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June 13, 1985

TMI Program Office  
Attn: Dr. B. J. Snyder  
Program Director  
US Nuclear Regulatory Commission  
Washington, DC 20555

Dear Dr. Snyder:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)  
Operating License No. DPR-73  
Docket No. 50-320  
Licensed Operator Requalification Training

On September 5, 1984, the TMI-2 Licensed Operator Requalification Program was submitted for your review and approval. By your letter, dated February 11, 1985, comments on the subject requalification program were provided and additional information was requested.

This letter responds to your specific requests for information. In addition, a revision to the Licensed Operator Requalification Program is attached which incorporates NRC staff comments and other appropriate changes.

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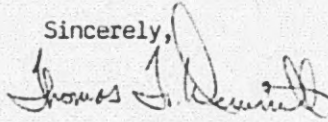
Dr. B. J. Snyder

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If there are any questions regarding the responses or program changes, please contact Mr. Bruce Leonard, Operator Training Manager at (717) 948-8046.

Sincerely,



F. R. Standerfer  
Vice President/Director, TMI-2

FRS/JCA/eml

Attachments

cc: Operator Licensing Branch - Division of Human Factors, Mr. B. A. Boger  
Section Chief - Reactor Projects Section 1C, Mr. R. M. Keller  
Regional Administrator - Offices of I&E, Dr. T. E. Murley  
Deputy Program Director - TMI Program Office, Dr. W. D. Travers

## TM1-2 LICENSED OPERATOR REQUALIFICATION PROGRAM

In response to the program evaluation forwarded to GPUN regarding the TM1-2 Licensed Operator Requalification Program, the following information is provided:

### Section 7.2.1 (a) - Lecture Series Topic Selection

The subjects of basic metallurgical concepts and corrosion theory have been considered for inclusion as separate lecture topics in the requalification training program. The effects that the Unit 2 containment building atmosphere has on components located therein and the characteristics and potential hazards of the fission product inventory in the systems have been addressed in numerous technical reports. The effects identified in these technical reports have been incorporated in operating, abnormal and emergency procedures and system design descriptions. These procedures and system design descriptions have been used over the last three training cycles to revise lesson plans for operator training. As a result of these changes and subsequent incorporation in lesson plans, there is no need to address these issues as separate topics in the requalification training program.

### Section 7.3.4 - Skills Training Participation

The program has been revised to delete the word "exercises". The annual reactivity manipulations shall be satisfied by participation in the manipulations or drills identified in the program. There will be no provisions for substitute exercises under the current program.

### 7.3.5 - Watchstanding

The watchstanding requirements have been revised to ensure that each licensed operator actively performs licensed duties for the periodicity specified. These duties will not be performed under instruction as referenced previously.

### 7.3.5.1 - Annual Written Examination

The wording of this section has been changed to reflect requalification program vice requalification cycle so that the examination is not limited solely to the material presented during the requalification cycle.





TMI TRAINING DEPARTMENT  
ADMINISTRATIVE MANUAL

Number  
6212-ADM-2611.01

Title  
LICENSED OPERATOR REQUALIFICATION PROGRAM - UNIT 2

Revision No.  
3-00

Applicability/Scope

Responsible Office  
TMI TRAINING DEPT.

This document is important to safety ☐ Yes ☒ No

Effective Date

List of Effective Pages

PAGE	REVISION	PAGE	REVISION	PAGE	REVISION	PAGE	REVISION
1.0	2-00	21.0	2-00				
2.0	2-00	22.0	2-00				
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4.0	2-00	24.0	2-00				
5.0	2-00	25.0	2-00				
6.0	2-00	26.0	2-00				
7.0	2-00	A.1	2-00				
8.0	2-00	B.1	3-00				
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	Signature	Concurring Organizational Element	Date
Originator	Bruce Leonard	Operator Training Manager	5-31-85
Concurred by	Thad D. Mang	Supv. Licensed Operator Trng	6-3-85
Approved by	S.L. Hewster	Mgr. Plant Trng TMI-2	6/4/85
	Adam Miller	Mgr. Plant Ops TMI-2	6/6/85

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## 1.0 PURPOSE

The goal of the operator requalification program is to enhance nuclear plant safety and reliability by maintaining a high level of skill and knowledge in licensed senior operators and licensed operators.

To achieve this goal, the operator requalification program is designed to be sufficiently broad in scope to review areas of knowledge necessary for safe plant operation and flexible enough to cover recent operating experience and operational changes so that proficiency can be enhanced and operational safety maintained.

The TMI-2 accident has caused unique plant conditions to exist. These conditions change rapidly as the recovery program progresses. The requalification program is written with this in mind. Some elements of an operating reactor's training program are not applicable at TMI-2. Due to the present status of the plant the requalification program is specifically tailored to meet its needs and does not reflect a training program designed for a cold shutdown plant preparatory to full operation. As such, program content and requirements are significantly different than any previous program.

The requalification program described in this document is implemented utilizing four interrelated segments. These segments are:

1. Pre-planned Lecture Series
2. Skills Training and Evaluation
3. Operational Review Program
4. Annual Examination and Evaluation

Each program segment is described separately. The operator requalification program is to be conducted on a cyclic basis so that all program requirements are completed in a period not to exceed two years.

Successive requalification programs are to be conducted on a schedule enabling a continuing program to exist.

The operator requalification program is to be established with fixed performance standards and specified remedial training requirements in the event of deficiencies occurring. The program training materials, performance results and records are to be maintained in a fully auditable manner.

Guidelines pertaining to the duration of training in the requalification program are estimates, and not guidelines, of the time for retraining of licensed personnel. The training sessions covering special nuclear plant operating situations or significant nuclear industry operating experiences may result in adjustments to these estimates. The duration of training

may also be adjusted as appropriate to assure that the performance of license holders meets or exceeds established standards.

## 2.0 SCOPE/APPLICABILITY

This procedure applies to all Licensed Operators and Licensed Senior Operators as defined herein.

Newly licensed individuals shall enter the requalification program and participate in the annual program cycle upon receipt of their license. Newly licensed individuals successfully completing their NRC examination (license date) less than three (3) months prior to annual requalification examination may be exempted from taking the current annual written and oral examination.

## 3.0 DEFINITIONS

The definitions given below are of a restricted nature for the purpose of this program.

- 3.1 Drill - A supervised training exercise conducted in a work environment for the purpose of developing and maintaining skills required to cope with plant abnormal/emergency conditions and including an evaluation of performance.
- 3.2 Contact Hour of Instruction - A one hour period in which the course instructor is present or immediately available for instructing or assisting students: lectures, seminars, discussions, problem solving sessions, and examinations are considered contact periods under this definition.
- 3.3 Licensed Operator (RO) - Any individual who possesses an NRC operator's license pursuant to Title 10, Code of Federal Regulations, Part 55, "Operators' Licenses."
- 3.4 Licensed Senior Operator (SRO) - Any individual who possesses a NRC senior operator's license pursuant to Title 10, Code of Federal Regulations, Part 55, "Operators' Licenses."
- 3.5 Annual - As referred to in the operator requalification program, is twelve (12) months, not to exceed fifteen (15) months, in order to accommodate plant operations. March 1, and subsequent anniversaries of this date, will be considered the starting date of each annual cycle of requalification program operation.
- 3.6 Shall, Should, and May - The word "shall" is used to denote a requirement; the word "should" to denote a recommendation; and the word "may" to denote permission - neither a requirement nor a recommendation.
- 3.7 Instructor - A qualified instructor from the Operator Training Section of the Training Department, or a "guest" instructor whose expertise in a specific subject area, e.g. a system engineer, has resulted in his assignment, approved by the Operator Training Manager or Manager, Plant Training to present material on that subject area.



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3.8 License Holder - An individual holder of an NRC Operator or Senior Operator license.

3.8 Approval - Verbal approval is authorized unless written approval is specified.

#### 4.0 RESPONSIBILITIES

- 4.1 An Instructor, Licensed Operator Training is responsible for:
- a. Developing course outlines, lesson plans, and evaluation examinations for the licensed operator requalification program.
  - b. Conducting instruction in the licensed operator requalification program.
- 4.2 Supervisor, Licensed Operator Training is responsible for:
- a. Determining the scope of the Fundamentals Review and Operational Proficiency Lecture Series. (Sections 7.2.1 and 7.2.2)
  - b. Designating those abnormal and emergency procedures to be the basis of the quiz questions for each six weeks' cycle such that all abnormal and emergency procedures are tested biennially. (Section 7.2.6)
  - c. Preparing notification for plant management and the Director, TMI-2 of unsatisfactory quiz results from the lecture series. (Section 7.2.6)
  - d. Designating individuals to conduct overall evaluation of the annual lecture series and resolving problems described in these evaluations. (Section 7.2.6)
  - e. Reviewing plant drill critiques and initiating additions or modifications to training programs to correct performance deficiencies noted. (Section 7.3.3)
  - f. Ensuring performance evaluations are conducted during drill exercises. (Section 7.3.1)
  - g. Preparing notification for plant management and the Director, TMI-2 of unsatisfactory skills training participation. (Section 7.3.4)
  - h. Determining expanded coverage of plant design changes, equipment modifications, procedure changes, and technical specification changes in the Operational Proficiency Lecture Series. (Section 7.4.1)
  - i. Ensuring the review of the annual written examination, answer key and grading system, and review of the graded examination for grading techniques and consistency. (Section 7.5.1)
  - j. Designating personnel to review and update the examination question file. (Section 7.5.1)
  - k. Establishing the annual oral examination schedule. (Section 7.5.2)
  - l. Designating personnel to conduct oral examinations. (Section 7.5.2)

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- m. Identifying significant license performance deficiencies requiring accelerated requalification programs. (Section 7.6.1)
  - n. Formulating individual accelerated requalification programs and designating individuals to conduct the associated examinations. (Section 7.6.1)
  - o. Preparing recommendations to plant management and the Director, TMI-2 regarding the removal from licensed duties or additional upgrading efforts to be considered for those individuals failing to meet the standards of the accelerated requalification program. (Section 7.6.1)
  - p. Designating licensed SRO's to conduct oral examinations for those individuals failing to maintain an active status. (Section 7.6.2)
  - q. Conducting an annual requalification program review and evaluation, submitting a report on this review, and taking corrective action where necessary. (Section 7.7)
- 4.3 Operator Training Manager is responsible for:
- a. Approving the scope of the Fundamentals Review and Operational Proficiency Lecture Series. (Sections 7.2.1 and 7.2.2)
  - b. Approving scheduling and appearance of "Guest" lecturers. (Section 7.2.5)
  - c. Designating personnel to evaluate selected lecture series training sessions. (Section 7.2.6)
  - d. Reviewing Industrial Experience Review, repeated personnel errors, or other indicators of degraded proficiency and initiating appropriate training. (Section 7.2.6)
  - e. Approving the annual written examination, answer key, and grading system as required. (Section 7.5.1) A designee may be appointed for this responsibility.
  - f. Approving accelerated requalification programs. (Section 7.6.1)
  - g. Specify, in conjunction with the Manager, Plant Operations, operating experience to be analyzed for training purposes and integrating the information into the training program. (Section 7.4.2)
  - h. Specifying changes and modifications to be analyzed for review in the operational review program. (Section 7.4)
  - i. Establishing the requalification program records identified in Section 7.8.
  - j. Ensuring all requirements in references listed in Section 5.0 are met.
- 4.4 Manager, Plant Training is responsible for:
- a. Designating personnel to evaluate selected lecture series training sessions. (Section 7.2.6)
  - b. Certifying the qualification of instructors on the basic principles trainer. (Section 7.3.2)



- c. Ensuring that the Training Department maintains the records identified in Section 7.8.
- 4.5 Manager, Plant Operations is responsible for:
  - a. Providing inputs to the Training Department on topics to be presented in the Fundamentals Review and Operational Proficiency Lecture Series. (Section 7.2.1 and 7.2.2)
  - b. Approving absences of licensed personnel from lecture series. (Section 7.2.4)
  - c. Approving Plant Drill Scenarios, the conduct of plant drills and additions or modifications to training programs as a result of drill critiques. (Section 7.3.3)
  - d. Reviewing repeated personnel errors or other indicators of degraded proficiency and initiating or requesting appropriate training. (Section 7.2.6)
  - e. Establishing a continuing system so that licensed personnel review documented plant design changes, equipment modifications, procedure changes and technical specification changes, specifying the changes and modifications to be analyzed, and ensuring that on-shift licensed personnel review the selected information in a timely manner. (Section 7.4.1)
  - f. Establishing a continuing system so that licensed personnel review operating experience from TMI and applicable segments of the nuclear industry and ensuring that on-shift licensed personnel review the information in a timely manner. (Section 7.4.2) Designating operating experience to be included in requalification training.
  - g. Approving the annual written examination, and answer key, as required. (Section 7.5.2) A designee may be appointed for this responsibility.
  - h. Provide input for and assist in the annual oral examination schedule. (Section 7.5.2.)
  - i. Identifying significant licensed performance deficiencies requiring accelerated requalification programs. (Section 7.3.1)
  - j. Reviewing accelerated requalification programs. (Section 7.6.1)
  - k. Approving SRO's designated to conduct oral examinations for those individuals failing to maintain an active status. (Section 7.6.2)
  - l. Implementing the operational review program (Section 7.4)
  - m. Maintain operational review series documentation.
- 4.6 Office of the Director
  - a. Approve waivers for annual written examinations (section 7.5.1) and annual oral examinations (7.5.2.8).
  - b. Waive watchstanding requirements as outlined in 7.3.5.

- c. Authorize oral and written reexaminations without assignment to an accelerated requalification schedule as outlined in 7.5.1.c.

## 5.0 REFERENCES

- 5.1 10 CFR 55, Appendix A, "Operators' Licenses."
- 5.2 NRC letter of March 28, 1980, on Qualifications of Reactor Operators.
- 5.3 NUREG 0737, Enclosure 3, "Clarification of TMI Action Plan Requirements."
- 5.4 ANS 18.1, 1971, "Selection and Training of Nuclear Power Plants Personnel."
- 5.5 6212-ADM-2611.03 Senior Reactor Operator Replacement Training Program, Unit II.
- 5.6 6212-ADM-2611.02 Replacement Operator Training Program, Unit 2.
- 5.7 6210-ADM-2604.01 Control of Examinations for Units 1 and 2.
- 5.8 6200-ADM-2600.01 Control of Examinations.

## 6.0 ATTACHMENTS

- 6.1 Appendix A, "Record of Reactivity Manipulations."
- 6.2 Appendix B, "Off-Shift Licensed Operator Watchstanding Documentation."

## 7.0 PROGRAM DESCRIPTION

### 7.1 Objectives

The Requalification Program objectives are to:

- 1) Maintain nuclear plant operational safety and reliability.
- 2) Assure that licensed personnel maintain the high level of skill and knowledge required to accomplish routine and emergency duties.
- 3) Establish a system for evaluating and documenting proficiency and competency of license holders.

### 7.2 Pre-Planned Lecture Series

The operator requalification program includes pre-planned training sessions conducted on a regular and continuing basis. The sessions include two types of lecture series as follows:

- 1) Fundamentals Review Lecture Series
- 2) Operational Proficiency Lecture Series

#### 7.2.1 Fundamentals Review Lecture Series

The training in these sessions covers areas in which the knowledge required of a licensed holder encompasses plant fundamentals.

##### A. Lecture Series Topics

The Fundamentals Review lecture topics are selected on an as-needed basis and shall include the following to be covered on an biennial basis:

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1. Theory and Reactor Principles of Operation of a highly borated and shutdown reactor. Emphasis in this area is to be on subcritical operations and excludes startup and power operations.
2. Heat Transfer, Fluid Flow, and Thermodynamics.
3. Features of Facility Design including Plant Systems.
4. General and Specific Plant Operating Characteristics including Expected Response to Equipment Failure.
5. Plant Instrumentation and Control Systems.
6. Radiation Control and Safety.
7. Plant Chemistry.
8. Applicable Portions of Title 10, Chapter I, Code of Federal Regulations.
9. Fuel Handling and Core Parameters.

A more detailed listing of the specific material that may be included is addressed in the replacement program for reactor operators reference 5.6, and senior reactor operators, reference 5.6.5.

B. Lecture Series Topic Selection

The topics presented in the Fundamentals Review series should reflect the general results of the annual examinations and performance of the licensed personnel as evaluated by the Manager, Plant Operations and the Site Operations Director. The scope of the lecture series is determined by the Supervisor, Licensed Operator Training and approved by the Operator Training Manager. The depth of coverage in each topic should reflect typical deficiencies identified by the annual examinations and plant status.

7.2.2 Operational Proficiency Lecture Series

The Operational Proficiency training sessions cover areas which involve essential plant operational requirements.

A. Topics

The Operational Proficiency lecture topics are selected to ensure coverage of essential plant operational requirements and to ensure operational changes and experiences are integrated into licensed individual's training. The lecture topics should include the following:

- 1) Normal, Abnormal, and Emergency Operating Procedures and changes thereto.
- 2) Technical Specifications and license changes.
- 3) Administrative Procedures and changes thereto.



- 4) Major Operational Evolutions.
- 5) Operating History and Problems.
- 6) Related Nuclear Industry Operating Experience.
- 7) Mitigation of Accidents Involving a Degraded Core.

B. Topic Selection

The topics presented in the Operational Proficiency Series include all the topics listed in Section 7.2.2.A. The scope of the lecture series is determined by the Supervisor, Licensed Operator Training and the Operator Training Manager taking into account the Manager, Plant Operation's and the Site Operations Director's inputs. The depth of the coverage in each topic should reflect the knowledge required of the Licensed Senior Operator for the condition of the plant. All topics shall be presented on a biennial basis. All Abnormal and Emergency Procedures shall be covered on a biennial basis.

7.2.3 Schedule

The Pre-planned Lecture Series shall be scheduled to be completed on a biennial basis. Lectures may be deferred due to unanticipated events, but should be conducted as soon as practicable thereafter and within the annual cycle. The lecture series shall be held on a continuing basis with a weekly schedule of lectures designed to be repeated for each shift when that shift is designated for its training week. The program and schedule will be consistent with unit operations or projected simulator and/or research reactor time. Scheduling shall be made to involve approximately 200 contact hours of instruction divided among the program topics and throughout the year. Records of the topics covered in each session shall be maintained by the Training Department.

7.2.4 Attendance Requirements

Attendance of all licensed personnel shall be recorded. Absences should be approved in writing by the Manager, Plant Operations or the Site Operations Director, Unit 2, and should be limited to one training week per year. The individual absent from training is responsible for the content of the material presented and shall take the quiz. Additional absences shall result in an individual being removed from licensed duties at the time absenteeism reaches 50% of yearly contact hours and placed in an accelerated requalification program until such time as the missed material is made up.

### 7.2.5 Training Methods

The pre-planned lecture series consists of training sessions supported by prepared lesson plans that have been reviewed by the Supervisor, Licensed Operator Training and approved by the Operator Training Manager.

#### A. Lecture Presentation

For each training session in the lecture series, a lesson plan shall be prepared, reviewed, and approved in accordance with applicable Training Department Procedures. The incorporation of training aids such as trainee handouts, films, slides, models, transparencies, and videotape presentations is encouraged. The Training Content Record shall become the reference source for the objectives covered during the lecture. In the event that videotape or film presentations, or computer-based instruction are used, an instructor shall be available to embellish, explain, or emphasize the presentation and to respond to any questions or comments from the trainees. Such training will be supported by an approved Training Content Record in lieu of an approved lesson plan.

#### B. Study Periods

Study periods are scheduled in conjunction with the Pre-Planned Lecture Series to provide licensed holders an opportunity to reinforce the lecture series learning experience and to study new or additional materials. While individual self-study is encouraged, it should not be substituted for instructor training sessions conducted as part of the Pre-planned Lecture Series.

### 7.2.6 Evaluation

The lecture series shall be evaluated by conducting evaluations of the trainee's knowledge, effectiveness of the overall lecture series, and effectiveness of the instructors.

#### A. Lecture Series Quiz

After each week of lectures, all trainees shall take a written, closed-book quiz covering the lecture topic(s).

##### 1. Quiz Administration

During or at the completion of a group of lectures, a written quiz of trainee knowledge shall be administered. The quiz shall be based on questions related to the lesson plan objectives covered during the lectures. All lecture topics covered during the training session should be represented by questions in the evaluation. In addition, questions shall be

included from selected abnormal and emergency procedures as designated by the Supervisor Licensed Operator Training. A variety of question types may be used, but questions requiring analysis or detailed discussions should predominate. Quizzes shall be prepared in accordance with Reference 5.8 and 5.9.

2. Quiz Standards

Quizzes shall be evaluated and a grade determined for each trainee. A performance standard of 80% is established for a written quiz. License holders who do not meet this performance standard should complete a remedial review process within seven (7) weeks consisting of:

- a) Review of the training session material associated with identified knowledge deficiencies.
- b) Review of associated reference material identified by the instructor.
- c) Answering written or oral questions to determine satisfactory knowledge prior to taking a second quiz.
- d) Administration of a second quiz covering at least the identified knowledge deficiencies. If the second quiz is completed satisfactorily, the license holder receives credit for completion of the required lecture. If the second quiz is failed, the Supervisor Licensed Operator Training shall notify the Manager, Plant Operations with copies to the Site Operations Director and the Director, TMI-2, via the Operator Training Manager and Manager, Plant Training of the evaluation results and provide a recommendation regarding the trainee's removal from licensed duties and entrance into an accelerated requalification program (Section 7.6.1).

B. Effectiveness

The effectiveness of the lecture series should be evaluated by the trainees, Manager, Plant Operations, and the Supervisor, Licensed Operator Training. The results of this evaluation should be factored into subsequent requalification training.



**1. Evaluation**

An overall evaluation of the lecture series should be conducted on at least an annual basis. The evaluation should encompass the instructor skills, training materials, presentation techniques, quiz techniques, and classroom facilities. This evaluation should be conducted by the Supervisor, Licensed Operator Training or his designee, and should consider input from the trainees, Manager, Plant Operations, and the program instructors. Significant problems should be identified and resolved by the Supervisor, Licensed Operator Training and the Operator Training Manager.

**2. Presentation Evaluation**

Evaluation of selected lecture series training sessions shall be conducted periodically in accordance with Training Department Procedures. The evaluations should be directed toward ensuring overall quality of instruction and should encompass instructor preparation, presentation techniques, and technical content of the lecture.

Evaluation of lecture series training by Operations personnel is encouraged.

**7.3 Skills Training and Evaluation**

In order to maintain an acceptable level of skills and familiarity associated with the nuclear plant systems, controls, and operational procedures, each licensed individual shall participate in frequent and varied plant evolutions. Each licensed individual shall demonstrate operational proficiency by participating in the following activities:

- 1) Reactivity Manipulations
- 2) Nuclear Plant Simulator or Research Reactor Exercises
- 3) Plant Drill Program

To maintain these skills, licensed operators shall actually manipulate the controls while licensed senior operators may either manipulate or actively supervise manipulations of the controls. Training to achieve proficiency should be planned so that skills training exercises are repeated until proficiency is demonstrated.

**7.3.1 Reactivity Manipulations**

During the two year term of the NRC license, each license holder shall participate in a variety of reactivity control manipulations and plant evolutions.

**A. Reactivity Manipulations**

Due to the unique status of Three Mile Island, Unit 2, in lieu of control manipulations prescribed by the March 28, 1980, NRC Directive as satisfying the

requirements of 10CFR55, Appendix A, paragraph 3a., the following is a list of appropriate manipulations which shall be completed by the licensed operators at Three Mile Island Unit 2. The manipulations may be accomplished by the use of a simulator or research reactor. The manipulations are designed to emphasize the necessity for a focused awareness of the unique conditions and potential operations which are peculiar to the TMI 2 status. Control manipulations shall total ten with at least one from categories one through three below performed annually.

1. Perform reactivity additions to demonstrate the observed effects of subcritical multiplication.
2. Perform reactivity manipulations to observe feedback from nuclear heat during startup.
3. Perform operations which demonstrates the effects of fuel displacement in subcritical multiplication and observed effects on Nuclear Instrumentation. Each operator shall maintain a record of control manipulations in the format on Appendix A.

B. Plant Drill Program

On an annual basis, each licensed individual shall participate in training exercises covering the following plant abnormal/emergency conditions during the plant drill program:

1. Unanticipated Criticality
2. Loss of cooling including:
  - a. Significant steam generator leaks
  - b. Large and small leaks of the Reactor Coolant System (including leak rate determination)

3. Control room inaccessibility
4. EPICOR II System Malfunctions
5. Submerged Demineralizer System Malfunctions

On a two-year cycle basis, each licensed individual shall participate in training exercises covering the following plant abnormal/emergency conditions either at a nuclear power simulator or during the plant drill program. Other drills based on current plant conditions may be run in addition to the below listed drills on an as needed basis.

1. Loss of Source Range Indication
2. Loss of RCS Pressure Indication or Level Indication
3. Loss of RCS Temperature Indication
4. Waste Gas Decay Tank Rupture

5. Loss of instrument air
6. Loss of electrical power and/or degraded power sources
7. Loss of component cooling system or cooling to an individual component

Response to abnormal/emergency conditions should include use of alternate methods of accomplishing a given function, such as alternate methods of core cooling. Exercises involving multiple failures and/or operator error shall be included. Utilization of applicable plant procedure and technical specifications during the training exercises should be minimized. Individual and operational team performance during the abnormal/emergency training exercises shall be monitored and deficiencies critiqued so that future performances will be improved. Any drill graded as unsatisfactory shall be run again. The Supervisor, Licensed Operator Training should ensure that evaluations are conducted during drill exercises.

C. Performance of Reactivity Manipulations and Plant Evolutions

Reactivity manipulations and plant evolutions shall be conducted either at the nuclear plant, at a suitable nuclear plant simulator, or at a research reactor.

1. Performance of Reactivity Manipulation  
Reactivity manipulations shall be performed at a research reactor or at a suitable nuclear plant simulator. (Section 7.3.2)
2. Performance of Plant Drill Program  
Abnormal/emergency plant evolutions shall be performed at either a nuclear plant simulator (Section 7.3.2) or conducted during the plant drill program (Section 7.3.3). In the event that an actual abnormal/emergency condition occurs at the plant and performance of the licensed personnel coping with the condition is satisfactory (as determined by the Manager, Plant Operations), credit for completion of a training exercise may be taken. The Manager, Plant Operations should provide the Supervisor, Licensed Operator Training or the Operator Training Manager with periodic observations identifying job performance results related to requalification training.



### 7.3.2 Nuclear Plant Simulator/Basic Principles Training Simulator/Research Reactor Exercises

A nuclear plant simulator provides a means of training licensed individuals to conduct normal plant evolutions and to cope with nuclear plant transient and accident conditions. The Basic Principles Training Simulator provides a means of training licensed individuals on the principles of nuclear plant operation, focusing on major system operation under steady-state and transient conditions. The main difference between the simulator and the BPT is size and complexity of controls, in that trainees can conduct many of the same evolutions, such as reactor and plant startups and shutdowns, on both devices. A research reactor provides a means of training licensed individuals on reactor and nuclear instrumentation operation under various conditions. It is especially valuable in training on subcritical conditions. Licensed individuals shall participate in a structured training program utilizing one or more of these devices on an annual basis.

During simulator training sessions, the team concept should be utilized, emphasizing individual roles in reporting, assignment of operational duties, use of plant procedures and use of technical specifications. During basic principles trainer or research reactor training sessions, the individual concept should be utilized. Large groups should be split such that part of the group is in the classroom and part on the training device on a rotating basis. Each licensed individual should complete nuclear plant training device training sessions involving at least twenty (20) hours of direct interaction with the training device on an annual basis. Brief post-evolution critiques conducted at the device or in the classroom may be considered as part of the direct interaction session. Lecture sessions conducted in conjunction with BPT training, covering topics designated in the Pre-planned Lecture Series, may be credited toward fulfilling the requirements of Section 7.2. Reactivity manipulations, plant evolutions, and exercises which should be considered in the training device program include:

1. Reactivity manipulations, Section 7.3.1 (A).
2. Plant Drill Program, Section 7.3.1 (B).
3. Demonstration of plant response to conditions identified from nuclear industry operating experience.

Instructors presenting simulator training sessions shall be qualified in accordance with applicable Training Department Procedures. Research Reactor Staff members shall normally conduct training sessions on that device.

### 7.3.3 Plant Drill Program Administration

Plant drills provide a means of training licensed individuals in responding to plant abnormal/emergency conditions. License holders shall participate in the plant drill program on an annual basis.

#### A. Plant Drills

On an annual basis each license holder shall participate in plant drills. Plant drills shall be conducted so that each licensed individual actively participates in drills covering abnormal/emergency plant evolutions, Section 7.3.1 (B), which are not adequately covered in the nuclear plant simulator, basic principles trainer or research reactor training program (Section 7.3.2). Participation in a plant drill involves either responding to drill conditions or being an assigned monitor for observing/evaluating response to a drill. Plant drills may be structured to review or carry out actions required to respond to abnormal/emergency plant conditions. Plant drills are conducted with the approval of the Manager, Plant Operations, on an individual or team basis and may involve:

1. Reviewing plant procedure steps.
2. Identifying actions required to establish stable plant conditions.
3. Identifying equipment control locations and functions.
4. Identifying expected plant instrumentation and alarm response.
5. Reviewing communications necessary to gather information or coordinate team actions.
6. Identifying supplementary actions aimed at mitigating results or causes of plant abnormal/emergency conditions.

#### B. Plant Drill Scenarios

Each plant drill must be carefully planned and monitored in order to ensure actual abnormal/emergency conditions are not inadvertently initiated during the drill and in order to evaluate individual or team response to the drill conditions. Plant drills which include carrying out actions are planned in a prepared drill scenario, and shall be approved by the Manager, Plant Operations. The drill scenario should include the following:

1. Purpose/objectives of the drill
2. Initial conditions
3. General description
4. Method of initiation

5. Precautions and limitations
  6. Sequence of expected actions
  7. Point of termination/conditions under which the drill is to be secured
  8. Final conditions
  9. Monitors required/location
- The drill performance should be evaluated and deficiencies identified. A drill critique should be held by the Senior Monitor with the drill participants. Deficiencies identified should be reviewed by the Supervisor, Licensed Operator Training. Additions or modifications to training programs required to correct performance deficiencies should be initiated by the Supervisor, Licensed Operator Training and/or the Manager, Plant Operations.

#### 7.3.4 Skills Training Participation

In the event that skills training guidelines for participation in reactivity manipulations, Section 7.3.1 (A), or plant drills, Section 7.3.1 (B) and Section 7.3.3 (A), are not met, they should be scheduled and completed within twelve (12) weeks of the required period. If the requirements are not completed within the twelve (12) week period, the Supervisor, Licensed Operator Training shall notify plant management and the Director TMI-2 via the Operator Training Manager and the Manager, Plant Training and provide a recommendation regarding the license holders removal from licensed duties.

#### 7.3.5 Watchstanding

In addition to meeting the requirements for participation noted above, licensed operators not assigned to a shift crew shall actively participate in control room operations a minimum of one shift per month. On shift licensed operators are not required to document watchstanding because a majority of their time is spent performing Licensed Operator duties. Licensed instructors from the Training Department staff and other operators not assigned to the Operations Department shall actively perform licensed duties a minimum of two shifts per month. This will be documented by completing Appendix B and forwarding it to the Training Department. Licensed duties performed while on shift shall be documented by using Appendix B. The following Off-Shift Licensed personnel are exempt from the requirements to perform licensed duties on shift while actively functioning in their normal



positions in addition to participating in the requalification program:

- 1) Site Operations Director
- 2) Manager, Plant Operations

Waivers of watchstanding requirements may be authorized by the Deputy Director for off shift licensed personnel provided the licensed operator (1) maintains a current knowledge of actual plant conditions and (2) participates in overall plant operations on a periodic basis to a depth consistent with level required of the licensed, on shift operators and senior operators.

Based on scheduled constraints, satisfactory participation shall be defined as meeting the requirements on a quarterly basis. If an individual has not spent three or six shifts in the control room over a given quarter depending on the applicable monthly requirement, he shall have one month in which to make up the missed shifts.

Failure to do so shall result in his being placed in the Inactive Status Retraining program, Section 7.6.2.

The Manager, Plant Operations is responsible for notifying the Operator Training Manager of those licensed personnel removed from shift in excess of two (2) months so that proper skills training participation documentation may be accomplished.

The Manager, Plant Operations and the Operator Training Manager may approve substitution skills training participation requirements. Granting of these waivers shall be done case by case and shall take into account the licensed operator's present job requirements and how they relate to skills training. The waivers shall be documented by completing Appendix B.

#### 7.4 Operational Review Program

The operational review program provides a system for on-shift review of selected operational experiences and changes to existing operating guidance or equipment. The operational review program enables continuing updating of on-shift personnel and establishes a means of disseminating new or changing information on a short term basis.

##### 7.4.1 Modification Review

A continuing system shall be established by the Manager, Plant Operations so licensed individuals review documented plant design changes, equipment modifications, procedure changes and technical specification changes. Selected changes and modifications should be analyzed and information pertinent to the basis for the changes and their operational implications collected. This information should be formally transmitted to all licensed individuals with acknowledgement of review required. Changes to emergency procedures, technical specifications and safety related systems should be reviewed during the

licensed operator's shift operation. The Manager, Plant Operations and the Supervisor, Licensed Operator Training should specify changes and modifications to be analyzed, with information for review transmitted in accordance with the urgency of the situation. The Manager, Plant Operations should ensure that all on-shift licensed personnel review the selected information in a timely manner. Expanded coverage of plant design changes, equipment modifications, procedure changes and technical specification changes in the Operational Proficiency Lecture Series (Section 7.2.2) should be considered by the Operator Training Manager. On-shift supervisory (SRO) personnel should provide guidance to on-shift operators in interpreting and reviewing changes and modifications. An on-shift discussion period to review changes and modifications is encouraged.

#### 7.4.2 Operating Experience Review

A continuing system shall be established by the Manager, Plant Operations to licensed individuals review operating experience from TMI and from applicable segments of the nuclear industry. Selected operational events and reportable occurrences at the facility should be analyzed and information pertinent to the event collected. Selected operational information from the nuclear industry should be analyzed. The following sources of information shall be considered:

1. Licensee Event Reports
2. Audit, evaluation, and inspection reports
3. Publications and periodicals covering nuclear industry information
4. NSAC/INPO Significant Event Reports

This information should be formally transmitted to all licensed individuals with required acknowledgement of review. The Manager, Plant Operations should ensure that all on-shift licensed personnel review the information in a timely manner. The Operator Training Manager shall specify operating experience to be analyzed for training purposes and applicable training conduct during requalification training or on shift. Subsequent coverage of operating experience in the Operational Proficiency Lecture Series (Section 7.2.2) should be considered by the Operator Training Manager. Selected nuclear plant accident/transient situations shall be analyzed and integrated into the Nuclear Plant Simulator, Basic Principles Trainer, or Research Reactor Exercises (Section 7.3.2) or the Plant Drill Program (Section 7.3.3).

**7.5 Annual Requalification Examinations**

As required by reference 5.1 an annual requalification examination shall be given. The annual examination shall be given to all license holders prior to the completion of each annual requalification program cycle and shall consist of an oral examination and a written examination.

**7.5.1 Annual Written Examination**

An annual written examination shall be administered to all licensed individuals. Waivers of exam requirements may be granted based on participation in the examination administration process. Waivers are to be approved by the Manager, Plant Training and the Site Operations Director.

**A. Written Examination Content**

The written examination should contain examination questions covering the following topics:

1. Theory and Principles of Operation of a Highly Borated and Shutdown Reactor
2. Heat Transfer, Fluid Flow, and Thermodynamics
3. Features of Facility Design
4. General and Specific Plant Operating Systems
5. Plant Instrumentation and Control Systems
6. Radiation Control and Safety
7. Plant Chemistry
8. Applicable Portions of Title 10, Chapter I, Code of Federal Regulations
9. Fuel Handling and Core Parameters
10. Technical Specifications
11. Administrative Procedures, Conditions and Limitations

The topics shall be grouped into examination categories for evaluation purposes. The number and content of categories shall reflect current NRC licensed operator exams. The examination shall be structured so that the level of questioning is consistent with the individual's license level (RO or SRO).

**B. Written Examination Administration**

The written examination should be prepared under a structure enabling consistency of questioning and minimizing possible compromise of examination prior to administration. The following guidelines should apply:

1. An examination question file is assembled containing questions and answers on each examination topic.
2. Questions are formulated using lesson objectives for the requalification program which should include input from many sources including:



- a. Replacement RO and SRO training programs
  - b. Requalification programs
  - c. Plant documents such as technical specifications and procedures
  - d. Previous examinations
  - e. Manager, Plant Operations
  - f. Operating experience
  - g. Plant design changes and system modifications
3. The examination should include a variety of question types, but questions requiring analysis and/or explanation should predominate.
  4. Questions and answers should be reviewed by the Supervisor, Licensed Operator Training prior to use.
  5. The Supervisor, Licensed Operator Training shall designate individuals to update the examination questions and answers file annually.

Personnel designated by the Operator Training Manager shall prepare the written examination(s) utilizing the examination question file. The number of different examinations prepared should be consistent with the GPUN Control of Examinations Procedure. The examination and answer key should be reviewed and approved by the Operator Training Manager or the Manager, Plant Operations or his designee prior to examination administration. The Operator Training Manager shall designate qualified personnel to grade the written examination and may review the graded examinations for grading techniques and consistency. The Supervisor, Licensed Operator Training should review the annual requalification exam for grading techniques, trends, and consistency.

C. Examination Performance Standards

A licensed individual receiving a grade of less than 70% in any examination category or an overall grade of less than 80% shall be relieved of his license duties and placed in an accelerated qualification program (Section 7.6.1). When a grade of less than 70% has been scored in a single section, the Director, TMI-2 may document the circumstances and authorize an oral and written reexamination of the failed section within one (1) week of grade issue. If the oral exam is completed satisfactorily and a grade of 80% or greater is scored on the written section, the individual may return to shift in a licensed status with the approval of the Director, TMI-2.

**7.5.2 Annual Oral Examination**

An annual oral examination shall be administered to all licensed individuals.

**A. Oral Examination Content**

The oral examination should contain questions covering the following areas:

1. Licensed duties and responsibilities of the operating position corresponding to the individual's license level.
2. Actions in the event of abnormal conditions.
3. Actions in the event of emergency conditions.
4. Interpretation of instrumentation responses.
5. Plant transient and accident response.
6. Plant modifications.
7. Procedure changes.
8. Technical Specifications.
9. Emergency Plan.
10. Plant Operating history and problems.
11. Related nuclear industry operating experiences.

**B. Oral Examination Administration**

The oral examination shall be conducted under a structure enabling consistency of questioning and evaluation. The following guidelines apply.

1. A checklist identifying the areas to be covered is to be used.
2. Overall evaluation is made on a pass/fail basis.
3. Comments on individual strengths and weaknesses are to be made. These comments shall be reviewed with the licensed operator at the completion of the oral exam.

The Supervisor, Licensed Operator Training shall establish the oral examination schedule after receiving input from the Manager, Plant Operations. Personnel assigned to conduct an oral evaluation shall be designated by the Supervisor, Licensed Operator Training and approved by the Operator Training Manager. Oral examinations shall be conducted by a Licensed Senior Operator or a Certified Senior Operator Instructor. Each oral examination should be structured so that an examination time of two (2) hours or more is appropriate. The oral examination should involve sessions conducted in the plant control room and in plant areas occupied by individuals whose actions are directed by the licensed operator. Waivers of oral examination requirements may be granted by the Manager, Plant Training and the Site Operations Director for the person conducting the first oral

examination.

C. Examination Performance Standards

A failing overall oral examination grade shall require the licensed individual to be removed from his license duties and be placed in an accelerated requalification program (Section 7.6.1).

7.6 Special Retraining Programs

Specific retraining programs for licensed individuals may be required to upgrade or refresh knowledge and skills related to licensed duties.

7.6.1 Accelerated Requalification Program

The accelerated requalification program is for licensed individuals having identified deficiencies requiring assignment to a special retraining effort.

A. Required Attendance

Licensed individuals meeting one or more of the following criteria shall be assigned to an accelerated requalification program:

1. Annual requalification written examination performance deficiencies per Section 7.5.1 (C).
2. Annual requalification oral examination performance deficiencies per Section 7.5.2 (C).
3. Pre-planned lecture series quiz performance deficiencies per Section 7.2.6 (A.2).
4. Significant licensed duty performance deficiencies identified by the Manager of Operations and/or the Supervisor, Licensed Operator Training.

B. Program Content

The accelerated requalification program content shall be specifically structured to upgrade knowledge and skills identified as deficient. Examination categories and areas in which performance standards were not met shall be covered in the program. The Supervisor, Licensed Operator Training shall be responsible for formulating individual accelerated requalification programs. They shall be approved by the Operator Training Manager, reviewed by the Manager, Plant Operations, and if assignment to the accelerated requalification program is due to operational performance deficiencies, the program shall be approved by the Manager, Plant Operations and the Operator Training Manager.

C. Program Administration

The accelerated requalification program may involve a variety of training exercises including:

1. Directed self-study
2. Oral interviews and discussion sessions



3. Written answers to questions to ascertain knowledge level proficiency.
4. Pre-planned lectures.
5. Skills training exercises at the plant or utilizing a simulator, basic principles trainer, or research reactor

D. Performance Standards

Successful completion of the accelerated requalification program shall be determined by administering a final examination. The scope and content of the examination shall cover all categories of the requalification written examination and/or all areas of the requalification oral examination originally failed. The examination format should be similar to the original exam or applicable sections. The examination shall be conducted by individuals designated by the Supervisor, Licensed Operator Training. Performance standards for the accelerated requalification program shall be as follows:

1. A score of at least 80% on each accelerated requalification written examination category.
2. A passing evaluation on the accelerated requalification oral examination.

In the event that these standards are not met, the individual's suitability for resuming licensed duties will be reviewed by the Supervisor, Licensed Operator Training. He shall provide a recommendation to plant management and the Director, TMI-2 via the Operator Training Manager and Manager, Plant Training regarding the license holder's permanent removal from licensed duties or additional upgrading efforts to be considered. Another accelerated requalification program will be structured to correct existing deficiencies for license holders not permanently removed from licensed duties.

7.6.2 Inactive Status Retraining

If a licensed individual has not actively carried out licensed duties for a period in excess of four (4) months, a special retraining program and/or evaluation is required prior to resuming licensed duties. Notification of inactive status will be made in accordance with the effective revision of reference 5.1. Active status can be maintained by performance of licensed duties and participation in the licensed personnel requalification program. Performance of licensed duties involves manipulation of controls which directly affect reactivity of the reactor or directing the licensed activities of licensed operators, and for those licensed individuals

not normally assigned to an operating shift, completing the requirements of Section 7.3.5 for participation in control room operations. In the event that a licensed individual does not maintain an active status, the Supervisor, Licensed Operator Training shall designate, subject to approval of the Manager, Plant Operations, a Licensed Senior Operator to conduct an oral examination similar in scope and format to an annual oral examination prior to resuming licensed duties. In addition, evaluation of performance in the current Pre-planned Lecture Series shall be conducted. If performance in the Pre-planned Lecture Series is unsatisfactory, a written examination similar in scope and format to the annual written examination (Section 7.5.1) shall be administered to the licensed individual prior to resuming licensed duties. Consideration should be given by the Manager, Plant Operations to assigning the licensed individual to a training status on an operating shift prior to resuming licensed duties. The performance standards applied to the annual requalification examination shall be used in evaluating the results of the oral and written examinations. If the performance standards are not met, the licensed individual shall complete an accelerated requalification program prior to resuming licensed duties. Licensed duties may be resumed only upon certification of the Director, TMI-2, which must be forwarded to the NRC.

#### 7.7 Requalification Program Evaluation

A requalification program review and evaluation shall be conducted on an annual basis by the Supervisor, Licensed Operator Training. The areas encompassed by the review should include:

1. Inspection, audit, and evaluation reports or requalification training completed by outside organizations and facility personnel.
2. Licensed individual performance evaluations related to licensed duties.
3. Program oral and written examination results.
4. Plant operational problems related to licensed individual knowledge or skills deficiencies.
5. Licensee Event Reports related to licensed individual performance from the plant and the nuclear industry.
6. Changes in job assignments related to licensed duties and/or safety related functions of licensed operators.
7. Regulations and standards affecting licensed operator retraining.
8. Assessment of licensed personnel performance deficiencies related to training prepared by the Manager of Operations.

Requalification program curriculum deficiencies and licensed operator retraining needs determined by the review shall be identified, recommended corrective actions structured and a report formulated for review by the training organization for submittal to the Manager, Plant Training and the Manager, Plant Operations.

#### 7.8 Requalification Program Records

Records of licensed individuals' performance in the requalification program shall be maintained in an auditable manner. The Supervisor, Licensed Operator Training is responsible for initiating the following requalification program records:

1. Oral and written examination results for each licensed operator.
2. Written examination questions and answer keys.
3. Lecture series attendance records.
4. Lecture series lesson plans.
5. Plant drill participation records.
6. Reactivity manipulation and plant evolution participation records.
7. Simulator training participation records.

These records shall be maintained by the Training Department.

Operational review series participation records shall be established and maintained by the Operations Department.

#### 7.9 Program Approval

Approval of this program is required by the Manager, Plant Operations and Manager, Plant Training. Approval of this program is acknowledgement of the responsibilities assigned herein for both approvers and subordinates.

Title

Licensed Operator Requalification Program - Unit 2

Revision No.

2-00

APPENDIX A  
RECORD OF REACTIVITY MANIPULATIONS

NAME \_\_\_\_\_ POSITION/LICENSE \_\_\_\_\_

CURRENT LICENSE EFFECTIVE DATE \_\_\_\_\_

- I. Control manipulations shall include at least one from categories A through C below and shall total ten over the period of the license.

	SIGNATURE (SRO)	DATE	P/S/RR	A
A. Perform reactivity additions which demonstrate the observed effects of sub-critical multiplication.				
B. Perform reactivity manipulations to observe feedback from nuclear heat during startup.				
C. Perform operations which demonstrate the effect of fuel displacement on sub-critical multiplication and observed effects on nuclear instrumentation.				

P = Plant; S = Simulator; RR = Research Reactor; A = Actual



APPENDIX B  
OFF SHIFT LICENSED OPERATOR  
WATCHSTANDING DOCUMENTATION

I certify that \_\_\_\_\_ has satisfactorily  
(Off Shift Licensed Operator)  
assumed and performed SRO/CRO licensed duties for  
(Circle One)

for the 11-7/7-3/3-11 Shift on \_\_\_\_\_  
(Circle One) DATE

\_\_\_\_\_  
Shift Foreman/SS

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