DOE/NE/38136--T1

Final Technical Report

NCSU/DOE/NE/38136-1

# NCSU Reactor Sharing Program

University Reactor Sharing Program

US D.O.E. Reference Number DE-FG05-95NE38136

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DISCLAIMER

## ABSTRACT

The Nuclear Reactor Program at North Carolina State University provides the PULSTAR Research Reactor and associated facilities to eligible institutions with support, in part, from the Department of Energy Reactor Sharing Program. Participation in the NCSU Reactor Sharing Program continues to increase steadily with visitors ranging from advance high school physics and chemistry students to Ph.D. level research from neighboring universities.

This report is the Final Technical Report for the DOE award reference number DE-FG05-95NE38136 which covers the period September 30, 1995 through September 30, 1996.

TABLE OF CONTENTS

# 1.0 INTRODUCTION

The Nuclear Reactor Program (NRP) is administratively a part of the Department of Nuclear Engineering where there is close collaboration between the faculty and the NRP staff. Nuclear Engineering courses and associated laboratories use the PULSTAR Reactor as a teaching tool. Both undergraduate and graduate students engage in a variety of projects involving the PULSTAR Reactor as part of the general requirements to obtain their academic degrees. The published Mission Statement for the NCSU PULSTAR Reactor is as follows:

> *The Nuclear Reactor Program (NRP) was instituted to provide specialized nuclear facilities to the North Carolina academic and industrial communities for the purpose of teaching, research and service. In addition, these nuclear facilities are made available to provide services to the state and federal agencies to support governmental activities.*

The one megawatt PULSTAR Reactor continues to meet its mission of teaching, research and service by having provided over 18,000 megawatt·hours of full power operation since initial criticality in September 1972. The reactor, associated facilities, and Nuclear Services Laboratories are made available to outside users. The routine operation of the facility is eight hours a day, five days a week. Weekend and evening operation of the PULSTAR reactor are performed as needed to support specific needs for experiments, visits, training, and irradiations. However, operation of the PULSTAR reactor is carefully scheduled to permit maximum utilization of the irradiation facilities such that the optimum use of the reactor fuel is achieved. It is typical to have several irradiations in progress simultaneously in the PULSTAR reactor.

As in the past, NCSU is prepared to make the PULSTAR reactor available to meet the needs of outside users as long as funds are available to cover the cost of services, therefore, funding from the D.O.E. Reactor Sharing Program is paramount in guaranteeing the availability and use of the reactor and its facilities.

## 2.0 DISCUSSION

This final technical report of the DOE Reactor Sharing Program at NCSU closes Grant DE-FG05-95NE38136. See attached tables.

## 3.0 CONCLUSION

The Reactor Sharing Program at NCSU has been very successful. The PULSTAR facility continues to participate in the DOE Reactor Sharing Program, but under a new DOE contract.

**NCSU NUCLEAR ENGINEERING DEPARTMENT**
DOE - UNIVERSITY REGIONAL REACTOR SHARING PROGRAM
North Carolina State University Grant No. 95NE38136
Principle Investigator and Program Director: Pedro B. Perez
Reactor Type: PULSTAR
Power Level: 1 MW

September 30, 1995 - September 30, 1996

| Participating Institution | Description of Project/Program | *Reactor Sharing Support |
|---|---|---|
| Peace College<br>Raleigh, NC **(UGS)** | Rx Tour(2)<br>SPWRF Tour(2)<br>t½ Lab<br>(38 Partipicants) | $ 835.00 |
| Carroboro Elemtary<br>Carroboro, N.C (PGS) | Rx Tour(5)<br>SPWRF Tour(5)<br>(52 Participants) | $ 334.00 |
| S.E. Halifax H.S.<br>Halifax, NC **(PGS)** | Rx Tour<br>SPWRF Tour<br>(25 Participants) | $ 334.00 |
| Tarboro H.S.<br>Tarboro, NC **(PGS)** | Rx Tour<br>SPWRF Tour<br>(34 Participants) | $ 412.50 |
| S. Robertson H.S.<br>Raleigh, N.C. **(PGS)** | Rx Tour(4)<br>SPWRF Tour(4)<br>(50 Participants) | $ 412.50 |
| Enloe H.S.<br>Raleigh, NC **(PGS)** | Rx Tour<br>SPWRF Tour<br>(20 Partipicants) | $ 247.50 |
| St. Mary's Jr. College<br>Raleigh, N.C. **(UGS)** | Rx Tour(2)<br>SPWRF Tour(2)<br>Lecture<br>(40 Participants) | $ 660.00 |
| Asheboro Elem. (Gifted Prog.)<br>Asheboro, N.C.**(PCS)** | Rx Tour<br>SPWRF Tour<br>(35 Participants) | $ 495.00 |
| Chemical Engineering<br>Science Summer Program | Rx Tour<br>SPWRF Tour<br>t½ Lab<br>(15 Partipicants) | $ 330.00 |

*Does not include cost of publicity or time of NCSU staff and student assistants.

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Reactor Type: PULSTAR
Power Level: 1 MW

September 30, 1995 - September 30, 1996
(continued)

| Participating Institution | Description of Project/Program | *Reactor Sharing Support |
|---|---|---|
| Halifax County M.S.<br>Halifax, N.C. **(PGS)** | Rx Tour(4)<br>SPWRF Tour(4)<br>(31 Participants) | $ 495.00 |
| Johnson C. Smith University<br>Charlotte, N.C. **(UGS)** | Rx Tour<br>SPWRF Tour<br>Lecture<br>(65 Participants) | $ 660.00 |
| H.S. Teachers Workshop<br>Raleigh, N.C. **(PGS)** | Rx Tour<br>SPWRF Tour<br>(22 Participants) | $ 247.50 |
| Bethany Elementary<br>Raleigh, N.C. **(PGS)** | Rx Tour(2)<br>SPWRF Tour(2)<br>(35 Participants) | $ 330.00 |
| Peace College<br>Raleigh, NC **(UGS)** | Rx Tour<br>SPWRF Tour<br>Lecture<br>(13 Participants) | $ 266.00 |

**Total charges covered by Rx Share Funds* $6059.00

*Does not include cost of publicity or time of NCSU staff and student assistants.

**NCSU NUCLEAR ENGINEERING DEPARTMENT**
DOE - UNIVERSITY REGIONAL REACTOR SHARING PROGRAM
North Carolina State University Grant No. 95NE38136

DOE - University Regional Reactor Sharing Program (Continued)
**Tours Conducted with cost incurred by NCSU**

| Participating Institution | Description of Project/Program | *NCSU Support |
|---|---|---|
| NCSU Electrical Engineering Raleigh, NC **(UGS)** | Rx Tour SPWRF Tour (20 Participants) | $ 165.00 |
| S.I.T.E Raleigh, NC **(UGS)** | Rx Tour(12) (71 Participants) | $2970.00 |
| Peace College Raleigh, NC **(UGS)** | Rx Tour SPWRF Tour Lecture (13 Participants) | $ 129.00 |

**Total cost incurred by NCSU* $3264.00
*(Reactor Share funds depleted)*

*Does not include cost of publicity or time of NCSU staff and student assistants.