

15 Nov 2011

Document Control Desk
US Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Attn: Ms. Cindy Montgomery, Research & Test Reactors (NRR/DPR/PRLB), Mailstop O12 D20

SUBJECT: PURDUE UNIVERSITY - REQUEST FOR ADDITIONAL INFORMATION REGARDING
THE PURDUE UNIVERSITY REACTOR LICENSE RENEWAL (TAC NO. ME 1594),
RESPONSES TO RAIs DATED 6 JULY 2011 (ML101460429)

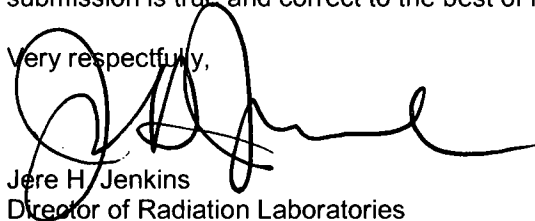
Dear Ms. Montgomery:

Enclosed please find the responses to the Request for Additional Information regarding the Purdue University Reactor License Renewal dated 6 July 2011. Included with this submission are responses to questions 1, 2, 5, 6, 8, 9, 14, 26, and 32. Further responses will be forthcoming as previously arranged.

Should you have any questions or require further information, please don't hesitate to call me at 765.496.3573, or e-mail at jere@purdue.edu.

I hereby certify under penalty of perjury with my signature below that the information contained in this submission is true and correct to the best of my knowledge.

Very respectfully,



Jere H. Jenkins
Director of Radiation Laboratories

Attachments: As described.

Cc: Duane Hardesty, USNRC Project Manager
Leah Jamieson; Purdue University College of Engineering
Jim Schweitzer, Purdue University REM
Ahmed Hassanein, Purdue NE

**REQUESTED ADDITIONAL INFORMATION IN RESPONSE TO RAIs DATED 6 JULY 2011
(ML101460429)**

REGARDING THE PURDUE UNIVERSITY REACTOR LICENSE RENEWAL (TAC NO. ME 1594)

- 1. ANSI/ANS-15.1-2007, Section 1 provides a definition of Reference Core Condition. The TS for PUR-1 provides no definition for Reference Core Condition although the reference core condition is mentioned in PUR-1 TS 1.10. Please provide a definition for the Reference Core Condition to comply with the modified ANSI/ANS-15.1-2007 standard definition as specified in Appendix 14.1 to NUREG-1537, Part 1.**

PUR-1 Response

The following definition will be added to the technical specifications:

Reference core condition: The condition of the core when it is at ambient temperature (cold) and the reactivity worth of xenon is negligible (<0.30 dollar).

Justification: To bring TS into alignment with ANSI/ANS-15.1-2007.

- 2. ANSI/ANS-15.1-2007, Section 1 provides definitions for key terminology utilized in the TS. Please review the TS for facility-specific definitions unique to PUR-1 that should be included in the TS. As a minimum, include definitions of Responsible Authority, Rod Control, Rod Regulating, Rod Transient, and Scram Time in TS 1.0 Definitions, or justify why the definitions are not needed, required, or justify the omission.**

PUR-1 Response

The following definitions will be added to the technical specifications:

Responsible authority: A governmental or other entity with the authority to issue licenses, charters, permits, or certificates.

Rod, control: A control rod is a device fabricated from neutron-absorbing material or fuel, or both, that is used to establish neutron flux changes and to compensate for routine reactivity losses. A control rod can be coupled to its drive unit allowing it to perform a safety function when the coupling is disengaged.

Rod, regulating: The regulating rod is a low worth control rod used primarily to maintain an intended power level that need not have scram capability and may have a fueled follower. Its position may be varied manually or by a servo-controller.

Rod, Shim-Safety: The control rods used in PUR-1 as described in the definition for Rod, control.

The following definitions will not be added to the technical specifications:

Rod Transient is not applicable to PUR-1 because it does not have a transient rod.

The term "scram time" is not used anywhere in the PUR-1 Technical Specifications.

Justification: To bring TS into alignment with ANSI/ANS-15.1-2007 and NUREG 1537.

5. ***TS 1.45: PUR-1 TS 1.45 provides a definition for an Unsecured Experiment. This definition refers to the definition in PUR-1 TS 1.32 for a secured experiment. The definition for "Secured experiment" is provided in TS1.37. Please update TS 1.45 to reference the definition for Secured experiment in TS 1.37 or explain the reference to the definition for Reactor Secured provided by TS 1.32 as currently written.***

PUR-1 Response

The bad reference was a typo, the corrected text is Unsecured Experiment - Any experiment, experimental facility, or component of an experiment is considered to be unsecured when it is not secured as defined in part 1.37 of this section.

6. ***TS 2.2. The specification for the Limiting Safety System Setting (LSSS) is 12.0 KW. Please review this specification to determine if the specification should actually be 12.0 kW(thermal), and update as appropriate.***

PUR-1 Response

The specification will remain unchanged.

8. ***Section 13.2.1, p. 13-9 of the PUR-1 Safety Analysis Report (SAR) references TS 3.5(f) established limits of radiation exposure for failure of a singly encapsulated fueled experiment. The proposed PUR-1 TS do not include 3.5(f). Please provide an updated TS references in the SAR for the established limits or justify why they are no longer required.***

PUR-1 Response

TS 3.5(f) and TS 3.5(g) have been reinserted into the proposed Technical Specifications as they are written in Amendment 12, as shown:

- f. The radioactive material content, including fission products, of any singly encapsulated experiment should be limited so that the complete release of all gaseous, particulate, or volatile components from the encapsulation will not result in doses in excess of 10% of the equivalent annual doses stated in 10 CFR 20. This dose limit applies to persons occupying (1) unrestricted areas continuously for two hours starting at time of release or (2) restricted areas during the length of time required to evacuate the restricted area.
- g. The radioactive material content, including fission products, of any doubly encapsulated experiment or vented experiment should be limited so that the complete release of all gaseous, particulate, or volatile components from the encapsulation or confining boundary of the experiment could not result in (1) a dose to any person occupying an unrestricted area continuously for a period of two hours starting at the time of release in excess of 0.5 Rem to the whole body or 1.5 Rem to the thyroid or (2) a dose to any person occupying a restricted area during the length of time required to evacuate the restricted area in excess of 5 Rem to the whole body or 30 Rem to the thyroid.
9. ***TS 3.5(f) and 3.5(g) relating to singly encapsulated and doubly encapsulated experiments have been eliminated from the proposed PUR-1 TS. For changes made to the TS (both additions and deletions) a justification in the form of an evaluation of a safety analysis must be provided. Please provide a safety evaluation for any TSs added or deleted or refer to where the TS additions or deletions are discussed in the SAR.***

PUR-1 Response

TS 3.5(f) and TS 3.5(g) have been reinserted into the proposed Technical Specifications as they are written in Amendment 12, as shown:

- f. The radioactive material content, including fission products, of any singly encapsulated experiment should be limited so that the complete release of all gaseous, particulate, or volatile components from the encapsulation will not result in doses in excess of 10% of the equivalent annual doses stated in 10 CFR 20. This dose limit applies to persons occupying (1) unrestricted areas continuously for two hours starting at time of release or (2) restricted areas during the length of time required to evacuate the restricted area.
- g. The radioactive material content, including fission products, of any doubly encapsulated experiment or vented experiment should be limited so that the complete release of all gaseous, particulate, or volatile components from the encapsulation or confining boundary of the experiment could not result in (1) a dose to any person occupying an unrestricted area continuously for a period of two hours starting at the time of release in excess of 0.5 Rem to the whole body or 1.5 Rem to the thyroid or (2) a dose to any person occupying a restricted area during the length of time required to evacuate the restricted area in excess of 5 Rem to the whole body or 30 Rem to the thyroid.

14. TS 3.5: The bases for TS 3.5 indicate that TS 3.5(f) and 3.5(g) conform to Regulatory Guide 2.2 (1973). In addition, Section 13 of the SAR (p.13-9) states that the exposure rate approaches the limits established in TS 3.5(f) for singly encapsulated experiments of 1.1 g of U-235. TS 3.5(f) and 3.5(g) are not included in your submittal. Please update the TS to provide the missing TS information or requirements or update the bases and SAR to the correct references, as appropriate.

PUR-1 Response

TS 3.5(f) and TS 3.5(g) have been reinserted into the proposed Technical Specifications as they are written in Amendment 12, as shown:

- f. The radioactive material content, including fission products, of any singly encapsulated experiment should be limited so that the complete release of all gaseous, particulate, or volatile components from the encapsulation will not result in doses in excess of 10% of the equivalent annual doses stated in 10 CFR 20. This dose limit applies to persons occupying (1) unrestricted areas continuously for two hours starting at time of release or (2) restricted areas during the length of time required to evacuate the restricted area.
- g. The radioactive material content, including fission products, of any doubly encapsulated experiment or vented experiment should be limited so that the complete release of all gaseous, particulate, or volatile components from the encapsulation or confining boundary of the experiment could not result in (1) a dose to any person occupying an unrestricted area continuously for a period of two hours starting at the time of release in excess of 0.5 Rem to the whole body or 1.5 Rem to the thyroid or (2) a dose to any person occupying a restricted area during the length of time required to evacuate the restricted area in excess of 5 Rem to the whole body or 30 Rem to the thyroid.

26. TS 6.2.6(b): PUR-1 TS 6.2.6(b) references PUR-1 TS 6.2.5(g). However, there does not appear to be a PUR-1 TS 6.2.5(g). Please update the TS, as required to provide the appropriate reference in the TS.

PUR-1 Response

This typo is corrected below, as well as one the subsequent paragraph.

6.2.6 Records

Records of CORO activities shall be prepared and distributed as indicated below.

- a. Minutes of each CORO meeting shall be prepared and forwarded to the Reactor Supervisor within 30 days following each meeting.
- b. Reports of reviews encompassed by section 6.2.4 e, f, and g above, shall be prepared and forwarded to the Reactor Supervisor within 30 days following completion of the review.
- c. Audit reports encompassed by Section 6.2.5 above, shall be forwarded to the CORO Chairman and to the management responsible for the areas audited within 30 days after completion of the audit.

32. TS 6.5: Regulation 10 CFR 50.59(c)(5)(i) requires that the facility licensee shall retain operator requalification documentation records until the operator's license is renewed. In addition, ANSI/ANS-15.1-2007, Section 6.8.2 contains the requirement that training records for reactor operators be maintained at all times the individual is employed or until the certification is renewed. Please amend PUR-1 TS 6.5 to satisfy this requirement.

PUR-1 Response

The technical specifications have been modified as follows:

- 6.5.2 Record of retraining and requalification of certified operations personnel shall be maintained at all times the individual is employed or until the certification is renewed.