



Leslie C. Wilbur  
Nuclear Reactor Facility

100 Institute Road  
Worcester, MA 01609-2280, USA  
508-831-5276, 508-831-5688, Fax 508-831-6062  
www.wpi.edu

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U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Mail Stop O-5 C12  
Washington, DC 20555-0001

Re: Docket No. 50-134  
License R-61  
Annual Report for 2004

In accordance with the Technical Specifications for the WPI Leslie C. Wilbur Nuclear Reactor Facility (License R-61), I am submitting the Annual Operating Report for 2004.

The WPI reactor is a non-power, university-based, teaching reactor. It continues to be used primarily in the academic mission of Worcester Polytechnic Institute, for the instruction of students, and in occasional scholarly research.

Please contact me if further information is required.

Sincerely,

  
Stephen J. LaFlamme,  
Director, Nuclear Reactor Facility

Cc: U.S. Nuclear Regulatory Commission  
ATTN: Mr. Thomas Dragoun  
475 Allendale Road  
King of Prussia, PA 19406-1415

U.S. Nuclear Regulatory Commission  
ATTN: Mr. Patrick Isaac  
Mail Stop O12-G13  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852-2738

American Nuclear Insurers  
95 Glastonbury Boulevard  
Glastonbury, CT 06033

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## 2004 Annual Operating Report

Worcester Polytechnic Institute  
Leslie C. Wilbur Nuclear Reactor Facility

License R-61  
Docket No. 50-134

### I. Operations Summary

#### *(a) changes in facility design*

There were no changes in facility design during 2004.

#### *(b) performance characteristics*

The operation of all reactor safety system components was normal during 2004, with the only exception being that in April 2004, during performance of the daily checkout surveillance procedure, it was determined that the reactor scram signal could not be reset. The cause was determined to be electronic failure of the electronic scram output circuit from one of the picoammeter channels.

Performance of the fuel was normal.

#### *(c) changes in operating procedures*

There were no changes made to operating procedures during 2004.

#### *(d) abnormal results of surveillance tests and inspections*

There were no unusual findings from the performance of surveillance tests and inspections, other than described above in (b).

#### *(e) personnel changes in reactor facility director, health physicist, or radiation, health, and safety committee members*

There were no personnel changes in 2004.

## II. Power Generation (kilowatt-hours)

2004 Output:	214.7
Total LEU-Fuel:	2830.7
Total Reactor:	10244.7

## III. Unscheduled Shutdowns

There were two unscheduled shutdowns during 2004. Of these, the first occurred when one of the Nuclear Instrumentation Channels failed to indicate properly during a startup. The startup was a trainee demonstration of a second startup following a trip from full power. Instrumentation Channel 2 was indicating about 100% of the 1 W scale while Channel 1 remained at 0% of the 0.1 W scale. While the trainee was in the progress of slowing the power increase to wait for Channel 1 to come on line, the Channel 1 picoammeter generated a trip signal at approximately 115% of the 0.1 W scale. The cause was assumed to be related to the positioning of the manual range switch, which apparently prevented the indicator from operating, but detector compensation issues due to the previous operation complicated the indicator response. The second unscheduled shutdown was caused when a trainee overshot 100% of the 1 kW scale. At approximately 105% of 1 kW, a pre-trip alarm was generated on one of the two Nuclear Instrumentation Channels, and the alarm caused a loss of magnet current to all three control blades apparently due to the voltage surge within the control panel, an actual scram signal was not generated. Neither of the scrams had any safety significance given the scope of the facility, and both were related to activities involving its teaching and training mission.

## IV. Maintenance

In April 2004, during performance of the daily checkout surveillance procedure, it was determined that the reactor scram signal could not be reset. The cause was determined to be electronic failure of the electronic scram output circuit from picoammeter channel 1. The failed components were replaced with updated components, and the same components in the other channel were also replaced. Following repairs, it was determined that the transformer in the power supply for picoammeter channel 2 had also failed, most likely during the testing of the original failure. The power supplies for both picoammeter channels were replaced with new power supplies.

## V. Changes, Tests, and Experiments Pursuant to 10CFR 50.59

There have been no changes to facility design, or new tests and experiments, requiring evaluations pursuant to 10CFR 50.59.

VI. Radioactive Effluents Release

Liquid effluent releases have been near background and well within 10CFR20 release limits. Gaseous Ar-41 has been released in trace amounts that are conservatively calculated to be well within 10CFR20 release limits, and we have verified level 1 compliance using the EPA COMPLY Code.

End