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ATTN: Document Control Desk
Nuclear Regulatory Commission
Washington, D.C., 20555-0001

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Project Manager
U. S. Nuclear Regulatory Commission
Research and Test Reactors Licensing Branch

SUBJECT: Docket No. 50-602, Request for Renewal of Facility Operating License R-129

REFERENCE:

UNIVERSITY OF TEXAS AT AUSTIN - REQUEST FOR ADDITIONAL INFORMATION REGARDING THE LICENSE RENEWAL REQUEST FOR THE NUCLEAR ENGINEERING TEACHING LABORATORY TRIGA MARK II NUCLEAR RESEARCH REACTOR (TAC NO. ME7694) January 27, 2017

Sir:

In responding to the referenced Request for Additional Information it was determined to be more effective to revise the Operator Requalification Program than attempt a complex revision to the 1992 ORP. As summary of the Request for Additional Information and the reposed response is provided below, with the proposed Operator Requalification Program attached.

RAI 48.a

Revise the ORP to include an annual operating test.

RESPONSE

"Annual Operating Tests" are described in Section 5.2

RAI 48.b

Clarify how the ORP complies with the requirements of 10 CFR 55.59(a)(2)(ii) and 10 CFR 55.59(c)(4)(i) and revise the ORP if necessary.

M003
A02D
NRR

RESPONSE

The proposed revision to the UT Operator Requalification Program is structured to reflect and directly address the sections of 10CFR55. The annual operating test is described in Section 5.2, and the comprehensive requalification written examination in section 5.1

49. Revise the ORP to ensure that no one licensed operator is permanently exempted from meeting the requirements of 10 CFR 55.59 (e.g., the addition of a requirement that exam preparation is rotated between the reactor supervisor and the supervisory senior reactor operator

RESPONSE

Section 5.1.2 of the proposed UT Operator Requalification Program provides guidance to limit the potential for an individual exercising repeated exemption

50. Revise the ORP to include medical examination requirements and that the medical examination period would not exceed the biennial medical examination requirement stated in 10 CFR 55.21.

RESPONSE

The proposed UT Operator Requalification Program includes guidance from 10CFR55.53, Conditions of Licenses, which includes biennial medical examination in section 6.3.

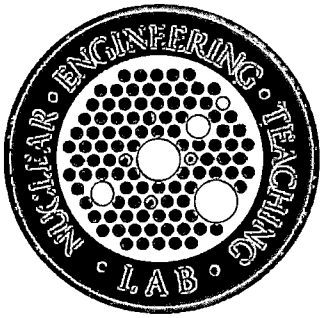
If there are any questions, please feel free to contact P. M. Whaley at 512-232-5373 or whaley@mail.utexas.edu.

Your attention in this matter is greatly appreciated,

P. M. Whaley

I declare under penalty of perjury that the foregoing is true and correct.

P. M. Whaley



OPERATOR REQUALIFICATION PROGRAM

The University of Texas at Austin

TRIGA Mark II Nuclear Reactor Facility

License R-129

Docket 50-602

14 March 2017

Nuclear Engineering Teaching Laboratory
10100 Burnet Rd., Building 159
Austin, Texas 78758

Table of Contents

1. Introduction

Licensed operators and senior operators at The University of Texas at Austin are required to participate in the Operator Requalification Program. The Operator Requalification Program requires each operator or senior operator participate in a requalification plan implementing periodic requirements. The requalification plan includes scheduled training activities such as lectures, requalification written examinations, operating tests, and on-the-job training requirements.

In accordance with 10CFR55 (§ 55.59, *Requalification requirements*) the Operator Requalification Program addresses:

- Schedule
- Lectures
- On-the-Job Training
- Evaluation
- Records

The Operator Requalification Program also addresses selected items from § 55.53 (Conditions of Licenses) related to maintenance of operator and senior operator licenses.

Each operator requalification plan is conducted continuously using a 2 year (24 month) cycle. For purposes of the Operator Requalification Program, "biennial" or "biennially" means every two years, not to exceed 30 months and "annual" or "annually" means every 12 months not to exceed 18 months. The maximum period for an annual requirement within the Operator Requalification Program is established to allow flexibility in coordinating the requalification program with academic schedules.

2. Schedule

Each operator requalification plan shall be conducted for a continuous period not to exceed two years, and shall be promptly and continuously followed on conclusion by successive operator requalification plans.

3. Lectures

Preplanned lectures shall be conducted on a regular and continuing basis when operator and senior operator written examinations or facility operating experience indicate that emphasis in scope and depth of coverage is needed. Where the evaluation of an individual operator's or senior operator's knowledge is adequate and performance is proficient, participation in lectures is not required. As described in § 55.59(c).2 (*Lectures*), the following subjects are addressed:

- Theory and principles of operation,

- General and specific plant operating characteristics,
- Plant instrumentation and control systems,
- Plant protection systems,
- Engineered safety systems (as applicable),
- Normal, abnormal, and emergency operating procedures,
- Radiation control and safety,
- Technical specifications,
- Applicable portions of title 10, chapter I, Code of Federal Regulations, and
- Emergent issues identified by facility management.

4. On-the-Job Training

On the job training addresses training activities related to:

- Control manipulations,
- Procedures and principles of operation,
- Knowledge of changes to the facility, and
- Emergency procedures.

4.1 Control manipulations

Each licensed operator and each licensed senior operator is required to manipulate the controls for specific plant evolutions described in § 55.59. Senior operator licensees are credited with completion of control manipulations if they direct the manipulations as they are performed. Simulation is acceptable for control manipulations related to emergency or abnormal condition, and actual manipulation of the plant controls is not required.

These manipulations may be accomplished as part of the Annual Operating Test of section 5.2, in group training sessions conducted as lectures incorporating simulations, or independently; therefore these control manipulations may be documented as evaluation of the Annual Operating Test, training lecture records, or in console logs. Simulations that are not part of the Annual Operating Test should be documented with the operator or senior operator training records, and should include (1) the scenario, (2) a summary of simulated actions, and (3) a reference to the applicable procedures.

4.1.1 Manipulations required to be performed annually:

- Reactor startups to greater than 10 kW,
- Plant shutdown,
- Significant (≥10 percent) power changes in manual rod control (this may be integrated with a startup to greater than 10 kW),
- Loss of coolant, including

  Loss of pool water

  Cooling system failures
- Loss of instrument (and plant) air, and
- Loss of electrical power (or degraded power sources).

4.1.2 Manipulations required to be performed biennially:

- Loss of protective system channel.
- Control rod drops.
- Inability to drive control rods.
- Fuel cladding failure detected by high activity in pool coolant or continuous air monitor indications.
- Malfunction of an automatic control system that affects reactivity.
- Reactor trip.
- Nuclear instrumentation failure.

4.2 Procedures and principles of operation

Each licensed operator and senior operator shall demonstrate satisfactory understanding of the operation of the apparatus and mechanisms associated with control manipulations of this section, as documented in the biennial comprehensive written examination and/or the annual operating test.

4.3 Facility Changes

To ensure that each licensed operator and senior operator is cognizant of facility design changes, procedure changes, and facility license changes, such changes will be communicated by the reactor manager to all licensed personnel as they occur.

4.4 Emergency procedures

Each licensed operator and senior operator shall review the contents of all emergency procedures annually.

5. Evaluation

Individual licensee knowledge and proficiency shall be evaluated based on the comprehensive written examination and operating tests. The results of testing will be used to determine if the operator or senior operator has an adequate and proficient level of knowledge and performance, and also identify weaknesses to be addressed in training as programmatic or emergent issues.

5.1 Biennial comprehensive requalification written examinations

Comprehensive written examinations shall be given biennially to determine licensed operators' and senior operators' knowledge of subjects covered in the Operator Requalification Program, and to provide a basis for evaluating knowledge of emergency procedures. Examination questions will be based on the applicable sections of § 55.41 (Written examination: Operators) and § 55.43 (Written examination: Senior operators)

5.1.1 The comprehensive written examinations shall be:

- Prepared by a senior operator
- Graded on a scale from 0 to 100%
- Based on questions derived from a representative sample of the following items (16 for operators, 21 for senior operators):

  (1) Fundamentals of reactor theory, including fission process, neutron multiplication, source effects, control rod effects, criticality indications, reactivity coefficients, and poison effects.

  (2) General design features of the core, including core structure, fuel elements, control rods, core instrumentation, and coolant flow.

  (3) Mechanical components and design features of the reactor core and pool cooling system.

  (4) Chill water cooling and auxiliary systems that affect the facility.

  (5) Facility operating characteristics during steady state and transient conditions, causes and effects of temperature based reactivity changes, and operating limitations and reasons for these operating characteristics.

  (6) Design, components, and functions of reactivity control mechanisms and instrumentation.

(7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

(8) Components, capacity, and functions of emergency systems.

(9) Shielding, confinement, and confinement isolation design features.

(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

(11) Purpose and operation of radiation monitoring systems, including alarms and survey equipment.

(12) Radiological safety principles and procedures.

(13) Procedures and equipment available for handling and disposal of radioactive materials and effluents.

(14) Principles of heat transfer thermodynamics and fluid mechanics.

(15) (Senior operators only) Conditions and limitations in the facility license.

(16) (Senior operators only) Facility operating limitations in the technical specifications and their bases.

(17) (Senior operators only) Facility licensee procedures required to obtain authority for design and operating changes in the facility.

(18) (Senior operators only) Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.

(19) (Senior operators only) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

(20) (Senior operators only) Procedures and limitations involved in initial core loading, alterations in core configuration, and determination of various internal and external effects on core reactivity.

(21) (Senior operators only) Fuel handling facilities and procedures.

5.1.2 The senior operator preparing the biennial comprehensive written examination:

- Is exempt from participating in the written examination, and
- Should (if possible) not be exempt more than once during sequential training plan cycles.

NOTE
Test writing responsibilities will be assigned (where possible) so that no individual is exempt from the biennial comprehensive written examination more than once in sequential training cycles.

5.1.3 If an operator or senior operator scores less than 80% on the written examination:

(1) The senior operator responsible for preparing and administering the test shall

- Identify performance weaknesses based on the subject areas in Section 3, and
- Prepare subject area examinations to determine if the weaknesses have been adequately remediated

(2) The examinee shall attend lectures on the subject area identified

(3) The examinee shall score at least 80% on the applicable subject area examinations

5.1.4 If an operator or senior operator scores less than 70% on the comprehensive written or remedial subject area examination, the operator shall be relieved from licensed duties until the training and examination specified in 5.1.3 are complete.

5.2 Annual operating tests

The annual operating test will include a systematic observation and evaluation of the performance and competency of licensed operators and senior operators in UT TRIGA specific evolutions and control manipulations derived from 10CFR55.45 (*Operating tests*). Satisfactory completion of the operating test will demonstrate to the examiner, to the extent possible, the licensee's understanding of and the ability to perform the actions necessary to accomplish the selected plant evolutions and control manipulation.

NOTE
The preparation and conduct of the Annual Operating Test will be assigned (where possible) so that no individual is exempt from the annual examination more than once each training cycle.

5.2.1 The operating test shall be

- Prepared by a senior operator
- Graded as Satisfactory (S) or Unsatisfactory (U)
- Based on a representative sample of at least four of the following 13 items:

(1) Performance of pre-startup procedures for the facility, including operating the controls associated with equipment that could affect reactivity.

(2) Manipulation of console controls as required to operate between shutdown and designated power levels.

(3) Identification of annunciators and condition-indicating signals, including performance of appropriate remedial actions.

(4) Identification of instrumentation systems and the significance of instrument readings.

(5) Observation and safe control of operating behavior characteristics of the facility.

NOTE
Simulation is acceptable for control manipulations related to emergency or abnormal condition, and actual manipulation of the plant controls is not required. Successful completion of a simulation requires the licensee demonstrate understanding of the actions to be taken and the applicable procedures to be used.

(6) Performance of control manipulations required to obtain desired operating results during normal, abnormal, and emergency situations.

(7) Safe operation of pool cooling and chill water, and identification of how operation of these systems affects the facility.

(8) Safe operation of systems whose controls could affect reactivity or the release of radioactive materials to the environment.

(9) Demonstration or description of the use and function of radiation monitoring systems, including fixed radiation monitors and alarms, portable survey instruments, and personnel monitoring equipment.

(10) Demonstration of knowledge of significant radiation hazards, including permissible levels in excess of those authorized, and ability to perform other procedures to reduce excessive levels of radiation and to guard against personnel exposure.

(11) Demonstration of knowledge of the emergency plan, including, as appropriate, the operator's or senior operator's responsibility to decide whether the plan should be executed and the duties under the plan assigned.

(12) Demonstration of knowledge and ability as appropriate to the operator or senior operator position to assume the responsibilities associated with the safe operation of the reactor.

(13) Demonstration of the operator's or senior operator's ability to function in such a way that procedures are adhered to and that the limitations in the facility operating license and amendments are not violated.

5.2.5 If the operator has performed at an unsatisfactory level, the operator will be relieved from licensed duties until the following items are complete:

- Development of a Remedial Training Program, proposed by the reactor manager and approved by the NETL Director or Associate Director,
- Completion of the approved Remedial Training Program, and
- Successful completion of an operating exam.

6. Conditions of Licenses

The Operator Requalification Program includes specific requirements to maintain an operator or senior operator license such as the minimum time in performance of licensed duties, and assurance that the licensee is capable of safe and competent performance.

6.1 Participation in the requalification plan

Each licensed operator or senior operator shall participate in the Operator Requalification Program, including the requalification plan and other activities required to maintain an operator or senior operator license.

6.1.1 If an operator or senior operator does not participate in the requalification plan, the operator or senior operator license will be suspended.

6.1.2 A suspended license may be reinstated on successful completion of all current requalification plan requirements.

6.1.3 A license suspended for two years for failure to participate in the requalification plan will be terminated.

6.2 Operational Proficiency

Each licensed operator or senior operator shall maintain operational proficiency

6.2.1 Every calendar quarter, each licensed operator or senior operator shall be the operator at the controls while the reactor is operating for at least 4 hours.

6.2.2 If a licensed operator or senior operator has not operated for at least 4 hours in the previous calendar quarter:

- The operator or senior operator license will be suspended, except that

- The operator or senior operator shall operate the reactor under supervision of a licensed operator or senior operator for at least 6 hours prior to operating without supervision.

NOTE
Since the intent of this requirement is to assure the operator or senior operator has sufficient operating experience for safe operation, the supervision may be performed by a licensed operator or senior operator.

- Prior to releasing the suspension, the reactor manager shall verify that the qualifications and status of the licensee are current and valid.

6.2.3 In the event that facility conditions such as an extended shutdown prevent licensed operators and senior operators from completing at least 4-hours of operation within a quarter, prior to resumption of normal licensed activities all operators and senior operators shall complete a special Facility Retraining Program:

- The Facility Retraining Program shall be approved by the Reactor Oversight Committee

- The Facility Retraining Program shall include (as a minimum):

  (1) Observation of subcritical behavior,

  (2) Approach to critical using subcritical multiplication to predict critical control rod positions,

  (3) Operation at power levels greater than 1 kW, and

  (4) A minimum of 2 hours of operations with at least one hour shall be as operator at the controls (up to one hour may be as an observer)

6.3 Capabilities for safe and competent execution of licensed duties

All operators and senior operators will maintain the ability to safely and competently perform licensed duties, including:

6.3.1 A medical examination every two years; if the operator or senior operator does not have a medical examination (no earlier than 60 days) prior to the anniversary of the effective date of the license, the reactor manager, Associate Director or Director shall:

(1) Notify the USNRC, and

(2) Suspend the operator or senior operator from licensed activities until such time as the medical examination is complete and indicates the operator or senior operator is medically qualified

6.3.2 Abstinence from consumption or ingestion of alcoholic beverages within the reactor bay or designated temporary controlled access areas; if an operator or senior operator is found to be consuming or ingesting alcoholic beverages within these areas then the reactor manager, Associate Director or Director shall:

(1) Notify the USNRC, and

(2) Suspend the operator or senior operator from licensed activities pending investigation and disposition of any required legal/judicial actions.

6.3.3. Not using, possessing, or selling any illegal drugs; if an operator or senior operator is found to have used, possessed or sold any illegal drugs then the reactor manager, Associate Director or the Director shall

(1) Notify the USNRC, and

(2) Suspend the operator or senior operator from licensed activities pending investigation and disposition of any required legal/judicial actions.

6.3.4 When the consumption or ingestion of alcohol, prescription medicines or drugs, and over the counter medicines or drugs has the potential to adversely affect an operator or senior operator in the performance of licensed duties,

- The affected operator or senior operator shall notify the reactor manager, associate director, and/or the director.
- The reactor manager, associate director, and/or the director shall evaluate whether the abilities of the operator or senior operator have been affected to the extent that the ability to safely and competently perform licensed duties is impacted.

NOTE
Although a formal medical evaluation may be requested and performed at the discretion of the reactor manager, Associate Director, or Director "the potential to adversely affect" is intended to be an informal and conservative assessment. Medical side effects should be reviewed along with observation of changes to the operator's or senior operator's general demeanor, bearing, alertness, and mental acuity. Operation "under the influence" of the substances listed in 6.3.4 has the potential to adversely affect performance, and can be verified by a confirmed test results exceeding the lower of the cutoff levels for drugs or alcohol contained in subparts E, F, and G of 10CFR26.

- If performance is adversely affected, the reactor manager, associate director, or the director shall relieve or suspend the operator or senior operator until the ability to safely and competently perform licensed duties is no longer compromised.

6.4 Felony Convictions

6.4.1 If the operator or senior operator is convicted of a felony, the licensee shall notify:

- The reactor manager, associate director, and/or the director immediately, and
- The USNRC within 30 days

6.4.2 The Director shall suspend the operator or senior operator from licensed activities pending evaluation that the operator or senior operator is still capable of successfully completing a background check for unescorted access and access to safeguards information.

7. Records

Each record must be legible throughout the retention period in 7.2. The record may be the original or a reproduced copy or a microform provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of producing a clear copy throughout the required retention period.

7.1 Requalification program records

All requalification plan records shall be maintained for the current and previous cycle biennial requalification plan, including:

- The participation of each licensed operator and senior operator in the requalification plan,
- Copies of written examinations administered, the answers given by the licensee, and the results of evaluations and documentation of operating tests, and
- Any additional training administered in areas in which an operator or senior operator has exhibited deficiencies.

7.2 Operator and senior operator licenses

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

7.3 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. Retention of operating logs is identified in Technical Specifications.