

SAFETY EVALUATION REPORT FOR
THREE MILE ISLAND, UNIT 2
DOCKET NO. 50-320
FUEL HANDLING SENIOR REACTOR OPERATOR TRAINING PROGRAM

1. Introduction

On January 14, 1985, the licensee submitted a Fuel Handling Senior Reactor Operator Training Program (FHSRO) for the Three Mile Island Nuclear Station, Unit 2 (TMI-2). The training program establishes the training requirements for personnel who are being trained specifically for defueling operations at TMI-2. The staff reviewed this submittal and requested additional information (RAI) in a letter of April 25, 1985. The licensee provided a response to the RAI in a letter of June 10, 1985. The response addressed specific concerns contained in the RAI and included a revised FHSRO training program and two procedures relating to GPUN "Training and Education Department Training System Development Process" and "Requirements for Certification of Candidates for NRC Operator Licenses."

2. Program Administration

The FHSRO training program development and conduct of the program is the responsibility of the Supervisor, Licensed Operator Training. The program also defines the responsibilities of the Director-TMI-2, the Managers of Plant Training, Plant Operations and Operator Training Manager.

The program also contains the licensee's plans for instructors in this program. These include licensed or certified members of the Training Department or "guest" instructors. The guest instructors include those personnel who have expertise in a specific subject area. Guest instructors will be approved by the Operator Training Manager or Manager, Plant Training. With the exception of guest lecturers, senior licensed or certified instructors must teach systems, integrated responses and transient behavior to licensed operators.

In the June 10, 1985, submittal, the licensee has stated that the development of the FHSRO training program has followed the guidelines contained in GPUN Training and Education Department procedure, "Training Systems Development Process" (TSD), 6200-ADM-2682.01. The TSD process is a systematic approach to training program development and consists of the following steps: analysis of training needs, design of the program, development of training program, implementation of the program and evaluation of the students as well as the program.

3. Replacement Training Program

The FHSRO program contains the prerequisites for FHSRO candidates, program content and objectives. The replacement program is divided into four phases which include:

- ° Fundamentals Training
- ° On-the-Job Training
- ° Defueling Systems Training
- ° Simulation Training

The fundamentals training was conducted at the beginning of the program and includes power plant fundamentals which provided candidates with the knowledge of the operating principles of mechanical, electrical and chemical systems and the reactor core characteristics as they relate to defueling. The topics include: reactor physics - emphasizing subcritical operation; mechanical and electrical fundamentals; criticality safety; radiological controls and core accountability. In addition, this phase of the training includes power plant systems which can affect defueling operations. These topics include: core construction; core cooling systems; electrical distribution for defueling; ventilation systems in the reactor and fuel handling buildings; core monitoring systems including nuclear and non-nuclear; fire protection; communications and liquid waste handling systems and technical specifications. Training is also included in: emergency, radiological control and administrative procedures; facility incidents and industrial experience and the Code of Federal Regulations.

The on-the-job training (OJT) phase provides the FHSRO candidate with the practical knowledge necessary to perform licensed duties. The OJT portion is contained in Appendix A of the program and is conducted during periods when candidates are assigned as an extra person on shift. The training includes practical training in procedures as well as systems which have direct interaction with FHSRO responsibilities. FHSRO candidates are evaluated by task examiners in this phase of the training program. FHSRO candidates will also have the opportunity to develop skills using fuel handling equipment during vendor site visits.

During defueling systems training, FHSRO candidates will be provided knowledge of systems to facilitate defueling. Topics included in this phase of the program include: electrical distribution; defueling and communication systems; technical specifications; administrative procedures and normal, abnormal and emergency operating procedures.

Simulation training is planned to reinforce skills and knowledge requirements for FHSRO candidates. The licensee plans to use the Defueling Test Assembly or similar mock-ups to provide training on defueling equipment. In addition, a research reactor or a simulator may be used to conduct training in theoretical fundamentals and operating characteristics.

The program also describes the administration of the program. This section contains the program presentation which includes: OJT and classroom training; use of qualified instructors and approved lesson plans. This section also includes evaluation criteria for OJT, written examinations during the classroom phase of the training program and the final examination. Final examination criteria is 80% overall average and 70% in individual sections. In addition, the final examination includes a two phase oral examination. One phase includes a "walk-through" evaluation and the second phase includes a "board" evaluation by the Training and Operations Department personnel.

4. Requalification Training

The FHSRO program also contains requalification training. In addition to the program objectives and description, the program includes the following elements:

- a) Preplanned lecture series which includes lecture topics, attendance requirements, use of lesson plans, instructor qualifications and the lecture series evaluation process.
- b) Skills training and evaluation which consist of reactivity manipulations including loading fuel into canisters, movement of canisters to storage outside the reactor vessel and transfer of canisters to storage racks in the fuel handling building. In addition to reactivity manipulations, the program requires participation in abnormal/emergency drill exercises. FHSRO performance and competency are periodically evaluated. Provision for remedial training is also included in the program.
- c) The skills training participation portion of the program consists of on-shift review of selected operational experiences and changes to the facility. The selected operational experiences are developed from licensee event reports, and industry significant event reports. Also included is a continuing system of review of defueling equipment changes, equipment modifications, procedure and technical specification changes. Provisions are included to disseminate new or revised information on a short term basis.
- d) An annual requalification examination is also included in the program. The annual examination consists of a written and oral examination administered to all licensed personnel. Topics in the written examination include: theory and principles of fuel criticality; heat transfer, fluid flow and thermodynamics; defueling facilities and system design; operating characteristics; instrumentation and control and

protection systems; applicable portions of 10 CFR Chapter I; normal/ abnormal, emergency and administrative procedures; technical specifications and industry operating experience. Also included is the written examination administration and passing grade criteria (80% overall and 70% in any section). The oral examination covers topics similar to those in the written examination and include examination administration and grade criteria.

- e) Special retraining programs are also included in the program. This segment provides accelerated training for individuals who have exhibited deficiencies in the annual written or oral examination or significant deficiencies in performance of licensed duties. Provisions for retraining personnel who have been in an inactive status are also included in this segment of the program.
- f) The on-the-job training and certification segments of the program contain provisions for new systems training or any problem areas identified during the defueling process. These segments provide for development of OJT task list for new systems as well as the examination/certification before these systems are used in the defueling process.

5. Staff's Evaluation

The staff's evaluation of the FHSRO training program utilized criteria contained in Section 13.2 of NUREG-0800, "Standard Review Plan." In addition, the staff also included the principle elements of the March 20, 1985, Commission Policy Statement on Training and Qualification of Nuclear Power Plant Personnel in the review of this program. The rationale to include the Policy Statement on Training and Qualifications was to assure that the licensee would use a more defined methodology to determine operator training needs.

The licensee response to the RAI of April 25, 1985, included the method used to define operator training needs. The licensee is developing the FHSRO program utilizing the Training and Education Department procedure, "Training System Development Process" (TSD), 6200-ADM-2682.01. The TSD process contains similar elements as those described in the March 20, 1985, Commission Policy Statement on Training and Qualification of Nuclear Power Plant Personnel. Since the defueling of TMI-2 will be a unique project, the staff concurs in the use of the TSD process to develop operator training needs and provide necessary feedback into the FHSRO training program.

The staff concludes that the FHSRO replacement and requalification program and GPUN's response to the April 25, 1985, relative to training program content is acceptable. The program should adequately prepare candidates to be licensed as a senior operator limited to fuel handling under § 50.54(M)(2)(IV), 10 CFR 55 and Appendix A of 10 CFR 55. The staff requests the additional conditions in the replacement and requalification programs:

- 1) As new or revised SERs are developed by the licensee, and approved by the NRC, the training program will be maintained up-to-date and licensed personnel informed of new or revised safety issues.
- 2) As new or revised OJT tasks are developed, the licensee will keep the program current and available for NRC inspection.
- 3) Before the start of a new phase of defueling, GPUN will notify the staff of the training and qualification schedule for FHSRO as contained in Section 8.6 and 8.7 of the requalification program.

Condition 1 is necessary to ensure that FHSROs continue to understand the defueling process at TMI-2. Since defueling of TMI-2 is a first time process, changes are expected. Therefore, SERs developed or revised by the licensee and approved by the NRC provide the technical basis for FHSROs to maintain qualifications. The two additional conditions ensure that new or

revised OJT tasks are kept current and that the NRC staff may monitor additional training and certification by the licensee.

The staff also includes the following interpretation of the requalification program:

- a) Due to the limited number of abnormal and emergency procedures assigned to the FHSRO position, Section 3(d) of Appendix A, 10 CFR 55, may be accomplished in the Lecture Series and in the Skills Training and Evaluation portion of the program.
 - b) Section 8.6, "On-the-Job Training," may also include classroom instruction in addition to those tasks identified as OJT.
6. Upgrading of Reactor Operator and Senior Reactor Operator Qualifications (Item I.A.2.1 of NUREG-0737)

During the review process, the staff determined that Item I.A.2.1 of NUREG-0737 should also apply to the TMI-2 FHSRO training program. Item I.A.2.1 contains revised criteria for training and licensing of personnel. The revised criteria was transmitted to all licensees in a March 28, 1980, letter from H. R. Denton. Since the FHSRO position and training program is unique to TMI-2, some of the criteria is not applicable. The following contains the revised criteria, a summary of the program including GPUN correspondence and the staff's evaluation.

A. ELIGIBILITY REQUIREMENTS TO BE ADMINISTERED AN EXAMINATION

1. Experience

- a) Applicants for SRO license to have four years of power plant experience.
- b) Applicants for SRO license shall have held an operator's license for one year.

The FHSRO program requires three years experience in operations or support of operations. FHSRO candidates are also required to have one year of supervisory experience. In the July 26, 1985, letter, GPUN states that the FHSRO position is significantly reduced in scope and responsibility than that of a SRO. In addition, the FHSRO experience requirements cannot be substituted by academic or related training as they may be for SRO candidates.

Since FHSRO are limited to defueling operations, the experience requirements need not be as stringent as those for SRO. The staff concludes that the three years experience including one year as in a supervisory position provides an adequate background for candidates to enter an FHSRO training program. GPUN, in a letter of May 20, 1985, has also described the shift staffing during defueling. The staffing includes a Recovery Operations Field Engineer, an experienced SRO in the control room and specially trained equipment operators. Therefore, FHSROs have ample technical and supervisory personnel readily available should problems arise.

2. Training

- a) SRO applicants shall have three months of shift training as an extra man on shift.

In the July 26, 1985, letter, GPUN has provided an update of the on-shift training, additional training in use of defueling equipment and participation in equipment testing. The actual time to complete the initial phase of the OJT on-shift program was about two months. This phase included checkouts in: administrative, abnormal and emergency procedures; radiological controls and plant systems interfacing with defueling activities. As actual systems have been fabricated, additional OJT has been developed. Completion of this phase which includes use of the Defueling Test Assembly is scheduled to be completed about mid-August. In addition, various FHSROs have been involved with development and vendor testing of special defueling equipment.

The staff concludes that the FHSRO on-shift training, OJT on defueling equipment and participation in equipment development and testing adequately meets the intent of on-shift training for FHSRO.

- b) RO applicants shall have three months training as an extra man on shift. This criteria does not apply since the FHSRO is a unique position and there are no licensing provisions for RO limited to fuel handling.
- c) Training programs shall be modified, as necessary, to provide:
 - 1) Training in heat transfer, fluid flow and thermodynamics.
 - 2) Training in the use of installed plant systems to control or mitigate an accident in which the core is severely damaged.
 - 3) Increased emphasis on reactor and plant transients.

The training program objectives include fundamentals of fluid flow, heat transfer and thermodynamics which should enable the candidate to evaluate fuel handling and support operations performance by means of available monitoring devices. Therefore, the FHSRO training program meets this criteria.

Training in the use of installed plant systems to mitigate an accident does not apply to the FHSRO program.

In the July 26, 1985, letter, GPUN provided information relative to the FHSRO training on reactor and plant transients. In addition to the OJT training in abnormal and emergency procedures relative to defueling activities, FHSROs participated in a three day program utilizing the Pennsylvania State University Reactor. Experiments conducted during this period included possible transients involving the reactor core in its present state. The staff concludes that the program has incorporated postulated defueling transients using a combination of classroom, experiments and OJT, thereby meeting the intent of this criteria.

- d. Training center and facility instructors who teach systems, integrated responses, transient and simulator courses shall demonstrate their competence to NRC by successful completion of a senior operator examination.

The FHSRO program contains this criteria. In addition, "guest" instructors who have expertise in various new systems or subject area may perform this function. Guest instructors are approved by the Operator Training Manager or the Manager, Plant Training.

- e. Instructors shall be enrolled in appropriate requalification programs to assure they are cognizant of current operating history, problems, and changes to procedures and administrative limitations.

All licensed or certified instructors are required to participate in applicable requalification programs. The staff reviewed GPUN Procedure, "Operator Training Instructor Indoctrination/Qualification Training Program," 6210-ADM-2610.02 on July 28, 1983, and found it acceptable.

3. Facility Certifications

Certifications completed pursuant to Sections 55.10(a)(6) and 55.33a(4) and (5) of 10 CFR Part 55 shall be signed by the highest level of corporate management for plant operation (for example, Vice President for Operations).

The licensee's procedure, "Requirements for Certification of Candidates for NRC Licenses," 4210-ADM-2610.01 and the current NRC License Application (NRC Form 398) contains this feature.

B. NRC EXAMINATIONS

The H. R. Denton letter informed licensees of a new category in licensing examinations; time limits and revised passing grades for written examination; the requirement of an operating test for SRO applicants and permission from the applicants to inform facility management of examination results.

The increased scope of examinations have been further modified and are contained in NUREG-1021 "Operator Licensing Examiner's Standards." Permission to notify facility management of examination results is also contained in NRC Form 398.

The TMI-2 FHSRO program is in agreement with passing grades and other criteria contained in this section of the H. R. Denton letter.

C. REQUALIFICATION PROGRAMS

1. Content of the licensed operator requalification programs shall be modified to include instruction in heat transfer, fluid flow, thermodynamics and mitigation of accidents involving a degraded core.

The FHSRO requalification program has provisions for instruction in the subjects of heat transfer, fluid flow and thermodynamics. Training in mitigating accidents involving a degraded core is not applicable for the FHSRO program.

2. The criteria for requiring a licensed individual to participate in accelerated requalification shall be modified to be consistent with the new passing grade for issuance of a license; 80% overall and 70% each category.

The FHSRO requalification program contains the revised passing grades.

3. Programs should be modified to require the control manipulations listed in Enclosure 4. Normal control manipulations, such as plant or reactor start-ups, must be performed. Control manipulations during abnormal or emergency operations must be walked through with, and evaluated by, a member of the training staff at a minimum. An appropriate simulator may be used to satisfy the requirements for control manipulations.

Since the FHSRO program is limited to fuel handling, the manipulations in Enclosure 4 do not apply. The FHSRO requalification program contains the requirements for 10 manipulations relating to fuel handling over the two year period of the license, thereby meeting the requirements of Appendix A of 10 CFR Part 55. FHSROs also participate in preplanned training exercises which involve various defueling abnormal and emergency procedures. These exercises are also evaluated. Therefore, the FHSRO program meets the intent of additional exercises contained in this criteria.

D. LONG RANGE CRITERIA AND/OR REQUIREMENTS

The criteria contained in this section addresses Shift Supervisor education requirements; additional simulator training and exercises; eligibility requirements for instructors; NRC administered examinations at simulators and the annual requalification examination.

The long range criteria for education requirements, simulator training and evaluation have not been implemented; therefore, need not apply for FHSRO. The NRC intends to monitor FHSRO performance and GPUN evaluation on a continuing basis. GPUN instructor eligibility requirements have been reviewed in previous evaluations and found acceptable.

Staff Evaluation of Item I.A.2.1

With the exception of criteria not relative to FHSRO training, the staff concludes that the program meets the criteria or intent for all items contained in the H. R. Denton letter of March 28, 1980.