

January 06, 2020

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Re: Response to Apparent Violations in NRC Special Inspection Report 05000182/2020-201;  
EA-20-144

Dear Ms. Montgomery:

This letter is in response to two apparent violations and one Severity Level IV violation dated December 7, 2020 as a result of the special inspection conducted October 27 – November 6, 2020. The apparent violations are involved with the reactor exceeding the maximum licensed power level (License Condition 2.C.1) and operating the reactor prior to completing the applicable surveillance testing for replaced equipment (Technical Specification 4.2.g) The Severity Level IV violation is due to inadequately posting a radiation area pursuant to 10 CFR 20.

Response to Apparent Violations

- A. Operating the Purdue University research reactor (PUR-1) in excess of the maximum licensed power limit of 12 kilowatts.
1. The apparent violation was likely caused by a miscalculation of the absolute efficiency for the High Purity Germanium (HPGe) detector used in the calibration of the nuclear instrumentation (NI) by foil activation.
  2. The following corrective actions have been taken
    - i. A written Standard Operating Procedure (SOP) for properly calibrating the HPGe detector and calculating the absolute efficiency has been reviewed and approved by the Committee on Reactor Operations (CORO).
    - ii. A Restart Plan to safely perform calibration of the NI by foil activation has been reviewed and approved by the CORO.
    - iii. A License Amendment Request (LAR) for proposed changes to the Technical Specifications (TS) to allow reactor operation for the purpose of performing calibration of the NI by foil activation has been approved by the NRC.
    - iv. Other facility procedures have been reviewed.
      1. A procedure to perform the TS required electronic calibration has been drafted. It will be approved by CORO and performed as part of the required surveillances prior to restart.
      2. The SOP for reactor startup will be revised to include verification of radiation area signs and will be approved by CORO prior to reactor restart.
  3. The SOP for the HPGe detector and the Restart Plan were approved by CORO on November 14, 2020. The LAR was approved by the NRC on December 11, 2020.

- B. Failure to complete the appropriate surveillance testing prior to returning the Purdue University research reactor back to into service following replacement of the NI system and detectors.
1. The apparent violation was caused by an oversight made by the PUR-1 staff.
  2. The following corrective actions will be taken
    - i. Calibration of the NI by foil activation (0-100% of the licensed reactor power limit) using the SOP for the HPGe detector and Restart Plan
    - ii. Reactor will not be returned to service until this and all applicable surveillance testing specified in the TS have been completed.
  3. The NI calibration and all applicable surveillance testing specified in the TS will be completed at the earliest convenience of the PUR-1 staff no later than March 1, 2021.

Response to Severity Level IV Violation

- C. Failure to post a sign bearing the radiation symbol and the words “CAUTION, RADIATION AREA” for the PUR-1 reactor facility, where the radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem in 1 hour at 30 centimeters from the top of the reactor.
1. The need to post a sign bearing the radiation symbol and the words, “CAUTION, RADIATION AREA” for the PUR-1 reactor facility was identified in an ALARA audit dated July 22, 2020, however, no actions were taken to post the sign.
  2. The following corrective steps have been taken
    - i. A sign bearing the radiation symbol and the words, “CAUTION, RADIATION AREA” has been posted at the entrance to the PUR-1 facility
  3. This was completed on November 10, 2020

We believe the measures implemented above bring Purdue University into compliance.

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

Sincerely,



Dr. Robert Bean  
*Facility Director*  
*Purdue University Radiation Laboratory*  
*School of Nuclear Engineering*