



Rensselaer

DEPARTMENT OF MECHANICAL,
AEROSPACE, AND NUCLEAR ENGINEERING

RCF 09-02
February 13, 2008

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

Re: Operations Report for the Rensselaer Polytechnic Institute Reactor Critical Facility

NRC License CX-22
Docket Number 50-225

To Whom It May Concern:

This document constitutes the calendar year 2008 Operations Report of the Rensselaer Polytechnic Institute Reactor Critical Facility (RCF) to the U.S. Nuclear Regulatory Commission (NRC) and to Rensselaer management.

The RCF operated successfully during calendar year 2008. The RCF was used for one laboratory course, a senior design project and two introductory courses in the Nuclear Engineering curricula. The facility staff trained one new Senior Reactor Operator who passed the NRC licensing exam in July 2008.

Work proceeded on critical experiments 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. 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.

Additional measurements were performed with a poison material supplied by the DOE Y-12 facility. These measurements were made to determine the consistency of the poison content, boron carbide, in samples. For these measurements the reactor was configured with a 1.5" center void and the samples were positioned in this voided space, axially and radially centered in the active fuel region. Hardware design and reactivity analyses to support this configuration change were prepared by a senior class project team supervised by the facility operating staff. The resulting core loads were 332-pins with only the void installed, 338 and 339-pins with 2" long samples in the void and 343-pins with 4" long samples installed in the void.

A NRC inspection was performed in September 2008. NRC findings have been reported in other correspondence.

Training and proficiency requirements for all licensed operators have been reviewed and are current. One operator submitted and received a license renewal. One individual is currently in training for a Senior Operators license. Total staffing on December 31, 2008 is six licensed Senior Reactor Operators.

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

1. Changes to facility design: None
2. Significant maintenance, repairs or other work performed on RCF systems:
 1. In November 2007 one channel of the Area Monitoring System failed. Technical Specifications permit replacement with portable equipment. A replacement detector was ordered and the channel returned to service in February 2008.
 2. One of two instrument channels that use BF3 detectors failed and troubleshooting identified the cable connection at the detector as the problem. Technical Specifications permit operation with a single BF3 channel. Parts were ordered and the channel returned to service in May 2008.
 3. Unplanned fast period scrams occurred on October 1, 2008 due to noise spikes from the log picoammeter that processes the output from ion chamber PP2. Troubleshooting determined that the detector was the cause and it was replaced. The instrument channel has operated trouble-free since then.
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. In June 2008 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. There were no staffing changes in 2008
7. Calculated integrated thermal power: Approximately 2×10^{-2} kwhr for all of 2008, far less than the 200 kwhr/yr limitation in the Technical Specifications.
8. There were several unplanned scrams in the report interval. Intermittent and brief power outages of off-site power on September 19, 2008 caused multiple scrams. The failed detector discussed above caused two scrams on October 1, 2008.
9. Maintenance operations were carried out and logged with satisfactory results.
10. No liquid discharges were performed in 2008.
11. Environmental monitors (exclusion area and site boundary) recorded exposures less than 40 millirem per year above background.
12. No personnel badges registered a dose above the minimum detectable (10 mrem) during 2008.

Sincerely



Glenn Winters, Director
RPI Critical Experiments Facility

cc:

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