Rensselaer | DEPARTMENT OF MECHANICAL, AEROSPACE, AND NUCLEAR ENGINEERING

April 28, 2004

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 2003 Operations Report of the RPI RCF to the USNRC, USDOE, and to Rensselaer management.

The Reactor Critical Facility (RCF) operated successfully during calendar year 2003. The RCF was used for one laboratory course and two introductory courses in the Nuclear Engineering and Engineering Physics curricula. Eighteen credits of PhD thesis work were conducted at the facility. Two graduate students and the facility staff performed experiments and work toward submittal of a critical benchmark to the international benchmark project. Lastly, the facility staff is training two new reactor operators that will sit for an NRC licensing exam in May 2004.

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

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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. A PhD thesis experiment is underway to measure the penetration of fission gammas through fuel pin lattices without water; the application is to above-ground cask storage of spent fuel and to fuel handling devices.

Work continues on upgrading the reactor instruments, circuits, readouts, and facilities. The analog linear and log power picoammeters were replaced with new digital units. A new rod position system was installed for testing and continues to operate in parallel with the original synchro transmitter-receiver system. Operational experience is being obtained with the new equipment. The old system is expected to be idled in 2004.

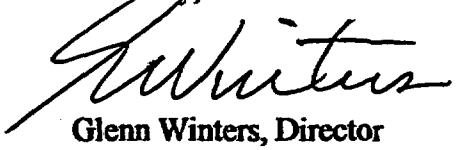
Funds have been requested under the USDOE URI Program to complete additional upgrades.

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. Picoammeters replaced.
    b. One channel of the area radiation monitoring system failed and was repaired by the manufacturer.
    c. First channel of a new rod position system installed and aligned.
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 13, 2003 an emergency preparedness drill was conducted at the RCF. On October 22, 2003 a security training exercise was conducted at the RCF with participation and support from RPI Public Safety and the Schenectady Police Department.
5. Changes, tests or experiments requiring authorization from the USNRC under 10CFR50.59 a or b: None
6. Jonathan Stephens has been Operations Supervisor through this period. Dr. Donald Harris retired as RCF Director on June 30, 2003. Mr. Glenn Winters was appointed Director on July 1, 2003. The Radiation Safety Officer, Dr. Kim, was replaced in September with Mr. Peter Carracappa. Mrs. Cecile Mars left the NSRB in 2003 and was replaced by Mr. Will Fahey.
7. Calculated integrated thermal power: Approximately 2×10^{-3} kwhr for all of 2003, 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. There were no discharges of radioactive effluents.
11. Environmental monitors (exclusion area and site boundary) recorded exposures below the minimum detectable level of the dosimeters (roughly 10 mrem per quarter above background).
12. Facility personnel exposures were all less than 100 mRem for the report period.

Sincerely,



Glenn Winters, Director
RPI Reactor Critical Facility

cc: Dr. Don Steiner, Chairman, RPI NSRB
Jonathan Stephens, RCF Operations Supervisor