SPECIAL PROCEDURE

PULSTAR Operator Requalification Program

1. INTRODUCTION

The purpose of the PULSTAR Operator Requalification Program is to ensure that the continuous high level of personnel proficiency requisite to the safe and efficient operation of the North Carolina State University PULSTAR Reactor is maintained. This program is intended to conform with the requirements of 10 CFR 55 as applied to research reactors and ANS 15.4, 15 September 1977. Any deviations from the requirements of 10 CFR 55 are justified by the mode of operation at the PULSTAR Reactor. More specifically, the following conditions conducive to continued Reactor Operator and Senior Reactor Operator proficiency exist at the NCSU PULSTAR facility:

1. Reactivity control manipulations are extremely frequent. Steady power reactor operations in excess of eight hours are most uncommon. A startup checklist, reactor startup, power level change, and shutdown are normally performed three to five times a week.
2. Frequent operation of the reactor for undergraduate teaching laboratories provides the operators with the review of the theory and practice of what might otherwise be uncommon reactor control manipulations.
3. Formal Reactor Operator Training programs for prospective power plant reactor operators are routinely presented. These programs are instructed by licensed PULSTAR staff and require proficiency in all areas of reactor operation. They cover a broad spectrum of experiments designed to bridge the gap between theory and practice. Numerous reactivity manipulations are

performed and/or supervised by NCSU licensed personnel during these programs.

2. DEFINITIONS

2.1 Controls: Apparatus and mechanisms, the manipulation of which, directly affect the reactivity or power level of the reactor.

2.2 Lecture: A pre-planned discourse, demonstration, or film program that is presented by a qualified person.

2.3 On-the-Job Training: The experience gained while manipulating the controls of the reactor, or directing the activities of individuals during plant control manipulations.

2.4 Reactor Operator: Any individual who is authorized to manipulate the controls of the reactor.

2.5 Senior Reactor Operator: Any individual who is authorized to direct the activities of reactor operators; such an individual is also a Reactor Operator.

3. REFERENCES

3.1 NCSU PULSTAR Safety Analysis Report, Section 11.2, 15 December 1971.

3.2 Code of Federal Regulations, 10 CFR 55, Operators' Licenses; 26 May 1987.

3.3 ANS 15.4, Standard for Selection and Training of Personnel for Research Reactors, 15 September 1977.

3.4 Operator Requalification Program, Revision 2, NCSU, PULSTAR Reactor 01 March 1978.

4. SCHEDULE

The Requalification Program will be conducted over a period of approximately two years to be followed by successive two-year programs. The contents of this program are lectures, quizzes, written examinations, and

document review. All individuals will be on the same two-year cycle. New operators will join the program at the time of licensing.

5. LECTURES

5.1 Requalification lectures will be conducted approximately every two months. Subjects for these lectures will be determined by the overall performance on the last written examinations. Lectures which may be included over the two-year period are:

1. Theory and principles of operation.
2. General and specific reactor operating characteristics.
3. Reactor instrumentation and control systems.
4. Reactor protection systems.
5. Engineering safety features.
6. Normal, abnormal, and emergency operating procedures.
7. Radiation control and safety.
8. Technical specifications.
9. Administrative controls.
10. Applicable portions of Title 10, Chapter I, Code of Federal Regulations.

5.2 Formal Research Reactor Training programs for prospective power plant reactor operators can be substituted for requalification lectures on a one-to-one basis, i.e., one training program can count as one requalification lecture.

5.3 Individual study may also substitute as a lecture; however, no more than two such study periods can be credited over a two year period.

5.4 All regularly scheduled lectures should be attended by all licensed operators. Those licensed operators who achieved an average score of greater than 80% on the last written examination may be excused from lecture attendance at the discretion of the Chief Reactor Operator.

Passing an NRC licensing exam will also provide this exemption for the duration of the requalification two-year cycle.

5.5 Personnel missing lectures who were not excused will be briefed on the topics, given a copy of the lesson plan (if applicable), and required to take the quiz (if applicable) at the earliest possible time following the missed lecture.

6. QUIZZES

Written quizzes may be given on the topics covered by a lecture. The results of these quizzes will be used to evaluate the effectiveness of the given lectures and to ascertain whether additional requalification on the given subject is needed.

7. WRITTEN EXAMINATION

7.1 A written examination will be taken near the end of each two year period. The examination will be similar in content to NRC licensing exams and will cover the following categories:

1. Principles of Reactor Operation (A)
2. Features of Facility Design (B)
3. General Operating Characteristics (C)
4. Instruments and Controls (D)
5. Safety and Emergency Systems (E)
6. Standard and Emergency Operating Procedures (F)
7. Radiation Control and Safety (G)
8. Reactor Theory (H)
9. Radioactive Materials, Handling, Disposal, and Hazards (I)
10. Specific Operating Characteristics (J)
11. Fuel Handling and Core Parameters (K)
12. Administrative Procedures, Conditions, and Limitations (L)

7.2 Personnel holding only Reactor Operator licenses will be examined on categories A-G, while personnel holding Senior Reactor Operator licenses will be examined on all categories.

8. ON-THE-JOB TRAINING

8.1 The primary mechanism for on-the-job training is the routine operation of the PULSTAR Reactor. Each licensed operator will be required to annually perform at least ten reactivity manipulations in any combination of reactor startups and shutdowns while actively performing on shift a minimum of four hours per calendar quarter. Direct supervision of these operations shall be considered equivalent to actual performance.

8.2 To ensure the completion of this minimum, a Record of RO/SRO Functions (Form 2.6-1) or NRP Computer Record will be maintained to record reactivity control manipulations performed or supervised by each licensed operator. This log will be periodically reviewed by the Chief Reactor Operator who will arrange the operating schedule to ensure compliance should this review reveal any persons to be lacking in their frequency of reactivity manipulations. In addition, the Chief Reactor Operator will periodically require a demonstrational confirmation that a licensed operator is current in his operations.

9. ORAL AND DEMONSTRATIONAL

9.1 The oral and demonstrational examination will be conducted for all licensed operators. This examination will be given annually and will be documented on the Reactor Operator Proficiency Form (Form 2.6-2).

9.2 The emphasis of this exam will be on actions to be taken during emergency and abnormal conditions. These examinations will be designed to verify the licensee's ability to operate the PULSTAR

reactor and its related subsystems in a safe and efficient manner during normal, abnormal, and emergency conditions.

10. DOCUMENT REVIEW

10.1 All licensed personnel shall review the contents of all abnormal and emergency procedures every six months.

10.2 All significant facility license, technical specifications, design and procedural changes shall be routed to all licensed operators in a timely manner. The initialed routing sheet will be kept on file as a record of these reviews.

10.3 In addition, the contents of the PULSTAR Operations Manual shall be reviewed yearly. Changes in the Operations Manual will be reviewed prior to an individual's operation of the Reactor. This is documented by a sign-off sheet in the front of the Operations Manual.

11. EVALUATION

11.1 Persons achieving a score of less than 70% on any area of the written or oral and demonstrational examination will receive additional tutoring in weak areas leading to re-examination.

11.2 An overall score of less than 70% will be considered a failure. In this case, the individual(s) involved will be relieved from all licensed activities and will receive accelerated retraining. Satisfactory completion of a re-examination will be required prior to resumption of licensed activities. Documentation of this re-examination will be entered into the individual's requalification record.

11.3 Regardless of the score, if an individual's test record indicates a significant deficiency in a critical area, a retraining program shall be administered to promptly correct the critical deficiency.

12. ABSENCE FROM LICENSED ACTIVITIES

An individual who has not been actively performing his licensed functions for a minimum of four hours per calendar quarter shall be required to demonstrate to the Chief Reactor Operator (or designated assistant) that his knowledge and understanding of the operation and administration of the facility is satisfactory. This may be accomplished through written, oral, or operational evaluation or a suitable combination thereof consisting of a minimum of six hours parallel work to return to active status. Any deficiencies revealed must be corrected before the individual resumes his licensed functions. This demonstration will be documented and maintained in the individual's requalification records.

13. EXEMPTIONS

The Chief Reactor Operator (Program Administrator) is exempt from the written, oral, and demonstrational examinations. Personnel who are not going to be performing licensed activities over the entire two year period are only required to participate in the requalification program during the time they are performing licensed activities. This exemption would normally apply to student operators who will graduate prior to completion of the two year period.

14. RECORDS

The Chief Reactor Operator will establish and maintain requalification records on all personnel involved in this program. The latter will include, as a minimum, copies of individual written examinations and results, results of oral and demonstrational examinations, evidence of participation in requalification lectures, number of reactivity control manipulations performed, documentation of any additional training administered in areas in which an operator or senior operator has exhibited deficiencies, and the CRO's annual evaluation of the operator.

15. ADMINISTRATION

The NCSU Operator Requalification Program will be conducted by the Chief Reactor Operator (CRO) under the normal supervision of the Reactor Operations Manager (ROM) and NRP Associate Director (AD). The CRO will be responsible for all testing and scheduling and will maintain complete requalification records.

16. APPROVALS

Reactor Operations Manager: Thomas L. Bray

Date: August 5, 1988

Associate Director: Gary D. Mills

Date: Aug 5 1988

Radiation Protection Council: John T. Roberts

Date: Aug 26, 1988

Record of RO/SRO Functions

Name_____License No._____Year_____

Date	S/U Checks			S/U Performed		S/U	Sample		Shut-	R.O.	S.R.O.	
	L.F.	S.F.	K.O.	Routine	T/A	Super	Changes	Pulses	downs	Hours	Hours	Other
Carry Fwd.												
Total as of												

Reactor Operator Proficiency

Name_____ Requal Cycle_____

R.O./S.R.O. License Number_____ Issue Date_____

1. Summary of O.J.T.

   Position(s) Held_____

   Totals from O.J.T. Log:

Year	S/U Checks			S/U Performed		S/U Super	Sample Changes	Pulses	Shut-downs	R.O. Hours	S.R.O. Hours
	L.F.	S.F.	K.O.	Routine	T/A						

2. Summary of Operator Requalification Program Written Test Results for Past Calendar Year.

Section	Points Possible	Points Received	Per Cent
A			
B			
C			
D			
E			
F			
G			
TOTAL			
H			
I			
J			
K			
L			
TOTAL			

Comments:_____

Name: _____

3. Results of Oral and Demonstrational Examinations

Date: _____ Examiner: _____

A. Console Exam

Section	Points Possible	Points Received	Per Cent
1. Startup Checklist	10		
2. Startup	10		
3. Power Operations	10		
4. Samples & Experiments	10		

B. Oral Exam (Emergency or Abnormal Conditions)*

Section	Points Possible	Points Received	Per Cent
1. _____	20		
2. _____	20		
3. _____	20		
TOTAL	100		

*Three credible accidents or conditions will be proposed by the Examiner and noted in the spaces provided.

Comments: _____