Rensselaer | DEPARTMENT OF MECHANICAL, AEROSPACE, AND NUCLEAR ENGINEERING

March 22, 2006

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

U.S. Department of Energy
NE-30
John Gutteridge
1000 Independence Avenue, SW
Washington, DC 20585

Re: Operations Report for the Rensselaer Polytechnic Institute (RPI) Reactor Critical Facility (RCF)
NRC License CX-22
Docket Number 50-225

To Whom It May Concern:

This document constitutes the calendar year 2005 Operations Report of the RPI RCF to the USNRC, USDOE, and to Rensselaer management.

The Reactor Critical Facility (RCF) operated successfully during calendar year 2005. The RCF was used for one laboratory course and two introductory courses in the Nuclear Engineering and Engineering Physics curricula. Two graduate students and the facility staff performed experiments and work toward submittal of a critical benchmark to the international benchmark project. Two undergraduate research projects were performed, one of which was for independent study. The facility staff trained three new Senior Reactor Operators who completed their training in 2005 and passed the NRC licensing exam in February 2006.

Work proceeded on critical measurements with the 0.640 pitch lattice plates. Critical measurements were performed with 332-pin and 333-pin configurations. Some subcritical measurements were conducted with fewer pins. The SPERT(F1) fuel is 4.81 w/o enriched high density UO_2 pellet fuel clad in stainless steel, so it is similar to power plant reactor fuel.

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The RCF is now the only facility in the U.S. carrying out reactor physics critical experiments in support of the power reactor function. These experiments are similar to power reactor startup measurements.

Work continues on upgrading the reactor instruments, circuits, readouts, and facilities. A fourth videographic recorder was installed. The startup instrumentation was replaced with all new equipment. A special purpose computer was installed in the RCF Control Panel. This will eventually be used to control reactor support equipment such as pumps, valves and heaters. Two electrical distribution switchboards have been replaced and all the motor controllers are identified for replacement in 2006.

Funds were provided under the USDOE URI Program to complete additional upgrades. The funds are intended for the motor controller replacements and for the control system hardware as mentioned above. The grant is a five year continuing program and a continuation request was submitted in December 2005.

Training and proficiency requirements for all licensed operators have been reviewed and are current.

The Technical Specifications, App. A to USNRC License CX-22 require reporting the following operational items:

1. Changes to facility design: None
2. Significant maintenance, repairs or other work performed on RCF systems:
   a) The instrumentation for Startup Channels A and B were replaced with new modules.
   b) Rod 4 had experienced a problem with delayed release. All fuel was removed in June and an inspection of the core structure was performed with no identified deficiencies. Rod drop timing measurements were satisfactory and the problem has not recurred.
3. Changes in operating procedures which relate to the safety of RCF operations: None
4. Surveillance checks, tests, and calibrations were conducted and logged as required. The results were satisfactory. On August 24, 2005 an emergency preparedness drill was conducted at the RCF.
5. Changes, tests or experiments requiring authorization from the USNRC under 10CFR50.59 a or b: None
6. Glenn Winters and Jonathan Stephens have been Director and Operations Supervisor respectively through this period.
7. Calculated integrated thermal power: Approximately 5×10^{-3} kwhr for all of 2005, far less than the Technical Specification 3.1.10 limit of 200 kwhr/yr.
8. There were no unplanned scrams in the report interval.
9. Maintenance operations were carried out and logged with satisfactory results.

10. The storage tank contents, approximately 2000 gallons, were discharged in June 2005 to flush and clean the tank. Tank samples were less than background counts and so no radioactivity discharge was recorded.
11. Environmental monitors (exclusion area and site boundary) recorded exposures less than 40 mrem per year above background.
12. Facility personnel exposures were all less than 10 mRem for the report period.

Sincerely,

Glenn Winters, Director
RPI Reactor Critical Facility

Peter Collopy, Director
Environmental Health and Safety

cc:

Michael Podowski, Chairman
RPI NSRB

Timothy Wei, Chair
MANE

Peter Collopy, Director
Environmental Health and Safety

Timothy Trumbull
RCF Operations Supervisor

Peter Caracappa
Radiation Safety Officer