

PURDUE

UNIVERSITY

SCHOOL OF NUCLEAR ENGINEERING

30 March 2015

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ATTN: Ms. Cindy Montgomery, Project Manager for Research and Test Reactors,
Mailstop O12 D20

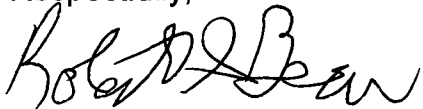
SUBJECT: ANNUAL OPERATING REPORT FOR PURDUE UNIVERSITY FOR
JANUARY 1, 2014 THROUGH DECEMBER 31, 2014, DOCKET 50-182.

Dear Ms. Montgomery,

Enclosed please find the Annual Operating Report for the Purdue University Reactor, PUR-1, for the operating period January 1, 2014 through December 31, 2015. Please feel free to call (765-496-3573) or email (bean@purdue.edu) with questions.

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.

Respectfully,



Robert S. Bean
Director, Radiation Laboratories

Attachment: REPORT ON REACTOR OPERATIONS For the Period January 1, 2014 to
December 31, 2014, PURDUE UNIVERSITY REACTOR-1 (PUR-1), March
2015

Cc: Leah Jamieson, College of Engineering
Ahmed Hassanein, School of Nuclear Engineering
James Schweitzer, Radiation Safety Officer, CORO Chair

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REPORT ON REACTOR OPERATIONS

**For the Period
January 1, 2014 to December 31, 2014**

**PURDUE UNIVERSITY REACTOR-1 (PUR-1)
Facility Docket No. 50-182
PURDUE UNIVERSITY
West Lafayette, Indiana 47907**

March 2015

**Prepared by
Robert S. Bean, Facility Director**

1. INTRODUCTION

This report is submitted to meet the requirements set forth in the technical specifications of the Purdue University Reactor (PUR-1) and 10 CFR 50.59 for the period January 1, 2014 to December 31, 2014.

2. PLANT DESIGN AND OPERATIONAL CHANGES

2.1 Facility Design Changes

There were no design changes to the facility in 2014.

2.2 Performance Characteristics

The overall status of the PUR-1 facility was sustained satisfactorily during the reporting period. However, due to staffing rollover in 2013, continued issues with channel 1, and new issues with channel 3, PUR-1 did not achieve criticality this reporting period.

A visual inspection of a representative fuel assembly was not conducted during this reporting period. Monthly surveillances of process water showed no fission product contamination, thereby verifying fuel integrity.

2.3 Changes in Operating Procedures Concerning Safety of Facility Operations

There were no changes to the operating procedures of the facility during 2014.

2.4 Results of Surveillance Tests and Inspections

2.4.1 Reactivity Limits

The reactivity worths of the control rods were not determined due to the issues with channel 1, channel 3 and other outages due to a series of unplanned maintenance demands. The latest measured values are the ones conducted during 2011, and are as follows:

Shim-safety #1: 3.96%

Shim-safety #2: 2.19%

Regulating Rod: 0.229%

These values are consistent with prior reported values. The worth curves of the control rods were checked after the current loading and the excess reactivity was determined to be 0.42%, and the shutdown margin was determined to be 1.77% based on these values.

2.4.2 Reactor Safety Systems

On December 14, 2012, the electronic calibration of all safety channels was completed. This was not performed during 2014 due to extended maintenance down-time.

Power calibration using gold foils was also not performed during 2014 due to extended maintenance down-time.

During the reporting period, the radiation area monitors and the continuous air monitor's PMS were maintained and checked for normal operation. The three area monitors and the CAM were each calibrated on Jan 27, 2014, and on July 30, 2014.

The rod drop times were measured on February 15, 2013. The rod drop times fell between 554.47 and 608.51 milliseconds. These values are consistent with past measurements and are well within the specification limit of one second. The rod drop times were not measured during the 2014 reporting period due to the extended maintenance outage.

The air system isolation was tested on May 27, 2014 and correct operation of the louvres was observed. The condensate valve performance could not be verified at that time. The condensate valve was cleaned and verified as operable on September 16, 2014. On October 23, 2014 the condensate valve was replaced (like for like), and the air system and condensate isolation operation was verified.

2.4.3 Primary Coolant System

The weekly measurements of the pH of the primary coolant consistently gave readings between 4.2 and 4.9 during 2014. On only one occasion, on January 8, 2014, the value was as low as 4.2 which is outside the specification limits of 5.5 ± 1.0 . All other data points for the remainder of the reporting period were within 4.5 to 4.9.

The Demineralizer resin was replaced on January 23, 2015.

During the weekly checks the conductivity of the primary coolant was measured and the values never exceeded 2.80 micromhos/cm. This represents a resistivity of more than 357,142.8 ohm-cm, which exceeds the lower limit of 330,000 ohm-cm as given in the specifications.

The specification for coolant height above the core to be 13 feet was always either met or exceeded.

Monthly samples of the primary coolant were collected and analyzed by personnel from Radiological and Environmental Management for gross alpha and beta activity. No activity which would indicate failure of the fuel plates was identified in the samples.

2.4.4 Containment

Readings between 0.05 and 0.16 inches of water were recorded weekly for the negative pressure in the reactor room.

2.4.5 Experiments

The mass of the singly encapsulated samples and the flux of the reactor are such that the complete release of all gaseous, particulate, and volatile components of the samples would not result in doses in excess of 10% of the equivalent annual doses as stated in 10 CFR 20.

No samples of unknown composition were irradiated in 2014.

2.5 Changes, Tests and Experiments Requiring Commission Authorization

During 2014, two changes, and no experiments, which required authorization from the Commission pursuant to 10 CFR 50.59 (a), were performed.

1. The previous CAM was replaced with a new CAM. The procedure for determining efficiency and calibration of the new CAM was approved by the Radiation Safety Officer.
2. The solenoid valve for the make-up water system was replaced and an isolation valve was added to the water process system between the water make-up solenoid valve and the connection with the balance of the water process system.

2.6 Changes in Facility Staff

As of Oct 6, 2014, David Storz was hired to perform the duties of Reactor Electronics Technician and to train to be a Licensed Operator (Level 4).

3. POWER GENERATION

Operation of the PUR-1 during 2014 consisted of 0 runs.

4. UNSCHEDULED SHUTDOWNS

There were no unscheduled shutdowns during 2014.

5. MAINTENANCE

The HEPA filter for the room supply and exhaust air was checked upon during normal maintenance checks, on March 21, May 19, and on Sept 16, 2014. Air filters were replaced as needed.

6. CHANGES, TESTS AND EXPERIMENTS

No changes, tests or experiments were carried out without prior Commission approval pursuant to the requirements of 10 CFR 50.59 (b).

7. RADIOACTIVE EFFLUENT RELEASES

No measurable amount of radioactive effluent was released to the environs beyond our effective control, as measured at or prior to the point of such release.

8. OCCUPATIONAL PERSONNEL RADIATION EXPOSURE

No radiation exposures greater than 25% of the appropriate limits of 10 CFR 20 were received during the reporting period.