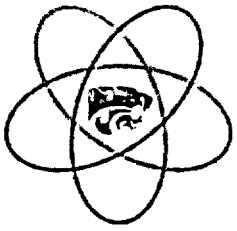

REQUALIFICATION PROGRAM

Kansas State University

TRIGA Mark II Nuclear Reactor Facility

License R-88

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Table of Contents

Requalification Program — Page

Table of Contents 1

1. Introduction 2

2. Medical Certification 3
- 2.1 General 3
- 2.2 Periodic Requirements 3
- 2.3 Special Requirements 3
  - 2.3.1 License Medical Condition Changes 3
  - 2.3.2 Responsibility, Task and Job Changes 4

3. On the Job Training and Proficiency 5
- 3.1 General 5
- 3.2 Periodic Requirements 5
  - 3.2.1 Reactivity Manipulations 5
  - 3.2.2 Proficiency as Operator at the Controls 5
- 3.3 Special Requirements 5
  - 3.3.1 Supervised Operation 5
  - 3.3.2 On the Job Training Information 6
  - 3.3.3 Facility Retraining Program 6

4. Examinations 7
- 4.1 General 7
- 4.2 Periodic Requirements 7
- 4.3 Special Requirements 8

5. Lectures 9
- 5.1 General 9
  - 5.1.1 Lecture Topics 9
  - 5.1.2 Lecture Content 9
- 5.2 Periodic Requirements 9
- 5.3 Special Requirements 9

6. Reports and Records 10
- 6.1 Control Room License, Technical Specification and Operator License Notebook 10
- 6.2 Operator Training Folders 10
- 6.3 Reactor Safety Committee Audit/Review 10
- 6.4 Operating logs 10
- 6.5 Training Records 10
- 6.6 Record Retention 10

1. Introduction

The Kansas State University (K-State) Nuclear Reactor Facility is designed to maintain a continuing and improving level of proficiency for reactor operators and senior reactor operators licensed to operate the reactor. To meet this goal, the requalification program addresses:

- Medical certification
- On the job training and proficiency
- Examination
- Lecture
- Records

The requalification program must be conducted for each complete retraining cycle, to be completed biennially (every two years), and upon conclusion must be promptly followed, pursuant to a continuous schedule, by successive requalification programs.

2. Medical Certification

2.1 General

The USNRC grants license to reactor operators and senior reactor operators based formal, documented physician evaluation and facility management certification that the licensee's medical condition and general health will not adversely affect the performance of assigned operator job duties or cause operational errors endangering public health and safety.

ANSI/ANS15.4 (*American National Standard for the Selection, Training and Qualification of Personnel for Research Reactors*) 7.2.1, "Basis of Requirements," states that "The physical condition and the general health of research reactor operators shall be such that they are capable of properly operating under normal, abnormal and emergency conditions and able to perform the associated tasks." Specific criteria for medical examination are provided by the standard.

Medical evaluations are based on K-State Nuclear Reactor Facility operator responsibilities, jobs and tasks. Principle responsibilities of the K-State position are control of machinery and electrical equipment supporting reactor operation, occupational exposures, and (sedentary) monitoring & logging meter readings. Significantly, at the K-State reactor:

- There is occasional use of a pendant-controlled, overhead crane;
- There is routine access to facility areas via metal stairs;
- There is no routine heavy lifting (e.g., loads greater than 50 lbs.);
- K-State reactor operators do not require or use respiratory protection.

2.2 Periodic Requirements

Biennially (every two years, at intervals not to exceed 14 months), the Nuclear Reactor Facility Manager shall complete and sign Form NRC-396, "Certification of Medical Examination by Facility Licensee," certifying medical fitness for each licensed operator/senior operator. Completion of this form requires that a physician conduct the medical examination of the licensee to determine that the licensee medical condition and general health will not adversely affect the performance of assigned operator job duties or cause operational errors endangering public health and safety.

2.3 Special Requirements

2.3.1 License Medical Condition Changes

The licensee shall immediately inform the Nuclear Reactor Facility Manager if (during the term of the license) the licensee develops a permanent physical or mental condition that invalidates the determination made by the physician. The Nuclear Reactor Facility Manager shall notify the Commission, within 30 days of learning of the diagnosis.

2.3.2 Responsibility, Task and Job Changes

As system and equipment modifications, procedure changes, and experiment program changes occur, reviews for personnel and facility safety will consider whether current medical evaluations could be affected. If a change could affect the ability of operator to perform (as described above), options for addressing changes include review of the changes by medical authorities, operational restrictions, additional safety measures, or additional medical evaluations for operators.

3. On the Job Training and Proficiency

3.1 General

Licensed operators shall participate in a sufficient set of operations over a minimum prescribed operating time to ensure their familiarity and competence to perform as operator at the controls. Changing conditions and emergent information are an essential part of maintaining operational proficiency; therefore, provisions are made to ensure this information is provided to licensed operators.

3.2 Periodic Requirements

3.2.1 Reactivity Manipulations

Biennially (every two years), each licensed operator (reactor operator and senior reactor operator) shall perform at least 10 reactivity manipulations (that demonstrate skill with reactivity control systems) including startups, shutdowns and other control manipulations.

3.2.2 Proficiency as Operator at the Controls

Every calendar quarter, each licensed reactor operator shall be the operator at the controls while the reactor is operating for at least 4 hours to maintain operational proficiency. Each reactor operator licensed to operate the K-State reactor shall be in direct control to meet proficiency requirements; reactor operators shall not meet proficiency requirements by directing activities of students or trainees. Each licensed senior operator either manipulates the controls or directs the activities of individuals during plant control manipulations to meet proficiency requirements.

In the event that facility conditions such as an extended shutdown do not allow licensed operators to complete at least 4-hours of operation within a quarter, operators shall complete a special Facility Retraining Program approved by the Reactor Safeguards Committee prior to resumption of normal licensed activities as operator at the controls.

3.1.3 Lessons Learned

The Nuclear Reactor Facility Manager shall review operating records at least annually to determine if there are operational issues that should be addressed by training, including formal lectures or "lessons learned" communications.

3.3 Special Requirements

3.3.1 Supervised Operation

Unless a Facility Retraining Program is required (as described above), any reactor operator and/or senior reactor operator who does not meet the periodic requirements previously described shall operate the reactor only under supervision of another licensed operator.

(a) Any operator who held a license (reactor operator and/or senior reactor operator) during the previous quarter and did not operate the reactor for at least 4 hours as described above

shall operate the reactor under supervision of a licensed operator for at least 6 hours before operating without supervision.

(b) Any operator who held a license (reactor operator and/or senior reactor operator) during the previous requalification program cycle and has not completed at least 10 reactivity manipulations as described above shall complete at least 5 startups, at least 5 shutdowns and at least 5 changes in reactor power under supervision of a licensed operator before operating without supervision.

3.3.2 On the Job Training Information

(a) The Nuclear Reactor Facility Manager or Reactor Supervisor shall notify all operators of changes in facility design, operating procedures, facility license, abnormal procedures, and/or emergency procedures. Changes shall be indicated in the operating log, with explanatory or supporting material placed at the control console until all licensed operators have either been the operator at the controls or indicate they have reviewed the material (such as initialing the log entry indicating change).

(b) If operational issues that should be addressed by training are identified in annual review, the Nuclear Reactor Facility Manager shall initiate a formal lecture, incorporate the material in the next formal training, or initiate appropriate communication to all licensed personnel.

3.3.3 Facility Retraining Program

When a licensed operator is making reactivity manipulations for the first hour of retraining operations, a second person shall be in the control room. The second person in the control room shall be a licensed senior reactor operator or reactor operator, a previously licensed operator, Mechanical and Nuclear Engineering nuclear faculty, or a member of the Reactor Safeguards Review Committee (as approved by the Committee).

The Facility Retraining Program may consist of self-directed exercises following Committee approved written instructions to complete the items indicated above, or operation under direction of a licensed senior reactor operator to complete a set of operations, as approved by the Committee. The Facility Retraining Program shall include (as a minimum):

- Observation of subcritical behavior
- Approach to critical using subcritical multiplication to predict critical control rod positions
- Operation at power levels greater than 1 kW
- A minimum of 2 hours of training; at least one hour shall be as operator at the controls, and up to one hour may be as an observer

4. EXAMINATIONS

4.1 General

4.1.1 Content

Examinations should be based on a representative sample of questions covering areas in depth required to evaluate trainee understanding and capabilities. Examinations should be based on evaluating knowledge, skills, and ability required to perform as a reactor operator/senior reactor operator, as appropriate.

4.1.2 Operating Examinations

Operating examinations shall be conducted by the Reactor Supervisor or Nuclear Reactor Facility Manager covering normal, abnormal and emergency operating procedures. Operating examinations shall be graded as Satisfactory (S) or Unsatisfactory (U).

4.1.3 Written Examinations

Written examinations be prepared and graded (on a scale from 0 to 100%) by the Reactor Supervisor or Nuclear Reactor Facility Manager covering:

- Theory and principles of operation.
- General and specific plant operating characteristics.
- Plant instrumentation and control systems.
- Plant protection systems.
- Engineered safety systems.
- Normal, abnormal, and emergency operating procedures.
- Radiation control and safety.
- Technical specifications.
- Applicable portions of title 10, chapter I, Code of Federal Regulations.

4.2 Periodic Requirements

4.1.1 Written Examinations

Written examinations shall be given annually, not to exceed 16 months, to allow coordination with the scholastic calendar.

4.1.2 Operating Examinations

Operating examinations shall be given annually, not to exceed 16 months, to allow coordination with the scholastic calendar.

4.1.3 Certification of Examiner

The Reactor Safety Review Committee shall certify the person preparing examinations (Nuclear Reactor Facility Manager or Reactor Supervisor) annually, not to exceed 17 months, to allow coordination with the semi annual review schedule.

4.3 Special Requirements

4.1.1 Requirements for Lecture Attendance

If an operator scores between 70% and 80% on any written examination, the examinee shall attend a lecture on the subject

4.1.2 Written Reexamination

If an operator scores less than 70% any written examination:

- The operator shall not act as operator at the controls
- The operator will attend a lecture on the subject area
- The operator will be reexamined
- The operator will be permitted to resume duties as operator at the controls when the operator scores at least 70% on a subsequent examination

4.3.3 Operating Reexamination

If an operator is evaluated Unsatisfactory (U) on operating examination,

- The operator shall not act as operator at the controls
- The examiner shall identify training required prior to reexamination
- The operator shall complete training required
- The operator shall be reexamined
- The operator will be permitted to resume duties as operator at the controls when the operator is determined to perform satisfactorily in a subsequent examination

4.3.4 Special Retraining Program

If an operator scores less than 70% any written examination and also Unsatisfactory on the operating examination, the Nuclear Reactor Facility Manager and/or Reactor Supervisor shall evaluate operator performance to determine lecture and reexamination requirements for reinstatement.

5. Lectures

5.1 General

5.1.1 Lecture Topics

The requalification program will include preplanned lectures on a regular and continuing basis throughout the license period in those areas where operator and senior operator written examinations and facility operating experience indicate that emphasis in scope and depth of coverage is needed in the following subjects:

- Theory and principles of operation.
- General and specific plant operating characteristics.
- Plant instrumentation and control systems.
- Plant protection systems.
- Engineered safety systems.
- Normal, abnormal, and emergency operating procedures.
- Radiation control and safety.
- Technical specifications.
- Applicable portions of title 10, chapter I, Code of Federal Regulations.

5.1.2 Lecture Content

Lecture material should be based on training objectives, including general and specific objectives. Lecture material should reflect operational needs, with objectives should be based on how the material relates to job performance.

5.2 Periodic Requirements

In general, lectures will be prepared based on need; however, training material will be prepared covering the Emergency Plan and emergency procedures, and all operators will participate in annual training either by lecture attendance or independent study of the training material.

5.3 Special Requirements

Lectures will be prepared when weaknesses in operator proficiency or understanding are identified through semi annual management review or examinations (written or practical).

6. Reports and Records

6.1 Control Room License, Technical Specification and Operator License Notebook

Copies of active reactor operator and senior reactor operator licenses are maintained in the control room.

6.2 Operator Training Folders

Records for individual reactor operators are maintained, including records of medical certification, license application, operator and senior operator licenses, and other information such as Suspensions and reinstatement of licenses

6.3 Reactor Safety Committee Audit/Review

Results of Annual RSC review are maintained, including certification of personnel preparing and grading examinations, review of training program status, and identification of problems or items that need to be communicated to operators.

6.4 Operating logs

The operating logs contain records of reactor operator/senior reactor operator at the controls, including reactivity manipulations such as startup, shutdown and power changes as well as start and stop times for operators at the controls. This information is used to determine operator proficiency status in a monthly report.

6.5 Training Records

Training records include copies of lesson plans, written examinations (and keys), records of attendance and a summary of examination results.

6.6 Record Retention

All requalification program records shall be maintained for the current and previous cycle biennial requalification program.