PURDUE
UNIVERSITY

SCHOOL OF NUCLEAR ENGINEERING

1 June 2012

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 (ML103400115 and ML103400250)

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 43, 51, 56, 60, and 61. 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

A020
NRR

REQUESTED ADDITIONAL INFORMATION IN RESPONSE TO RAIs

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

43. Please describe any changes that have occurred to the PUR-1 facility since the PUR-1 SAR dated July 7, 2008, was submitted to the NRC that may impact the safety conclusions of the SAR.

Response:

There have been no changes to the PUR-1 facility since 7 July 2008 that would impact the safety conclusions of the SAR.

51. Section 3.5 of the SAR describes emergency procedures related to the air conditioner drain from the condensate holdup tank. Please describe the required actions if contamination is suspected and the method to dispose of any radioactive condensate if contamination is confirmed.

Response:

If contamination is suspected, the condensate water will be analyzed utilizing the same procedures that are used for the periodic analysis of the reactor water. If contamination is confirmed, the water will be properly disposed of by the university's Department of Radiological and Environmental Management in accordance with federal, state and local laws, as is all of the other waste generated in work performed at the university.

56. NUREG-1537, Section 11.1.4 provides guidance for radiation monitoring and surveying. SAR Section 11.1.6 addresses monthly wipe tests and water samples, but does not stipulate how the program avoids, prevents, and remedies the occurrence and spread of contamination. Please describe specific contamination control training and a contamination control program with provisions for recordkeeping sufficient in content and retention to support cleanup of contamination, maintenance, and planning for eventual decommissioning.

Response:

PUR-1 utilizes the Purdue University radiation safety program, as set forth by university policy and the Radiation Safety Manual (http://www.purdue.edu/rem/home/booklets/radman.pdf), which complies with requirements of the relevant parts of Title 10 of the Code of Federal Regulations and Title 410 Part 5 of the Indiana Administrative Code. Initial training of reactor personnel is performed by the Department of Radiological and Environmental Management (REM). This includes such topics as contamination control and record keeping. The reactor staff is supported by REM health physicists and technicians during reactor operations where exposures and contamination are possible. Record keeping is maintained both at the reactor and REM offices.

60. NUREG-1537, Section 8 discusses the need for emergency electrical power systems to systems that ensure radiation doses are maintained ALARA and are within the regulatory

limits of 10 CFR Part 20. Please discuss pertinent design bases details related to emergency electrical power, such as:

- ***A. The status of the reactor ventilation system/exhaust during normal operation, and what would happen to the ventilation system in the event of a loss of electrical power to the facility during operations, maintenance, or fuel handling, or in the event of an emergency.***
- ***B. The reactor ventilation connections to the HVAC system for the rest of the Duncan Annex and including whether operation is continuous related to emergency electrical power.***
- ***C. The conditions under which reactor ventilation system/exhaust would be isolated, and whether it can be isolated under loss of electrical power to the facility.***
- ***D. The fail position for the reactor ventilation system/exhaust dampers related to a loss of electrical power.***

PUR-1 does not have emergency electrical power. Pertinent to the question, however, we note the following:

A. The reactor ventilation system exhausts to the roof of the building through a HEPA filter, as noted in the SAR and responses to previous questions. In the event of loss of electrical power, fans will stop, and inlet and outlet dampers will close, which is equivalent to the isolation switch on the operations console.

B. The reactor ventilation system is separate and not connected to any other HVAC system in the Duncan Annex. Loss of electrical power will result in shutdown of the fans, and closing of the inlet and outlet dampers.

C. In the event of an accident in the reactor room where there is the danger of airborne contamination, the isolation/shutdown switch would be thrown and the reactor console, which would shutdown the fans and close the dampers. This would be equivalent to a loss of power.

D. The fail position of the ventilation system and dampers is off/closed.

61. Section 13.2.1 of the SAR states that the reactor staff would evacuate the facility within 1.5 minutes in the event of an accident. Please provide substantiation for this time estimate and discuss other pertinent details such as:

- ***A. Radiation alarms in the building to alert the occupants of events requiring evacuation.***
- ***B. An evacuation plan for students, faculty and staff and whether periodic evacuation drills are conducted to validate the stated evacuation times.***
- ***C. The responsible authority that would order and direct the building evacuation in the event in the reactor that would require an evacuation.***
- ***D. The exact areas that would be evacuated in the event in the reactor that would require an evacuation***
- ***E. The conditions, if any, that would require the entire building be evacuated and how long would it take to complete the evacuation. Also, include how the evacuation is verified complete.***

Response:

The facility boundary is the reactor room. The room itself measures approximately 30 x 40 feet, and has two easily accessible exits on opposite ends of the room. Therefore, 1.5 minutes is a completely reasonable estimate for evacuation should that become a necessity. The other details are as follows:

A. There is an alarm in the reactor room, and a separate alarm out in the hallway of the nuclear engineering laboratories in the Duncan Annex basement that can be triggered from inside the reactor room.

B. Evacuation drills are not conducted. The evacuation plan is listed in the reactor emergency procedure, which all reactor operators and those granted unescorted access privileges much be familiar with. These plans and procedures are commensurate with the size of the facility and the risks present.

C. As outlined in the Emergency Plan submitted with the SAR, the Emergency Director is responsible for determining the necessity of and making the order for building evacuation.

D. The reactor room, which is the facility boundary, is the only room that would be required to be evacuated under credible emergency conditions.

E. A fire in the building, or a bomb threat, are the only credible conditions that would require evacuation of the entire building. The evacuation of the facility would be verified by the reactor Emergency Director or designated alternate. The building would be verified by university police or fire emergency personnel.

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