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March 14, 1985

Standardization and Special Projects Branch
Division of Licensing
Nuclear Regulatory Commission
Washington, D. C. 20555

ATTENTION: Cecil Thomas
RE: Docket #50-602

Dear Sir:

Enclosed are the written responses to questions related to the review of the Reactor Operator Requalification Program for The University of Texas at Austin license request (application letter dated November, 9, 1984).

Sincerely,

Thomas D. Bauer

T. L. Bauer

TLB:jc

cc: G. Funken
D. Klein
H. Walls

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Operator Requalification Program

Response to Questions

1. Substitution of scheduled classes or university courses that are periodically taught are intended to provide an alternate source of training instruction. Although taught periodically, these courses are not to be routinely substituted for training requirements. Three undergraduate, upper division (junior, senior level) courses contain material applicable to the training program. These courses are Introductory Nuclear Reactor Theory (ME 361E), Radiation Detection and Measurement (ME 361F) and Reactor Operations (ME 361G). Each course is a one semester course consisting of 3 semester credit hours over a period of approximately 12 weeks. Participation as student, assistant or instructor in these courses may be substituted for some lecture requirements of the operator training program. Substitution of ME 361E is for Nuclear Theory and Principles of Operation. Substitution of ME 361F is for Radiation Control and Safety. The course ME 361G is a substitute for 3 categories, Nuclear Theory, Principles of Operation, Design and Operating Characteristics, and Facility Instrumentation and Control Systems.

Introductory Nuclear Reactor Theory is a lecture course that provides a good basic training in nuclear fundamentals. Fundamentals include principles such as fission, neutron reactions, neutron multiplication and criticality, and extend to such topics as neutron diffusion, neutron moderation and neutron thermalization. The course provides ample information on reactor statics but lacks an appropriate treatment of reactor dynamics. Supplemental lectures are necessary to provide the total training program requirements for an operator or senior operator's knowledge of Nuclear Theory and Principle of Operation. Radiation Detection and Measurement is a lecture and laboratory course that instructs and demonstrates the basic principles of radiation interactions with materials. Topics include a brief health physics introduction, operation and analysis of

gaseous filled detectors, scintillation detectors and solid state detectors. Specific course topics and experiments provide good training on fundamental concepts but are to be supplemented by lectures that relate the fundamentals to specifics of laboratory radiation sources, radiation survey equipment and radiation safety regulations.

Reactor Operations is a lecture and laboratory course developed to provide a student with direct experience and knowledge of the operation of a nucleus fission reactor. References to power reactors and experience with a research reactor are provided by the course. Lecture topics and reactor experiments are designed for most of the operator training objectives in the areas of Nuclear Theory and Principles of Operation, Design and Operating Characteristics, and Facility Instrumentation and Control Systems. Course material also includes some information on each of the other operator training subjects. Although the subject material for the 3 listed operator training subjects is presented in a form adequate for operator training, the 4 remaining subjects are not generally presented in a form adequate for training objectives. Supplemental lectures are not intended for 3 of the training subjects, but are necessary for the remaining 4 training subjects. For any of the seven subjects, mastery of the course material is expected at a level above that required of the student that is not training for a license.

2. Inclusion of lectures, discussions and self-study in the training program is intended to avoid the problems of a one person lecture to one or two persons on material with which all persons are already familiar. Substitution of self-study for lectures will require the same knowledge but should supplement information obtained from previous lectures (training qualification), other studies or training. Discussions are included in the training program so that an interactive learning and evaluation process occurs between the persons being trained and the training

instructor. For the small staff of the facility the training instructor will always be the reactor supervisor or a senior operator with substantial facility experience and educational background.

The University of Texas TRIGA reactor is part of the Nuclear Engineering Teaching Program. Besides the applications of various radiation related experiments, education is a major activity of the facility. Licensed operators are generally engineering students or degree graduates qualified to teach courses in the nuclear engineering teaching program. Because of the facility purpose and type of facility staff, training is an integrated activity that occurs on a continuing basis, both in terms of reactor operation experience and in terms of classroom education.

3. The person designated to administer initial qualification and requalification exams will be a licensed senior operator who functions as the facility supervisor. Evaluation and documentation of the knowledge of the functioning reactor facility supervisor are provided by several factors that collectively demonstrate an allowance for an examination exemption. These factors are the educational experience documented by an advanced degree in the field of nuclear engineering, active participation in lecture preparations or presentations of the training program, daily performance and review of activities related to reactor operation and the evaluation of questions contained in the administered exam.

For both the initial and subsequent facility qualification training, the senior operator designated as reactor supervisor is responsible for the development and implementation of the reactor operator training program. The supervisor for the initial qualification program will be a licensed senior operator at the current University of Texas TRIGA facility. Evaluation and documentation of the knowledge for the initial qualification of the facility supervisor will be provided by the active role of the supervisor in the development of the training

program and the primary responsibility for the specification of reactor facility features and preparation of all documents related to the facility license and operation. The supervisor for subsequent qualification programs and requalification will be a licensed senior operator at the new University of Texas facility. Evaluation and documentation of the knowledge of the supervisor will be provided by the active role of the supervisor in the training of personnel and operation of the facility.

4. A competency evaluation as opposed to the knowledge evaluation performed by written examination is a subjective observation by another individual (designated senior operator, facility supervisor, or management). The observation, which may include oral questions, but not written examination, is to evaluate operator performance such as proficency of operating the reactor controls and systems, awareness of facility conditions and changes, and weaknesses or deficiencies. A record of satisfactory or unsatisfactory evaluation will be maintained as part of the requalification records. If appropriate, requalification training will be applied to correct evaluations that indicate the need for improvement.

5. Performance requirements for operators and senior operators are expected to change some between the new and old TRIGA facilities. These changes are to be identified from the new faciltiy documents, primarily the Safety Analysis Report and related documents. Related documents will include Emergency Plan, Physical Security Plan, Reactor Startup Plan, Instrumentation, Control and Safety System Checkout Plan, and programs for quality assurance and radiological safety. Development of the performance objectives for certified operators at the new facility and incorporation of changes into the initial and subsequent requalification training program are to be identified as the new facility construction commences and the old facility operation is curtailed. Major differences

expected between the facilities are related to new power and pulse differences and beam tube experiential facilities. Minor differences will include facility features such as size and function of building areas and new equipment such as the reactor instrumentation, control and safety system.

A person designated from the old facility staff and actively involved in the new facility design will be designated to determine and implement the required training program changes. This person will be TRIGA reactor operator with a senior license permit and will have an educational experience as indicated by an advanced degree in the area of nuclear engineering. Performance objectives of operators should not change substantially although a significant change in the knowledge of facility features related to reactor operation, experiment operation of safety conditions is expected to occur. Performance objectives of senior operators beyond those required of operators should include core characteristics, functional details of instrumentation, control and safety system, radiation safety of beam tube experimental facilities, fuel movements and general operations.