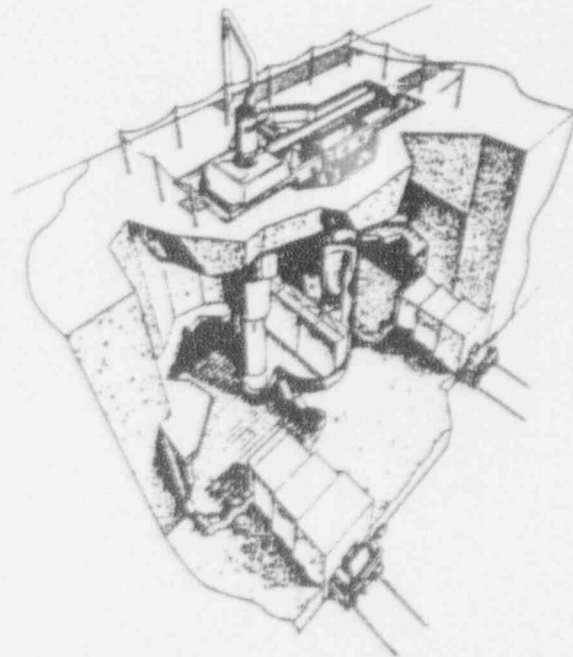


**REACTOR OPERATOR  
REQUALIFICATION PROGRAM**

**For The**

**AFRRI TRIGA REACTOR  
FACILITY**



Defense Nuclear Agency  
Armed Forces Radiobiology Research Institute  
Bethesda, Maryland 20889-5603

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ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE  
TRIGA REACTOR FACILITY

I. PURPOSE

This document sets forth the requirements for the Reactor Operator (RO) and Senior Reactor Operator (SRO) Requalification Program for the Armed Forces Radiobiology Research Institute (AFRRI) TRIGA reactor facility in accordance with the Code of Federal Regulations, Title 10, Part 50.54, Conditions of Licenses, and Part 55.59, Requalification.

II. RESPONSIBILITY

The Reactor Facility Director (RFD) is ultimately responsible for certifying that each RO and SRO has met the requalification criteria outlined by this document. The RFD may appoint a Training Coordinator, in writing, who will be responsible for administration of the requalification program at AFRRI. However, each licensed operator is ultimately responsible for ensuring that he or she meets all the requirements as outlined in this document.

III. SCHEDULE

The Operator Requalification Program cycle will last a period of two years beginning in the first quarter of the even-numbered year. Each licensed operator will enter the requalification program on the date the U.S. Nuclear Regulatory Commission issues him/her a license and will continue in the program until either the expiration date of the current license or the date at which the current license is terminated. Training will be scheduled such that, regardless of when the licensed operator enters the requalification program, he/she will complete all requirements within a two-year period. At the end of the requalification program cycle, the RFD must certify in writing that the operator has completed the requalification program.

IV. REFERENCES

- A. Reactor License R-84
- B. Technical Specifications

- C. Reactor Operational & Administrative Procedures
- D. 10 CFR - Parts 19, 20, 50, 55, 70, and 73
- E. AFRRI Reactor Facility Emergency Plan
- F. Safety Analysis Report
- G. Physical Security Plan for AFRRI TRIGA Reactor Facility
- H. AFRRI Manual M91-1, Safety and Health Manual
- I. Facility Design Files and As-Built Drawings.

## V. REQUALIFICATION PROGRAM

As required by 10 CFR 55.59, all licensed operators will participate in the Operator Requalification Program. The requalification program will include the following:

- A. Preplanned lecture series
- B. On-the-job training
- C. Periodic evaluation
- D. Supervisor evaluation
- E. Medical evaluation

### A. PREPLANNED LECTURE SERIES

The preplanned lecture series will be conducted on a continuing basis throughout the requalification cycle and will include the following subjects:

- 1. Nuclear and radiation physics theory
- 2. General and specific plant operating characteristics
- 3. Plant instrumentation, control and engineered safety systems
- 4. Plant protection systems and facility interlocks
- 5. Plant physical security systems
- 6. Facility changes, modifications, and malfunctions
- 7. Normal, abnormal, and emergency operating procedures
- 8. Radiation control and safety
- 9. Technical Specifications
- 10. Applicable portions of Title 10 CFR

Individual study, training aids (audio-visual) or other forms of study may be employed; however, they shall not be substituted for the lecture series.

Lectures may be videotaped with these tapes being used to conduct make-up classes for licensed operators who missed the original lecture. A minimum of one lecture in each of these ten areas will be given during the requalification cycle.

## B. ON-THE-JOB TRAINING

Each licensed operator will manipulate the controls of the AFRRI TRIGA reactor such that reactivity changes are made in the performance of the following operations on a least 10 different occasions during the requalification period. Any combination of operations is acceptable for a total of 10; however, at least one from each category is required.

1. Square wave or steady state operation
2. Pulsing operation
3. Excess reactivity measurement

In addition, each licensed operator will participate in the following reactor checkout operations on different occasions during the requalification period. Any combination of operations is acceptable for a total of 18; however, at least one from each category is required.

1. Daily operational startup or safety checklist
2. Daily operational shutdown checklist
3. Weekly operational instrument checklist

Each licensed operator shall participate in the annual AFRRI TRIGA reactor maintenance shutdown program at least once during the requalification period. This participation will contain activities such as:

1. Control rod worth measurements
2. Fuel measurement and inspection
3. Fuel temperature measurement system calibration
4. Reactor thermal power calibration
5. High flux safety channel calibration

Each licensed operator shall perform duties at the AFRRI TRIGA reactor facility, including the frequent operation and maintenance of the AFRRI TRIGA reactor facility, that ensure familiarization and retraining on a continuous basis.

Each SRO shall perform or directly supervise the performance of the above activities with the same frequency required of a RO.

The Training Coordinator will track individual progress to ensure that each licensed operator actively performs the functions of a licensed operator as defined in 10 CFR 55.4 for at least four (4) hours per calendar quarter. This is the minimum acceptable criteria. In addition, the Training Coordinator is responsible for notifying the RFD if any licensed operators have less than the required four hours at least two weeks prior to the end of the calendar quarter.

If the operator does not satisfactorily complete these on-the-job training requirements, to include a minimum of four hours per calendar quarter active performance of the functions of an operator or senior operator, then the operator will not resume the functions authorized by his/her license until the Reactor Facility Director or Reactor Operations Supervisor certifies in writing that all of the following conditions have been met:

1. The qualifications and status of the licensee are current and valid.
2. The licensee has completed a minimum of six hours of shift functions, under the direction of a licensed operator or senior operator as appropriate, in the position to which the individual will be assigned.
3. The six hours have included a complete tour of the facility and all required startup and shutdown procedures.

The above mentioned on-the-job training consists of activities required of ROs and SROs as outlined in 10 CFR 55.59(c)(3)(i) that are applicable to the AFRRI TRIGA reactor facility in accordance with 10 CFR 55.59(c)(7).

### C. PERIODIC EVALUATION

The evaluation of each licensed operator's knowledge and performance of the requirements set forth in the requalification program will be accomplished by written and oral examinations, including a demonstration at the reactor console. These examinations will be prepared in accordance with 10 CFR Parts 55.41, 55.43, 55.45, and 55.59. The oral examination and demonstration at the reactor console shall be administered annually, not to exceed 15 months, to each licensed operator. Written examinations shall be administered every two years, not to exceed 27 months, to each licensed operator. All examinations will be administered and graded by either the RFD or his designee.

The operating examination shall be prepared in accordance with 10 CFR 55.59(a)(2)(ii). In addition, only sections of 10 CFR 55.45(a) that are applicable to the AFRRI TRIGA reactor facility shall be used to develop the examination. This examination will require the operator to demonstrate an understanding of and the ability to perform the actions necessary to accomplish a representative sample from among the following eight items (derived from 10 CFR 55.45(a)):

1. Manipulate the console controls as required to safely operate the facility.
2. Identify annunciators and condition-indicating signals and perform appropriate remedial actions if necessary.



3. Identify the reactor instrumentation systems and significance of their readings.
4. Perform control manipulations required to obtain desired operating results during normal, abnormal, and emergency situations.
5. Demonstrate or describe the use and function of the facility's radiation monitors and alarms and portable survey instruments.
6. Demonstrate knowledge of significant radiation hazards and techniques for reducing personnel exposure.
7. Demonstrate knowledge of the emergency plan for the facility.
8. Demonstrate knowledge of the operational procedures and facility license ensuring that the operational procedures are adhered to and that the limitations in the license and amendments are not violated.

The written examination for each licensed operator shall be prepared in accordance with 10 CFR 55.59(a)(2)(i). In addition, only sections of 10 CFR 55.41 and 10 CFR 55.43 that are applicable to the AFRRI TRIGA reactor facility shall be used to develop the examination. This examination will include a representative sample from among the following 12 items (derived from 10 CFR 55.41 and 55.43):

1. Conditions and limitations in the facility license.
2. Facility operating limitations in the Technical Specifications.
3. Fundamentals of reactor theory, including the fission process, neutron multiplication, source effects, control rod effects, criticality indications, reactivity coefficients, and poison effects.
4. General design features of the core, including core structure, fuel elements, control rods, and core instrumentation.
5. Mechanical components and design features of the reactor cooling system.
6. Reactor operating characteristics during all modes of operation.
7. Design, components, and functions of control and safety systems, including instrumentation, interlocks, and automatic and manual features.
8. Administrative, operational, and emergency procedures for the facility.
9. Purpose and operation of radiation monitoring systems, including alarms and

survey equipment.

10. Radiological safety principles and procedures.
11. Radiation hazards that may arise during normal and abnormal situations.
12. Procedures for handling and disposal of radioactive material.

If a licensed operator scores less than 70% on any section of the written examination, that licensed operator will be entered into an accelerated requalification program on that section topic. If an individual receives a grade of less than 80% overall, he/she will enter an accelerated requalification program with training emphasis placed on identified weaknesses.

An unsatisfactory evaluation on the annual oral examination will require that discussions of deficiencies take place between that licensed operator and the RFD or ROS. A second oral examination will then be administered. If performance is again unsatisfactory, the licensed operator will be temporarily suspended from licensed duties and placed into an accelerated requalification program.

The Training Coordinator will be responsible to the RFD for preparation of all examinations, training schedules, materials, and documentation associated with these evaluations. The RFD is the senior technical manager and, as such, shall oversee the preparation and administration of written examinations. Additionally, he will give senior staff members oral examinations. These senior staff members may then administer the remaining oral examinations. As the senior supervisor in charge, the RFD shall not be required to take examinations.

#### D. SUPERVISOR EVALUATION

Each licensed operator of the AFRRI TRIGA reactor will be periodically evaluated for performance and competency by the RFD or his designee in accordance with 10 CFR 55.59(c)(4)(iii). These evaluations will include performance and actions taken during actual or simulated abnormal or emergency conditions.

#### E. MEDICAL EVALUATION

All licensed operators will undergo a medical evaluation at least once during the requalification period (every two years) by a physician in accordance with 10 CFR 55.21, 55.23 and 55.33(a)(1). The Training Coordinator is responsible for scheduling medical examinations for each licensed operator and ensuring that a record of this medical evaluation is maintained in the operator's training file in accordance with 10 CFR 55.27.



## VI. ACCELERATED REQUALIFICATION PROGRAM

The additional training that an operator may require (as indicated by his/her examinations) may consist of additional lectures and study assignments as the Training Coordinator deems necessary, written exams, and console performance or oral examinations. The additional training and the examination that the operator receives will depend upon the weaknesses exhibited on previous examinations. The number of lectures and examinations that an operator will receive will be determined by either the RFD or his designee. The operator must obtain an overall rating of at least 80% on the reevaluation in order to be removed from the accelerated requalification program. Any operator who was temporarily suspended from licensed duties must be recertified by the RFD prior to having the temporary license suspension lifted. The Training Coordinator will be responsible to the RFD for directing all accelerated training efforts to include preparation of examinations, training schedules, materials and documentation associated with accelerated requalification requirements.

## VII. RECORDS

The following records will be maintained for each licensed operator and retained until the individual license is either renewed or terminated:

- A. Current copy of either the operator's Reactor Operator or Senior Reactor Operator license
- B. A graded copy of the licensed operator's most recently administered requalification exam
- C. The licensed operator's Requalification Program Checklist
- D. The licensed operator's Requalification Memorandum for Record
- E. The summary of training received by a licensed operator in the accelerated requalification program documented in a memorandum for record and any additional documentation that is pertinent to additional training received by that licensed operator
- F. The licensed operator's medical evaluation record
- G. All training records associated with each licensed operator's last completed two year requalification cycle

The Training Coordinator will be responsible to the RFD for maintenance of all records associated with this requalification program.