

The emergency exhaust system activates only during an evacuation whereupon all personnel are required to evacuate the building (TS 3.6.2). If there is an evacuation while the emergency exhaust system is out of service for maintenance or repair, personnel evacuation is not prevented.

In the unlikely event an accident occurs during emergency exhaust system maintenance or repair, the public dose will be equivalent to or less than that calculated in the Safety Analysis Report, Chapter 13.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 38 TO

FACILITY OPERATING LICENSE NO. R-2

PENNSYLVANIA STATE UNIVERSITY

DOCKET NO. 50-5

1.0 INTRODUCTION

By letter dated July 9, 2012 (Agencywide Documents Access and Management System Accession No. ML12194A552), the Pennsylvania State University (the licensee or Penn State) submitted a request for license amendment to change the Technical Specifications (TSs) for the Penn State Breazeale Reactor. The requested amendment would change TS 3.5 a., which requires an operating fan and system operability when the reactor is not secured. The requested change would require an operating fan and system operability when the reactor is operating.

2.0 EVALUATION

The licensee proposed a TS amendment to change TS 3.5 a., which requires an operating fan and system operability when the reactor is not secured.

The current Penn State TS 3.5 a., states the following:

- a. If the reactor is not secured, at least one facility exhaust fan SHALL be operating and, except for periods of time less than 48 hours during maintenance or repair, the emergency exhaust system SHALL be operable.

In its letter dated July 9, 2012, the licensee has requested to change the phrase “the reactor is not secured” to “the reactor is operating”:

- a. If the reactor is operating, at least one facility exhaust fan SHALL be operating and, except for periods of time less than 48 hours during maintenance or repair, the emergency exhaust system SHALL be operable.

On June 15, 2012, the licensee discovered that the current TS 3.5 a. did not properly account for the design of the system. During evacuation alarm testing (on a daily and monthly basis) and during recovery from system actuation, the reactor key must be inserted in order for the test to take place and for the actuation to be accomplished. However, if the key is inserted, then the reactor is considered to be not secured. Currently TS 3.5 a. requires that when the reactor is not

secured at least one exhaust fan must be operating. However, during testing, those fans may not be operating. Thus, under these circumstances, the facility is in temporary or momentary non-compliance with its TSs.

The licensee stated that the proposed wording reverses a change made to TS 3.5 a. in Amendment No. 32 to license No. R-2 in 1998. Originally, the requirement applied when the reactor was "operating." The requirement was amended in 1998 to apply when the reactor was "not secured" on the basis that the use of the wording "not secured" was a more conservative approach and not because of any reactor safety concerns. This requested wording change from "not secured" to "operating" returns TS 3.5 a. to previously approved wording and resolves potential conflicts between system design and operation and facility TSs.

The NRC staff has reviewed the licensee's submission and the previously issued license Amendment No. 32 and the associate safety evaluation report and noticed that under the previously approved wording, the reactor operated safely and in compliance with its TSs for many years. After its review, the NRC staff concludes that the requested change is acceptable and the wording change will not affect facility operations and will also be consistent with system design and operation. The NRC staff agrees with the licensee's assessment that this requested change will not affect the facility exhaust system function. The TS change will not reduce the facility's capability to detect and respond to airborne radioactive material during an unplanned release or a maximum hypothetical accident. Further, it will not increase the likelihood or consequences of any event. Finally, the proposed change in wording will not change facility exhaust fan operation or system operability when irradiated fuel or fueled experiments with significant fission product inventory are being moved outside containers, systems, or stage areas. Based on the foregoing analysis, the NRC staff concludes that the requested amendment will not change reactor operations or environmental monitoring procedures and requirements, and involves no undue risk to the health and safety of the public or the environment.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a TS wording change that addresses the facility exhaust fan operating requirement. This amendment involves changes in the installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20, or changes in inspection and surveillance requirements. The NRC staff has determined that this amendment involves no significant hazards considerations. Furthermore, the requested amendment does not involve a significant increase in the amounts, and no significant change in the types, of any effluents that may be released off-site and no significant increase in individual or cumulative occupational radiation exposure. Accordingly, the requested amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c) (9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The NRC staff has concluded on the basis of the information provided and the considerations previously discussed that (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously evaluated, or create the possibility of a new or different kind of accident from any accident previously evaluated, and does not involve a

significant reduction in a margin of safety, the amendment does not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed activities; and (3) such activities will be conducted in compliance with the Commission's regulations, and the issuance of this amendment will not be inimical to the common defense and security or the health and safety of the public.

Principal Contributor: Xiaosong Yin

Date: October 12, 2012