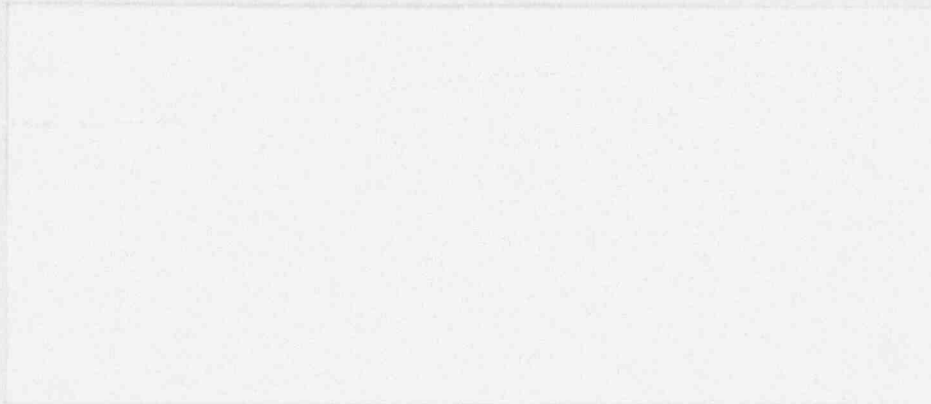


**SCHOOL
OF
NUCLEAR ENGINEERING**



Purdue University

West Lafayette, Indiana 47907



REPORT ON REACTOR OPERATIONS

For the Period

January 1, 1995 to December 31, 1995

PURDUE UNIVERSITY REACTOR-1

PURDUE UNIVERSITY

West Lafayette, Indiana 47907

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Prepared by

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1. INTRODUCTION

This report is submitted to meet the requirements set forth in 10 CFR 50.59 and the technical specifications of the Purdue University Reactor (PUR-1) for the period January 1, 1995 to December 31, 1995.

During the reporting period of 1995 a total of 352 people visited the reactor facility. Those people included 95 different groups, of which 46 groups were for the purpose of maintenance or surveillance testing, 18 groups were for class purposes, 17 groups were pre-scheduled tours, and 3 groups were participants in our reactor sharing program.

2. PLANT DESIGN AND OPERATIONAL CHANGES

2.1 Facility Design Changes

There were no design changes to the facility in 1995.

2.2 Performance Characteristics

The operation of the PUR-1 facility continued satisfactorily during the reporting period. During the visual inspection of the surfaces of two representative fuel plates no changes were identified. This inspection included any defects that might compromise the integrity of the cladding including any evidence of corrosion. Satisfactory performance of the fuel continued during the year.

2.3 Changes in Operating Procedures Concerning Safety of Facility Operations

Five operating and six maintenance/calibration procedures were rewritten or revised and approved during the year.

2.4 Results of Surveillance Tests and Inspections

2.4.1 Reactivity Limits

The reactivity worths of the control rods were determined to be as follows:

Shim-safety #1 - 4.97%

Shim-safety #2 - 2.62%

Regulating Rod - 0.26%

The worth curves of the control rods were checked after the inspection and the excess was determined to be 0.41%. The shutdown margin was determined to be 7.43% based on these values.

The inspection of the control rods was completed on August 1, 1995 with no evidence of change or deterioration observed.

No experiment was placed in the reactor pool during the year that would require the determination of its reactivity during the initial criticality following its installation.

2.4.2 Reactor Safety Systems

Each prestartup check included a channel test for each safety system, provided the shutdown exceeded 8 hours or if the system was repaired or de-energized.

Each reactor safety system had a channel check performed at time intervals of less than 4 hours during operation.

On August 30, 1995 the electronic calibration of all safety channels was completed.

The irradiation of gold foils for a power calibration was done on October 19, 1995. The calibration indicated that the actual power was 16% below the indicated power level at 100 watts and that the system was nonlinear in the last decade but in a conservative direction.

During the prestartup which precedes each run, the radiation area monitors and the continuous air monitor were checked for normal operation. During 1995 the calibration of the radiation area monitors and the continuous air monitor was completed on March 27 and September 26.

Following the control rod inspections, the rod drop times were measured on August 1, 1995. The rod drop times fell between 541 and 589 milliseconds. These values are consistent with past measurements and are well within the specification limits of one second.

2.4.3 Primary Coolant System

The weekly measurements of the pH of the primary coolant fell between 5.0 and 5.3 during 1995. These values are within the specification limits of 5.5 ± 1.0 . During the weekly checks and the prestartup check which proceeds each run, the conductivity of the primary coolant was measured and the values never exceeded 1.42 micromhos-cm. This represents a resistivity of more than 700,000 ohm-cm which exceeds the lower limit of 330,000 ohm-cm as given in the specifications.

The specification of 13 feet of water was always either met or exceeded, according to the prestarted check list that was completed prior to each reactor run.

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

2.4.4 Containment

Readings between 0.08 and 0.18 inches of water were recorded weekly for the negative pressure in the reactor room.

The semi-annual checks made in 1995 for the proper operation of the inlet and outlet dampers and the air conditioner were completed on January 31 and August 3. All worked satisfactorily.

Selected fuel plates were visually inspected on August 1, 1995. The surface condition of fuel plate #4-3-73 indicated no change from the last inspection, and the cladding of the other inspected plates identified no changes.

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 or that required double encapsulation were submitted for irradiation.

2.5 Changes, Tests and Experiments Requiring Commission Authorization

During 1995 no changes, or experiments which required authorization from the Commission pursuant to 10 CFR 50.59 (a) were performed.

2.6 Changes in Facility Staff

There were no changes in the Facility Staff during the year.

3. POWER GENERATION

Operation of the PUR-1 during 1995 consisted of 216 runs which generated 145,226 watt-minutes of energy and covered an integrated running time of 65.1 hours.

4. UNSCHEDULED SHUTDOWNS

No unscheduled shutdowns occurred during 1995.

5. MAINTENANCE

Only routine maintenance was required during the reporting period.

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 effluents were released to the environs beyond our effective control, as measured at or prior to the point of such release.