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ADMINISTRATIVE MANUAL

Number

6211-ADM-2611.03

Title

TMI-I DIRECT SENIOR REACTOR OPERATOR TRAINING PROGRAM

Revision No.

n-00

Applicability/Scope

DIRECT SENIOR REACTOR OPERATOR CANDIDATES

Responsible Office

TRAINING DEPARTMENT

This document is important to safety  Yes  No

Effective Date

05/16/83


List of Effective Pages

PAGE	REVISION	PAGE	REVISION	PAGE	REVISION
1.0	0-00	13.0	0-00	35.0	0-00
2.0	0-00	14.0	0-00	36.0	0-00
3.0	0-00	15.0	0-00	37.0	0-00
4.0	0-00	16.0	0-00	38.0	0-00
5.0	0-00	17.0	0-00	39.0	0-00
6.0	0-00	18.0	0-00	40.0	0-00
7.0	0-00	19.0	0-00	41.0	0-00
8.0	0-00	20.0	0-00	42.0	0-00
9.0	0-00	21.0	0-00	43.0	0-00
10.0	0-00	22.0	0-00	44.0	0-00
11.0	0-00	23.0	0-00	45.0	0-00
12.0	0-00	24.0	0-00	46.0	0-00
13.0	0-00	25.0	0-00	47.0	0-00
14.0	0-00	26.0	0-00	48.0	0-00
15.0	0-00	27.0	0-00	49.0	0-00
16.0	0-00	28.0	0-00	50.0	0-00
17.0	0-00	29.0	0-00	51.0	0-00
18.0	0-00	30.0	0-00	52.0	0-00
19.0	0-00	31.0	0-00	53.0	0-00
10.0	0-00	32.0	0-00	54.0	0-00
11.0	0-00	33.0	0-00	55.0	0-00
12.0	0-00	34.0	0-00	56.0	0-00

*Apr. Roy Myer*  
*J. L. Newton*

	Signature	Concurring Organizational Element	Date
Originator	<i>Bruce Leonard</i>	Technical Programs Specialist	2/16/83
Concurred by	<i>J. Newton</i>	Operator Training Manager	2/25/83
	<i>E.R. Frederick</i>	Sup. Licensed Oper. Trng Unit I	3/25/83
Approved by	<i>Rabriel</i>	Manager, Plant Training	4/5/83
	<i>m/cross</i>	Manager, Plant Operations	4/25/83

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TITLE: TMI-1 DIRECT SENIOR REACTOR OPERATOR TRAINING PROGRAM

1.0 PURPOSE

The purpose of the Direct Senior Reactor Operator Training Program is to prepare qualified personnel to perform senior reactor operator duties.

2.0 SCOPE/APPLICABILITY

This procedure applies to all Direct Senior Operator candidates. Personnel placed in this program will normally fill job descriptions which do not require frequent control room participation.

3.0 DEFINITIONS

- 3.1 Candidate - An individual recognized by the Manager, Plant Operations as a potential Senior Reactor Operator. Members shall also have approval of his/her immediate supervisor.
- 3.2 Extra-Person - A candidate assigned to an operating shift for on-the-job training whose presence is not required to perform specific, non-training related tasks.
- 3.3 Task Examiner - Any individual who, due to his qualifications and experience, is selected to certify knowledge requirements of this program.
- 3.4 Instructor - An instructor from the Operator Training Section of the Training Department or a "guest" instructor whose expertise in a specific subject area, e.g., a systems engineer, has resulted in his assignment, approved in writing by the Operator Training Manager or Manager Plant Training to present material on that subject area.

4.0 RESPONSIBILITIES

- 4.1 The Shift Supervisor is responsible for the following:
  - a) Assignment of individuals as alternate task examiners. (A copy of this assignment list shall be forwarded to the Supervisor, Licensed Operator Training.)
  - b) Verifying adequate level of achievement and progress by the license candidates on the OJT phase of the program.
- 4.2 The Supervisor, Licensed Operator Training, TMI-1, is responsible for the following:
  - a) General supervision of the development and conduct of the Direct SRO Training Program.
  - b) Approval of the development, coordination, scheduling and administration of the Direct SRO Training Program, including course outlines, lesson plans, student handouts, simulator training, and evaluation exams.
  - c) Scheduling classes, students, classroom and facilities necessary to conduct the training program.
  - d) Interfacing with the Operations Department in all matters impacting the training programs.
  - e) Assuring that the program content is updated and revised to meet current requirements and supervising revision of the program content, descriptions, lesson plans, and exams.

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- f) Evaluation of course instruction and license candidate progress to determine the effectiveness of the training program and reporting these evaluations to the Operator Training Manager.
- g) Maintaining the necessary records and reports of training.
- h) Developing and conducting oral exams.
- i) Evaluation of candidate critiques of the training received.
- 4.3 The Operator Training Manager is responsible for the following:
  - a) Assuring the quality of the Direct SRO Training Program by written approval of materials including course outline, lesson plans, student handouts, simulator training, quizzes and exams and their compatibility with the Direct SRO Training Program.
  - b) Certification of candidates in accordance with AP 1058.
- 4.4 The Manager, Plant Training is responsible for the following:
  - a) To ensure that the training program is developed to meet the requirements established by the Director-TMI I, through the Manager, Plant Operations, and that proper records and documentation are provided and maintained.
  - b) Certification of candidates in accordance with AP 1058.
- 4.5 The Manager, Plant Operations is responsible for the following:
  - a) To ensure that the overall level of training of plant operators is satisfactory through the approval of program content, schedules and administrative procedures.
  - b) To evaluate candidates at the completion of the simulator program on their proficiency to direct licensed activities.
  - c) Certification of candidates in accordance with AP 1058.
- 4.6 The Director-TMI I is responsible for the following:
  - a) Final certification of candidate in accordance with AP 1058.

5.0 REFERENCES

- 5.1 American Nuclear Standard (ANS) 3.1, Rev. 01/17/78, Selection, Qualification and Training of Personnel for Nuclear Power Plants.
- 5.2 Code of Federal Regulations, Section 10CFR55, Rev. 9/1/80, "Operator Licenses".
- 5.3 Regulatory Guide 1.8, Draft Rev. 9/80, Personnel Qualification and Training.
- 5.4 Administrative Procedure 1058, Requirements for Certification of Candidates for NRC Operator Licenses.
- 5.5 NUREG 0737, Clarification of TMI Action Plan Requirements.

6.0 ATTACHMENTS

- 6.1 Appendix A - Systems Guide Lists
- 6.2 Appendix B - Licensed Operator OJT and System Checkouts
- 6.3 Appendix C - Administrative Procedure and Qualification Checklist
- 6.4 Appendix D - Outbuildings Checklist
- 6.5 Appendix E - Primary Systems Checklist
- 6.6 Appendix F - Secondary Systems Checklist
- 6.7 Appendix G - Watchstanding Checklist
- 6.8 Appendix H - Oral Exam Summary Sheet
- 6.9 Appendix I - Shift Foreman Trainee Duties Checklist

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- 6.10 Appendix J - Designation of Foreman as Final OJT Examiner
- 6.11 Appendix K - Simulator Training

7.0 PROGRAM DESCRIPTION

7.1 Prerequisites:

All candidates for Direct Senior Reactor Operator shall:

1. Possess a degree in Engineering or applicable science.
2. Have four years of responsible power plant experience. Responsible power plant experience should be that obtained as a control room operator (fossil or nuclear) or as a power plant staff engineer involved in the day-to-day activities of the facility. A maximum of two years power plant experience may be fulfilled by academic or related technical training, on a one-for-one time basis. Two years shall be nuclear power plant experience.
3. Complete a minimum of three months performing the duties of a Senior Reactor Operator while under instruction as an extra person in the control room.
4. Satisfactorily meet the minimum medical requirements for licensed personnel as specified in 10CFR55.

7.2 Sequence:

1. The program consists of the following:
  - a) OJT - 3 months
  - b) Decision Analysis (3 days)
  - c) Supervisory Development (1 week)
  - d) Simulator Training (3 weeks)  
 (Candidates who possess a Startup Certification will only complete a two (2) week program.)
  - e) Classroom - as determined by Supervisor Licensed Operator Training, TMI-1.

The length of the Direct SRO program is dependent on the candidates experience and availability. The requirements listed above are essential to the program and must be completed. The time necessary to complete the on-the-job training tasks may vary from candidate to candidate, and as a result time to completion may vary. In no case shall the program exceed eighteen (18) months.

Due to the diversity of nuclear experience that will be encountered from candidate to candidate, and the time requirements of regularly assigned job functions, the commitment of time devoted to the program may vary. Courses in Decision Analysis and Supervisory Development may be waived by the Operator Training Manager due to candidates previous experience. The program concludes with the NRC examination..

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### 7.3 Program Objectives:

1. Conduct training in the subject areas listed below as required to enable the trainee to demonstrate through written and oral examinations, completion of specified practical factors, and completion of an operating examination, the ability to direct the activities of licensed operators safely and competently and to obtain an NRC Senior Reactor Operator license.

#### Subject Areas

- a) Supervisory course in decision analysis/supervisory development.
- b) Supervisory control room and plant operating experience, directed by specific task assignments and licensed senior operators.
- c) Reactor Theory
- d) Plant Design and Operating Characteristics
- e) Plant Control Systems
- f) Radiation Control and Safety
- g) Plant Transients
- h) Recognizing and Mitigating Core Damage
- i) Simulator Training
2. Verify that the candidate has received or otherwise demonstrated knowledge equivalent to those candidates who have completed the TMI-1 Senior Reactor Operator Replacement Training Program and its precursors.

### 7.4 Outline:

1. On-the-Job Training
  - a) Secondary Systems
  - b) Primary Systems
  - c) Administrative Procedures
  - d) Normal, Abnormal and Emergency Operating Procedures
  - e) Technical Specifications
  - f) Shift Foreman Duties
2. Classroom Training

Classroom Training will be provided to meet needs established by the Supervisor, Licensed Operator Training. A review of the candidates college level courses and training in nuclear related fields shall be made to determine the extent of the program needed. The topics listed below are to be used as a guide for determining needed classroom training.

- a) Reactor Theory Review
  - Neutrons and Neutron Interactions
  - Solving Exponential Equations
  - Multiplication Factors
  - Reactor Kinetics
  - Reactivity
  - Subcritical Multiplication
  - Neutron Sources
  - Reactor Period and Start Up Rate
  - Problem Solving in Reactor Kinetics
  - Reactivity Coefficients



- Flux Distribution
- DNB, F<sub>Q</sub>, F<sub>H</sub>
- Reactor Control
- Fuel Assemblies and Control Rods
- Transients and Effects on Fuel Assemblies & Control Rod
- Fission Product Poisons
- Reactor Transient Analysis
- Excore Nuclear Instruments
- Fission Product Gasses and Fission Products
- b) Heat Transfer and Fluid Flow, Thermodynamics
- Heat Transfer
- Properties of Fluids
- Steam Tables
- Core and Plant Parameters, Normal and Transient
- c) General Categories
- Facility Incidents
- Emergency Plan
- Security
- Technical Specifications
- Administrative Procedures
- Emergency, Abnormal and Normal Operating Procedures,  
including Abnormal Transient Operating Guidelines
- Primary and Secondary Chemistry Review
- Recognition and Mitigation of Consequences of Severe Core  
Damage
- Change Modifications
- d) Radiation Control and Safety
- Radioactivity and Radiation
- Effects of Radiation
- Radiation Exposure Limits
- Radiation Protection Problems
- Radiation Instruments
- e) Reactor Control
- RCS Instrument Failures
- Integrated Control System (ICS)
- ICS Transients

7.5 Administration

7.5.1 Program Presentation

1. On-the-Job Training

- a) The on-the-job training program consists of preselected and day to day tasks which involve participation by the Direct Senior Reactor Operator candidate in Shift Foreman related activities designed to reinforce classroom study, maximize new learning experiences, and stimulate interest.
- b) Primary verification of OJT tasks shall be by oral checkout of the candidate on individual task items by a task examiner. Task Examiners for items in Appendix B shall be licensed RO's and

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SRO's. Task Examiners for Appendix D shall be Qualified Auxiliary Operators. Final verification shall be by oral and written checkout of task sheet sections by the Shift Supervisor (or Shift Foreman as designated in writing by the Shift Supervisor, using the Summary Sheet in Appendix J), or by a Licensed SRO Instructor.

- c) During the OJT phase the license candidates shall be assigned to various shifts with the approval of Manager, Plant Operations. During this phase, the candidate shall assume Shift Foreman duties under instruction and perform other tasks as assigned.
- d) The level of performance for each OJT Task is designated in the text or to the right of the description in parenthesis. The following are levels of performance in order of preference:
  - (P) = Perform. The candidate shall perform each task under the direct supervision of a qualified operator. This level of performance is the most preferred due to the hands-on experience gained by the candidate.

(S) = Simulate. The candidate shall simulate each task under the direct supervision of a qualified operator. The simulation shall be done as much as possible in the vicinity of the actual component or equipment. Hands-on training, without actual manipulation of valves, breakers, etc is encouraged.

When simulating Emergency and Abnormal Procedures the following is required.

1. Find all indications mentioned.
2. Locate all items used to verify that automatic actions have occurred.
3. Locate all controls necessary to perform all immediate manual and subsequent actions.
4. Walk through all Emergency and Abnormal Procedures and note indicators, check automatic actions, and simulate performing manual actions from memory.

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(D) = Discuss. The task examiner shall examine the candidate on the items to evaluate the candidate's overall understanding of the procedure.

Using the procedure as a reference the candidate shall be able to discuss:

1. Limits and precautions
2. Major steps in procedure
3. Basis for procedure sequence.

When an option of the level of performance is offered the examiner shall designate by circling which one was done.

e) Signatures obtained to meet the requirements of this program are valid for eighteen (18) months. After that time the task must be repeated.

2. Classroom Training

- a) Classroom training shall be conducted by qualified instructors using approved lesson plans.
- b) The candidate will be responsible for all material presented.

3. Simulator

A three (3) week Simulator Program will be utilized to reinforce classroom and OJT concepts and to develop an understanding of integrated plant response.

One week of the Simulator Program will be devoted to Startup Certification, as required.

- a) Candidates for Direct SRO will be evaluated by the Manager, Plant Operations or his designated representative at the completion of the simulator program on their proficiency to direct licensed activities. This evaluation is part of the certification process.

The use of the simulator for training is addressed in Appendix K.

7.5.2 Evaluation Criteria

1. On-The-Job Training

- a) Comprehensive oral checkouts shall be administered by the task examiners for specific task sign-offs and documented by the examiner's signature.
- b) The ultimate responsibility for determining adequate achievement by the student rests with the Shift Supervisor, or Licensed SRO Instructor who shall evaluate the performance of the candidate by final oral check out and/or written questioning at the end of each section of the OJT task (i.e. Primary Systems, Electrical Systems), using the Oral Examination Summary Sheet in



Appendix H. This form shall be retained in the candidate's permanent training file.

- c) All tasks which cannot be performed are to be simulated. Performance or simulation of a task shall not alone constitute successful completion of the task. Discussion and oral questioning by the task and final examiners must be included to substantiate successful completion of the task.
- d) Individuals failing to achieve a "pass" grade on the OJT Oral Exam checkouts shall be:
  - 1. Informed of their weak areas and given direction on the material that they should study to upgrade their performance.
  - 2. Re-examined within two weeks of the initial failure.

NOTE: Details of weak areas and scheduled date for re-exam must be forwarded to the Supervisor, Licensed Operator Training.

If an individual fails the second section check-out the Manager, Plant Operations, Operator Training Manager and candidate's supervisor shall review the Direct SRO license candidate's overall progress and performance and determine the corrective action to be taken.

- 2. **Written Examinations**  
 Written examinations shall be administered by representatives of the Operator Training Section as required by the Supervisor, Licensed Operator Training. Questions shall cover that material presented in the classroom, material specified for self study, and the material identified on the task sheets.  
 A passing grade of 80% is mandatory for all written examinations. A grade of less than 80% shall require candidate counseling by the instructor responsible for noted weak areas on the candidate's exam with suggested corrective actions that will upgrade the candidate's performance. A re-exam will be administered within two weeks. If a candidate fails the second exam the Manager, Plant Operations, Operator Training Manager, and the candidate's supervisor shall evaluate the SRO license candidate's performance and decide on the corrective action to be taken.
- 3. **Final Examination**  
 A comprehensive written and oral examination shall be administered by the Training Department at the conclusion of the training program. An 80% overall

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average and a 70% on individual sections is required for the satisfactory completion of the written phase. The oral examination should normally consist of two phases; a "walk through" phase, administered by an Instructor selected by the Supervisor, Licensed Operator Training, and a "board" composed of Instructors designated by the Supervisor, Licensed Operator Training and the Manager, Plant Operations or his selected representative. A "pass" grade is required for the oral exam substantiated by documentation with the Oral Examination Summary Sheets in Appendix H.

Upon completion of these exams, the candidate's training files and Training Department recommendations shall be forwarded to the Director - TMI I, who shall certify the candidate for NRC examination or, in the case of unsatisfactory completion of the program, decide on the corrective action to be taken.

7.6 Changes and Lesson Plan Correction

The program shall be maintained to reflect the following:

- a) Changes in regulatory requirements
- b) Changes in applicable codes, standards and guides
- c) Significant experiences at the facility
- d) Significant experience throughout the industry
- e) Remedial action recommended by review/audit findings
- f) Regularly scheduled participant critiques.

Changes will be incorporated per the applicable Training Department Procedure.

7.7 Program Scheduling

The program will be scheduled as needed.

7.8 Records and Reports

- 1. A Training Program Administrative form shall be completed and submitted to the Administrative Section for each classroom lecture or lesson by the instructor who presented the material.
- 2. Current and past schedules, lesson plans, student handouts, completed OJT task sheets, exam keys and completed exams and quizzes, both written and oral, as well as any additional pertinent qualification records shall be maintained on file in the Training Department.

The Candidate Progress Report shall be maintained at the training center. Copies of the updated report shall be submitted by the Supervisor, Licensed Operator Training to the Manager, Plant Training and Manager, Plant Operations via the Operator Training Manager on a monthly basis, or more frequently on a case-by-case basis if requested by any of the reviewing individuals.

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7.9 Evaluation

1. At the conclusion of each month of training the license candidates will be asked to complete a training critique form to assist in program evaluation. The completed critiques shall be reviewed by the Supervisor, Licensed Operator Training and forwarded, along with recommendations or corrective action taken to the Manager, Plant Training, via the Operator Training Manager.
2. The Direct SRO Training Program and its contents shall be reviewed and updated at the end of each program presentation by the instructors presenting the course and the Supervisor, Licensed Operator Training. He shall report the results of this review, along with recommendations or corrective action taken to the Manager, Plant Training, via the Operator Training Manager. During the presentation of the course no changes in course content shall be made without prior approval of the Operator Training Manger.
3. Annually an internal team will be formed by the Supervisor, Licensed Operator Training to review the Direct SRO Training Program. The review team should consist of personnel from the Operations and Training Departments. The team will assess the adequacy of the program for:

- Meeting new requirements
- Adequacy of records
- Quality of material and presentations
- Effectiveness

In conducting the review, the team may use any records maintained by the Training or Operations Departments to assist them. These may include:

- NRC Inspections
- QA Audits
- Other Audits
- Regulatory Changes
- Industry Experience
- License Candidate Critiques

The review team shall report the results to the Manager, Plant Training and the Manager, Plant Operations via the Supervisor, Licensed Operator Training and the Operator Training Manager.

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APPENDIX A  
SYSTEMS CHECKOUT GUIDELINE

When studying for a system checkout the candidate should be able to do the following:

1. State the functions
2. State setpoints and interlocks
3. State the design limits and parameters during normal operations.
4. Draw a one line diagram including:
  - a. Major components (pumps, breakers, valves).
  - b. Power supplies to components
  - c. System interconnections
  - d. Meters and gageboards (as applicable)
5. Describe physical location of major components (where applicable)
6. State Technical Specifications and basis for each
7. Describe system response during normal and abnormal conditions.

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APPENDIX "B"  
 LICENSED OPERATOR OJT CHECKLIST

1.0 PRIMARY PLANT PRACTICAL FACTORS

	TASK EXAMINER	DATE
1.1 REACTOR COOLANT SYSTEM (1)		
1.1.1 RCS FILL AND VENT 1103-2 (S)		
1.1.2 DRAINING AND N <sub>2</sub> BLANKETING OF RCS SYSTEM 1103-11 (S)		
1.1.3 RCS LEAKAGE 1303-1.1 (S)		
1.1.4 LOSS OF RC/RC PRESSURE 1202-6A (S)		
1.1.5 LOSS OF RC/RC PRESSURE 1202-6B (S)		
1.1.6 LOSS OF RC/RC PRESSURE 1202-6C (S)		
1.1.7 LOSS OF HIGH ACTIVITY IN RC 1202-11 (S)		
1.1.8 INADEQUATE CORE COOLING 1202-39 (S)		
1.1.9 LOSS OF RC FLOW/RC TRIP 1202-14 (S)		
1.1.10 VIBRATION AND LOOSE PARTS 1203-40 (S)		
1.2 REACTOR COOLANT PUMPS AND SEALS (1)		
1.2.1 RCS PUMP AND MOTOR MALFUNCTIONS 1203-16 (S)		
1.2.2 ESTABLISH ALL CONDITIONS NECESSARY TO RUN REACTOR COOLANT PUMPS (START & STOP RCP'S) (P OR S)		

(1) Systems Checkout. All signatures by licensed SRO or RO.



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APPENDIX "B"  
LICENSED OPERATOR OJT CHECKLIST

1.0 PRIMARY PLANT PRACTICAL FACTORS CONTINUED

	TASK EXAMINER	DATE
1.3 REACTOR VESSEL CONSTRUCTION (1)	_____	_____
1.4 MAKEUP AND PURIFICATION (1)	_____	_____
1.4.1 LOSS OF REACTOR COOLANT MAKEUP 1203-15 (S)	_____	_____
1.4.2 PERFORM AN RCS BORATION AND CALCULATION	_____	_____
1.4.3 PERFORM RCS DILUTION	_____	_____
1.4.4 PERFORM RCS DEBORATION	_____	_____
1.4.5 PERFORM RCS BORON CHANGE FOR ALL RODS OUT POWER REDUCTION TO 50% (With Xe)	_____	_____
1.4.6 SOLUBLE POISON CONCEN- TRATION CONTROL 1103-4 (S)	_____	_____
1.4.7 MAKEUP AND PURIFICATION 1104-2 (D)	_____	_____
1.5 DECAY HEAT REMOVAL (1)	_____	_____
1.5.1 LOSS OF DECAY HEAT REMOVAL 1202-35 (S)	_____	_____
1.5.2 DECAY HEAT REMOVAL 1104-4 (D)	_____	_____
1.6 CORE FLOOD (1)	_____	_____
1.6.1 CORE FLOOD SYSTEM 1104-1 (D)	_____	_____
1.7 PRESSURIZER AND PRESSURE RELIEF (1)	_____	_____
1.7.1 PRESSURIZER FAILURE 1202-29 (S)	_____	_____
1.7.1 PRESSURIZER OPERATION 1103-5 (D)	_____	_____

(1) Systems Checkout - All signatures by licensed SRO or RO

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APPENDIX "B"  
LICENSED OPERATOR OJT CHECKLIST

1.0 PRIMARY PLANT PRACTICAL FACTORS CONTINUED

	TASK EXAMINER	DATE
1.8 ONCE THROUGH STEAM GENERATORS (1)		
1.8.1 OTSG TUBE RUPTURE 1202-5 (S)		
1.8.2 INADVERTENT CLOSURE OF MAIN STEAM ISOLATION VALVE 1202-42 (S)		
1.8.3 LOSS OF FEED TO OTSG 1202-26A (S)		
1.8.4 LOSS OF FEED TO OTSG 1202-26B (S)		
1.8.5 OTSG FILL, DRAIN, LAYUP 1106-16 (D)		

FINAL VERIFICATION:

SHIFT SUPERVISOR

/DATE

(1) Systems Checkout. All signatures by licensed SRO or RO.



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APPENDIX "B"  
LICENSED OPERATOR OJT CHECKLIST

		TASK EXAMINER	DATE
2.0	PRIMARY SUPPORT SYSTEMS		
2.1	NUCLEAR SERVICE RIVER WATER (1)		
2.1.1	RIVER WATER FAILURE 1203-19 (S)		
2.1.2	NUCLEAR RIVER WATER 1104-30 (D)		
2.2	DECAY HEAT RIVER WATER (1)		
2.3	DECAY HEAT CLOSED COOLING (1)		
2.3.1	DHCC 1104-13 (D)		
2.4	INTERMEDIATE CLOSED COOLING (1)		
2.4.1	LOSS OF INTERMEDIATE COOLING 1202-17 (S)		
2.4.2	INTERMEDIATE CLOSED COOLING 1104-8 (D)		
2.5	RADIATION MONITORING SYSTEM (1)		
2.5.1	EXCESSIVE RADIATION LEVELS 1202-12 (S)		
2.5.2	EVALUATE AND FOLLOW- UP RMS ALARMS		
2.5.3	RADIATION MONITORING CHECKS 1303-4.15 (S)		
2.6	FUEL HANDLING (1)		
2.7	WASTE DISPOSAL - SOLID (1)		
2.7.1	SOLID WASTE DISPOSAL 1104-288		
2.8	WASTE DISPOSAL LIQUID (1)		
2.8.1	INITIATE, MAKE, AND COMPLETE A LIQUID WASTE RELEASE (P) OR (S) (1104-29		
2.8.2	LIQUID WASTE DISPOSAL 1104-29) (D)		

- (1) Systems Checkout. All signatures by licensed SRO or RO
- (2) Signature Required by Chem. Tech. Performing Sample.

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 TMI-1 DIRECT SENIOR REACTOR OPERATOR TRAINING PROGRAM

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APPENDIX "B"  
 LICENSED OPERATOR OJT CHECKLIST

2.0 PRIMARY SUPPORT SYSTEMS CONTINUED

	TASK EXAMINER	DATE
2.9 PRIMARY SUMPS AND DRAINAGE (1)	_____	_____
2.9.1 PLANT SUMPS AND DRAINAGE 1104-40 (D)	_____	_____
2.10 HYDROGEN RECOMBINER (1)	_____	_____
2.10.1 HYDROGEN RECOMBINER 1104-62 (D)	_____	_____
2.11 HYDROGEN AND NITROGEN NUCLEAR (1)	_____	_____
2.11.1 NITROGEN SUPPLY 1104-26 (D)	_____	_____
2.11.2 HYDROGEN ADDITION 1102-12 (D)	_____	_____
2.12 PRIMARY CHEMISTRY CONTROL (1)	_____	_____
2.12.1 ASSIST IN RECOGNIZING & TAKING ACTION FOR OUT OF SPECIFICATION CHEMISTRY (P) OR (S)	_____	_____
2.12.2 CHEMICAL ADDITION NUCLEAR 1104-47B (D)	_____	_____
2.13 FLUID BLOCK (1)	_____	_____
2.13.1 FLUID BLOCK 1104-20 (D)	_____	_____
2.14 PRIMARY SAMPLING (1)	_____	_____
2.14.1 OBSERVE DRAWING AND ANALYZING A PRIMARY SAMPLE (2)	_____	_____
2.14.2 NUCLEAR PLANT SAMPLING 1104-43 (D)	_____	_____
2.15 SPENT FUEL COOLING (1)	_____	_____
2.15.1 SPENT FUEL CLEANUP PROCESS 1104-29C (D)	_____	_____

- (1) Systems Checkout. All signatures by licensed SRO or RO.
- (2) Signature Required by Chem. Tech. Performing Sample.

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2.0 PRIMARY SUPPORT SYSTEMS CONTINUED

	TASK EXAMINER	DATE
2.16 NUCLEAR SERVICES CLOSED COOLING (1)		
2.16.1 NSCC SYSTEM FAILURE 1203-20 (S)		
2.16.2 NSCC 1104-11 (D)		
2.17 WASTE DISPOSAL GAS (1)		
2.17.1 INITIATE, MAKE AND COMPLETE A LIQUID WASTE RELEASE (P)		
2.17.2 WASTE DISPOSAL - GASEOUS. 1104-27 (D)		

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APPENDIX "B"  
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3.0 SECONDARY SYSTEMS PRACTICAL FACTORS

	TASK EXAMINER	DATE
3.1 MAIN STEAM (1)		
3.1.1 BE ABLE TO USE STEAM TABLE PARAMETERS AND PLANT PARAMETERS - PLOT A SECONDARY HEAT BALANCE		
3.1.2 STEAM SUPPLY SYSTEM RUPTURE 1203-23 (S)		
3.1.3 MAIN STEAM 1106-14 (D)		
3.2 AUXILIARY STEAM AND AUXILIARY BOILERS (1)		
3.2.1 ASSIST IN STARTUP OF SYSTEM (P) OR (S)		
3.2.2 AUXILIARY BOILERS 1106-4 (D)		
3.2.3 AUXILIARY STEAM CROSS CONNECTION 1106-19 (D)		
3.3 EXTRACTION STEAM (1)		
3.3.1 EXTRACTION STEAM HEATER VENT AND DRAINS 1106-12 (D)		
3.4 HEATER VENTS AND DRAIN (1)		
3.4.1 PLACE HEATER DRAIN PUMPS IN SERVICE (P) OR (S)		
3.4.2 EXTRACTION STEAM, HEATER VENT AND DRAINS 1106-12 (D)		
3.5 FEEDWATER (1)		
3.5.1 ASSIST IN STARTUP OF SYSTEM (P) OR (S)		
3.5.2 FEEDWATER SYSTEM 1106-3 (D)		

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3.0 SECONDARY SYSTEMS PRACTICAL FACTORS CONTINUED

	TASK EXAMINER	DATE
3.5.3 STARTUP AND PLACE A FEEDWATER PUMP IN SERVICE (P) OR (S)	_____	_____
3.6 EMERGENCY FEEDWATER (1)	_____	_____
3.6.1 ASSIST IN STARTUP OF THE SYSTEM (P) OR (S)	_____	_____
3.6.2 EMERGENCY FEED 1106-6 (D)	_____	_____
3.7 CONDENSATE (1)	_____	_____
3.7.1 ASSIST IN STARTUP OF THE SYSTEM (P) OR (S)	_____	_____
3.7.2 HIGH CATION CONDUCTIVITY IN CONDENSATE 1203-5 (S)	_____	_____
3.7.3 CONDENSATE SYSTEM 1106-2 (D)	_____	_____
3.8 CONDENSER AIR EXTRACTION (1)	_____	_____
3.8.1 ASSIST IN STARTUP OF THE SYSTEM (P) OR (S)	_____	_____
3.8.2 MAIN AND AUX. VACUUM SYSTEM 1106-15 (D)	_____	_____
3.9 GLAND SEAL (1)	_____	_____
3.9.1 ASSIST IN STARTUP OF THE SYSTEM (P) OR (S)	_____	_____
3.9.2 TURBINE GLAND SEAL STEAM SUPPLY SYSTEM 1106-10 (D)	_____	_____
3.10 MAIN TURBINE - GENERATOR (1)	_____	_____
3.10.1 PLACE MAIN TURBINE ON LINE AND PLACE IN AUTO (INCLUDING WARMUP) (P) OR (S) (1106-1)	_____	_____
3.10.2 TURBINE TRIP TEST 1106-1.0 (P) OR (S)	_____	_____
3.10.3 TURBINE TRIP 1203-3 (S)	_____	_____

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3.0 SECONDARY SYSTEMS PRACTICAL FACTORS CONTINUED

	TASK EXAMINER	DATE
3.10.4 TURBINE GENERATOR 1106-1 (D)	_____	_____
3.11 TURBINE LUBE OIL (1)	_____	_____
3.11.1 TURBINE LO PUMPING 1106-9 (D)	_____	_____
3.11.2 ASSIST IN STARTUP OF THE SYSTEM (P) OR (S)	_____	_____
3.11.3 TURBINE OIL CONDITIONER & SUPPLY 1104-34 (D)	_____	_____
3.12 GENERATOR STATOR COOLING (1)	_____	_____
3.12.1 STATOR COOLING SYSTEM 1106-7 (D)	_____	_____
3.13 GENERATOR CORE MONITOR (1)	_____	_____
3.13.1 TURBINE GENERATOR 1106-1 APP. C.3 (D)	_____	_____
3.14 GENERATOR GAS AND VENTS (1)	_____	_____
3.14.1 HYDROGEN SEAL OIL AND GAS 1106-8 (D)	_____	_____
3.14.2 ASSIST IN STARTUP OF THE SYSTEM (P) OR (S)	_____	_____
3.15 GENERATOR SEAL OIL (1)	_____	_____
3.15.1 HYDROGEN SEAL OIL AND GAS 1106-8 (D)	_____	_____
3.15.2 ASSIST IN STARTUP OF THE SYSTEM (P) OR (S)	_____	_____
3.16 ELECTROHYDRAULIC CONTROL (1)	_____	_____
3.16.1 TURBINE HIGH PRESSURE FLUID SYSTEM 1106-17 (D)	_____	_____
3.16.2 ASSIST IN STARTUP OF THE SYSTEM (P) OR (S)	_____	_____

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4.0 SECONDARY SUPPORT SYSTEMS

	TASK EXAMINER	DATE
4.1 SECONDARY SERVICE RIVER WATER (1)		
4.1.1 SSRW 1104-31 (D)		
4.2 MECHANICAL DRAFT COOLING TOWER (1)		
4.2.1 MDCT 1104-37 (D)		
4.2.2 ASSIST IN STARTUP OF SYSTEM (INCLUDING TEMP. CONTROL AND DEICING (P) OR (S))		
4.3 SCREENHOUSE EQUIPMENT (1)		
4.3.1 SCREENHOUSE EQUIPMENT 1104-33 (D)		
4.4 CONDENSER CIRCULATING WATER (1)		
4.4.1 CIRCULATING WATER 1104-9 (D)		
4.4.2 ASSIST IN STARTUP OF SYSTEM (INCLUDING DEICING (P) OR (S))		
4.5 CIRCULATING WATER CHLORINATION AND CHEM. FEED (1)		
4.5.1 CIRC. WATER CHLORINATION 1104-35 (D)		
4.6 AMERTAP (1)		
4.6.1 CIRCULATING WATER 1104-9 (1)		
4.6.2 ASSIST IN STARTUP OF SYSTEM (P) OR (S)		
4.7 CYCLE MAKEUP PRETREATMENT (1)		
4.7.1 CYCLE MAKEUP PRETREATMENT 1104-22 (D)		

(1) SYSTEM CHECKOUT. ALL SIGNATURES BY LICENSED SRO OR RO.

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4.0 SECONDARY SUPPORT SYSTEMS CONTINUED

	TASK EXAMINER	DATE
4.8 CYCLE MAKEUP DEMINERALIZER (1)		
4.8.1 CYCLE MAKEUP DEMINERALIZER 1104-23 (D)		
4.9 DEMINERALIZED WATER (1)		
4.10 DOMESTIC WATER (1)		
4.10.1 DOMESTIC WATER 1104-49 (D)		
4.11 RECLAIMED WATER (1)		
4.11.1 RECLAIMED WATER 1104-47A (D)		
4.12 INSTRUMENT/CONTROL AIR (1)		
4.12.1 INST./CONT AIR 1104-25 (D)		
4.12.2 LOSS OF INSTRUMENT AIR 1202-36 (S)		
4.13 STATION SERVICE AIR (1)		
4.13.1 STATION SERVICE AIR 1104-42 (D)		
4.14 INDUSTRIAL WASTE FILTER SYSTEM (1)		
4.14.1 IWFS 1104-50B (D)		
4.15 INDUSTRIAL WASTE TREATMENT (1)		
4.15.1 IWTS 1104-50A (D)		
4.16 SECONDARY CHEMISTRY CONTROL (1)		
4.16.1 OBSERVE DRAWING AND ANALYZING A SECONDARY SAMPLE.		
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4.0 SECONDARY SUPPORT SYSTEMS CONTINUED

TASK EXAMINER

DATE

4.17 SECONDARY SERVICE CLOSED COOLING

(1)

4.17.1 SSCC 1104-12 (D)

4.17.2 SSCC SYSTEM FAILURE:

1203-21 (S)

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5.0 INSTRUMENTATION AND CONTROL

	TASK EXAMINER	DATE
5.1 CONTROL ROD DRIVE SYSTEM (1)		
5.1.1 LOCATE AND OPERATE THE FOLLOWING SWITCHES ASSOCIATED WITH THE CONTROL ROD DRIVE SYSTEM		
5.1.1.1 SAFETY RODS OUT BYPASS		
5.1.1.2 GROUP 7 OUT LIMIT BYPASS		
5.1.1.3 BORON DILUTE BYPASS		
5.1.2 POINT OUT AND DESCRIBE THE COMPONENTS IN THE CRD CABINETS		
5.1.3 CRD SYSTEM 1105-9 (D)		
5.1.4 CONTROL ROD MOVEMENT 1303-3.1 (P) OR (S)		
5.1.5 CRD EQUIPMENT FAILURES 1202-8 (S)		
5.1.6 UNANTICIPATED CRITICALITY 1203-10 (S)		
5.2 EXCORE NUCLEAR INSTRUMENTS (1)		
5.2.1 NUCLEAR INSTRUMENTS 1105-1 (D)		
5.2.2 CHANGE INPUTS TO THE POWER RANGE RECORDER (P) SP 1302-1.1		
5.3 INCORE NUCLEAR INSTRUMENTS (1)		
5.3.1 INCORE MONITORING SYSTEM 1105-5 (D)		
5.3.2 INCORE NEUTRON DETECTORS SURVEILLANCE 1301-5.3 (P)		

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5.0 INSTRUMENTATION AND CONTROL CONTINUED

	TASK EXAMINER	DATE
5.4 NON NUCLEAR INSTRUMENTS (1)		
5.4.1 RCS NNI 1105-6 (D)		
5.4.2 CHANGE INPUTS FOR THE CONTROLLING RCS PRESSURE SIGNAL (P) 1105-6-3.4.3		
5.4.3 CHANGE INPUTS FOR THE CONTROLLING RC FLOW SIGNAL (P) 1105-6-3.4.10		
5.4.4 SELECT THE CONTROLLING TC'S FOR THE PUMP INTERLOCKS (P) 1105-6-3.4.5		
5.4.5 DETERMINE THE STATUS OF RC PUMP INTERLOCKS (P)		
5.4.6 POINT OUT AND DESCRIBE ALL METERS, SWITCHES AND MODULES IN THE ICS/NNI CABINETS		
5.5 REACTOR PROTECTION SYSTEM (1)		
5.5.1 RPS 1105-2 (D)		
5.5.2 RESET REACTOR PROTECTIVE CHANNELS AFTER A TRIP (P) OR (S)		
5.5 REACTOR PROTECTION SYSTEM CONTINUED		
5.5.3 DETERMINE THE CAUSE OF A TURBINE TRIP (P) OR (S)		
5.5.4 DETERMINE WHICH RELAY CAUSED A GENERATOR TRIP FROM THE RELAY TARGET (P) OR (S)		
5.5.5 POINT OUT AND DESCRIBE ALL METERS, SWITCHES AND MODULES IN THE RPS CABINETS		
5.5.6 REACTOR TRIP 1202-4 (S)		

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5.0 INSTRUMENTATION AND CONTROL CONTINUED

	TASK EXAMINER	DATE
5.6 EMERGENCY SAFEGUARDS ACUTATION SYSTEM (1)		
5.6.1 ESAS 1105-3 (D)	_____	_____
5.6.2 EMERGENCY CHECKLIST (P)	_____	_____
5.6.3 EMERGENCY SAFEGUARDS ACTUATION SURVEILLANCE (P)	_____	_____
5.6.4 RESET AN ENGINEERED SAFEGUARDS CHANNEL AFTER A TRIP (P) OR (S)	_____	_____
5.6.5 POINT OUT AND DESCRIBE ALL METERS, SWITCHES, AND MODULES IN THE E.S. CABINETS	_____	_____
5.7 INTEGRATED CONTROL SYSTEM (1)		
5.7.1 ICS 1105-4 (D)	_____	_____
5.7.2 POINT OUT AND DESCRIBE ALL CONSOLE ICS INSTRUMENTATION INPUT SWITCHES, INDICATORS AND RECORDERS	_____	_____
5.7.3 OPERATE ICS CONTROLS IN HAND (P)	_____	_____

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6.0 ELECTRICAL SYSTEMS

	<u>TASK EXAMINER</u>	<u>DATE</u>
6.1 BALANCE OF PLANT ELECTRICAL (1)		
6.1.1 ELECTRICAL SYSTEM 1107-1 (D)		
6.1.2 POINT OUT AND DESCRIBE COMPONENTS AND THE ELECTRICAL FLOWPATH IN THE SWITCHYARD AND RELAY HOUSE (INCLUDE OPERATIONS)		
6.1.3 POINT OUT AND DESCRIBE COMPONENTS AND THE ELECTRICAL FLOWPATH FROM THE MAIN TRANSFORMER THROUGH 6900 VOLT AND 4160 VOLT BUSSES AND 480 VOLT DISTRIBUTION (INLCUDE INTERLOCKS & OPERATIONS)		
6.1.4 DEMONSTRATE UNDERSTANDING OF THE GUIDANCE FOR OPERATING SWITCHYARD BREAKERS (MANUAL IN CONTROL ROOM		
6.1.5 WALKTHROUGH THE PROCESS FOR TRANSFERRING VITAL POWER BUSSES FROM NORMAL TO BACKUP POWER SUPPLY (1107-2-3.3.6)		
6.1.6 EMERGENCY POWER 1303-4.16 (D)		
6.1.7 BLACKOUT 1202-2 (D)		
6.1.8 BLACKOUT 1202-2A (D)		
6.1.9 LOW SYSTEM (GRID) VOLTAGE 1203-41 (D)		
6.1.10 LOAD REJECTION 1203-1 (D)		
6.1.11 EMERGENCY ELECTRICAL SYSTEMS 1107-2 (D)		

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6.0 ELECTRICAL SYSTEMS CONTINUED

TASK EXAMINER

DATE

6.1 BALANCE OF PLANT ELECTRICAL CONTINUED

6.2 DIESEL GENERATORS (1)

6.2.1 STARTUP AND SECURE A  
DIESEL OPERATOR, PLACE  
IN ES STANDBY (P) OR (S)

6.2.2 DIESEL GENERATOR  
1107-3 (D)

6.3 120 VAC VITAL POWER AND D.C.  
DISTRIBUTION (1)

6.3.1 POINT OUT AND DESCRIBE  
COMPONENTS AND ELECTRICAL  
FLOWPATH IN THE 120 VAC  
VITAL DISTRIBUTION SYSTEM.  
BE ABLE TO DISCUSS INTER-  
LOCKS AND OPERATION.  
(INCLUDE PLACING AN INVERTER  
IN SERVICE)

6.3.2 POINT OUT AND DESCRIBE  
COMPONENTS AND THE  
ELECTRICAL FLOWPATH IN  
THE 125/250 VAC DIST.  
SYSTEM. BE ABLE TO  
DISCUSS INTERLOCKS AND  
OPERATION. (INCLUDE  
PLACING CHARGER IN  
SERVICE).

6.4 ISOLATED PHASE BUS DUCT COOLING  
(1)

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7.0 BUILDING SUPPORT SYSTEMS

TASK EXAMINER

DATE

7.1 REACTOR BUILDING EMERGENCY  
COOLING (1)  
RB EMER. COOLING 1104-38 (D)

7.2 REACTOR BUILDING SPRAY (1)  
7.2.1 RB SPRAY 1102-14 (D)  
7.2.2 INITIATE, MAKE AND  
COMPLETE A RB PURGE  
(P) OR (S) (1102-14)

7.3 PENETRATION PRESSURIZATION (1)  
7.3.1 PENETRATION COOLING  
SYSTEM 1104-16 (D)  
7.3.2 PENETRATION PRESSURIZATION  
1104-21 (D)

7.4 REACTOR BUILDING - HVAC (1)  
7.4.1 RB RECIRCULATION  
1104-14D (D)  
7.4.2 REACTOR COMPARTMENT  
SYSTEM 1104-14C (D)  
7.4.3 STEAM GEN. COMPARTMENT  
SYSTEM 1104-14A (D)  
7.4.4 OPERATING FLOOR  
VENTILATION SYSTEM  
1104-14B (D)

7.5 AUXILIARY & FUEL HANDLING-HVAC  
(1)  
7.5.1 AUX. & FH BUILDING  
SUPPLY AND EXHAUST  
1104-15A (D)  
7.5.2 SPENT FUEL PUMP AREA  
1104-15B (S)  
7.5.3 NSCC AND DECAY HEAT  
PUMP 1104-15C (D)

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7.0 BUILDING SUPPORT SYSTEMS CONTINUED

	TASK EXAMINER	DATE
7.6 CONTROL BUILDING AND CONTROL ROOM HVAC (1)		
7.6.1 CONTROL ROOM HVAC 1203-24 (D)		
7.6.2 CONTROL BUILDING VENTILATION SYSTEM 1104-15 (D)		
7.7 SERVICE BUILDING - HVAC (1)		
7.7.1 SERVICE BUILDING 1104-24D (D)		
7.8 REACTOR BUILDING NORMAL COOLING (1)		
7.9 FIRE PROTECTION SYSTEM (1)		
7.9.1 FIRE SERVICE WATER SYSTEM 1104-45B (D)		
7.9.2 FIRE SERVICE SPRINKLER SYSTEM 1104-45C (D)		
7.9.3 FIRE SERVICE DELUGE SYSTEM 1104-45D (D)		
7.9.4 WALK THROUGH YOUR RESPONSE TO FIRE ALARM ANNUNCIATORS		
7.10 DIESEL GENERATOR BUILDING - HVAC (1)		
7.10.1 DIESEL GENERATOR BUILDING 1104-24M (S)		

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8.0 REACTOR MANIPULATIONS

TASK EXAMINER

DATE

8.1 REACTIVITY CALCULATIONS

8.1.1 SHUTDOWN AND OPERATING  
REACTIVITY BALANCE  
1103-15 (P)

8.1.2 BORON CHANGE REACTIVITY  
BALANCE 1103-15 (P)

8.1.3 SHUTDOWN MARGIN  
CALCULATION 1103-15 (P)

8.1.4 XENON POWER BLOCK  
1103-15 (P)

8.2 REACTIVITY CHANGES

THE TRAINEE DURING HIS ON-THE-JOB  
TRAINING PHASE WILL PERFORM AT LEAST  
FIVE (5) REACTIVITY CHANGES AS  
DESCRIBED BELOW, WITH NO MORE THAN FOUR  
(4) BEING ANY COMBINATION OF ITEMS 2 AND  
5. REACTIVITY CHANGES WILL BE  
DOCUMENTED ON THIS SHEET

8.2.1 CRITICAL APPROACH FROM  
SUBCRITICAL ON SOURCE  
RANGE INSTRUMENTATION TO  
CRITICAL AT THE POINT OF  
ADDING HEAT ON THE  
INTERMEDIATE RANGE  
INSTRUMENTATION.

8.2.2 ANY POWER LEVEL CHANGE  
(INCREASE OR DECREASE)  
OF 10 PERCENT OF RATED  
POWER OR GREATER WITH  
CONTROL RODS IN MANUAL

8.2.3 REACTOR SHUTDOWN FROM  
CRITICAL AT 15 PERCENT  
OF RATED TO SUBCRITICAL  
SHUTDOWN ON SOURCE  
RANGE INSTRUMENTATION

8.2.4 BORATION OR DEBORATION  
DURING CRITICAL  
OPERATION

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8.0 REACTOR MANIPULATIONS CONTINUED

TASK EXAMINER

DATE

- 8.2 REACTIVITY CHANGES CONTINUED
  - 8.2.5 OPERATION OF REFUELING BRIDGE TO CHANGE CORE GEOMETRY DURING REFUELING

- 8.3 CORE POWER
  - 8.3.1 MONITOR AND CALCULATE QUADRANT POWER TILT 1203-7 (P)
  - 8.3.2 MONITOR AND CALCULATE CORE IMBALANCE 1203-7(P)

FINAL VERIFICATION:

SHIFT SUPERVISOR

/DATE

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APPENDIX "B"  
LICENSED OPERATOR OJT CHECKLIST

9.0 SITE EMERGENCIES

	TASK EXAMINER	DATE
9.1 PLANT RESPONSE TO PENETRATION OF PROTECTED AREA 1202-13 (D)	_____	_____
9.2 FIRE 1202-31 (D)	_____	_____
9.3 FLOOD 1202-32 (D)	_____	_____
9.4 EARTHQUAKE 1202-30 (D)	_____	_____

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/DATE \_\_\_\_\_

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APPENDIX "B"  
LICENSED OPERATOR OJT CHECKLIST

10.0 DEMONSTRATE THE USE OF THE  
PLANT COMPUTER FOR:

	TASK EXAMINER	DATE
10.1 LEAKAGE CALCULATIONS (P)	_____	_____
10.2 SAXON PROGRAM ACCESS (P)	_____	_____
10.3 CHANGING TREND RECORDER POINTS (P)	_____	_____
10.4 FINDING ALARM POINTS (P)	_____	_____
10.5 DISPLAY AND PRINTOUT OF VARIOUS GROUPS (P)	_____	_____
10.6 OPERATOR TREND GROUPS (P)	_____	_____
10.3 CHANGING TREND RECORDER POINTS (P)	_____	_____
10.4 FINDING ALARM POINTS (P)	_____	_____

FINAL VERIFICATION:

\_\_\_\_\_  
SHIFT SUPERVISOR

\_\_\_\_\_  
/DATE

APPENDIX "B"  
LICENSED OPERATOR OJT CHECKLIST

11.0 DEMONSTRATE THE USE OF THE  
PLANT COMPUTER FOR:

	TASK EXAMINER	DATE
11.1 COOLDOWN OUSIDE CONTROL ROOM 1202-37 (D)	_____	_____
11.2 PLANT STARTUP 1102-2 AND 1103-8 (D)	_____	_____
11.3 PLANT SHUTDOWN 1102-10 (D)	_____	_____
11.4 PLANT COOLDOWN 1102-11 (D)	_____	_____
11.5 PLANT HEATUP TO 525° 1102-1 (D)	_____	_____

FINAL VERIFICATION:

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SHIFT SUPERVISOR

\_\_\_\_\_  
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APPENDIX "C"  
DIRECT SRO - PROCEDURE QUALIFICATION  
ADMINISTRATIVE PROCEDURES

READ AND DISCUSS THE FOLLOWING ADMINISTRATIVE PROCEDURES.

PROCEDURE	QUAL	NAME: _____	
		SIGNATURE	DATE
1. DOCUMENT CONTROL 1001	(1)	_____	_____
2. Procedure Revisions and Approval 1001A	(1)	_____	_____
3. Procedure Preparation 1001D	(1)	_____	_____
4. Procedure Utilization 1001G	(1)	_____	_____
5. Periodic Review of Procedures 1001K	(1)	_____	_____
6. Station Organization and Chain of Command 1009	(1)	_____	_____
7. Technical Specifications Surveillance Program 1010	(1)	_____	_____
8. Controlled Key Locker Control 1011	(1)	_____	_____
9. Equipment Control (Locking) AP 1001	(1)	_____	_____
10. Record Retention AP 1024	(1)	_____	_____
11. Equipment Control (Tagging) AP 1037	(1)	_____	_____

NOTE 1: SRO, RO

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APPENDIX "C"  
DIRECT SRO - PROCEDURE QUALIFICATION  
ADMINISTRATIVE PROCEDURES

READ AND DISCUSS THE FOLLOWING ADMINISTRATIVE PROCEDURES.

PROCEDURE	NAME: _____	QUAL	SIGNATURE	DATE
9. SHIFT RELIEF AND LOG ENTRIES 1012		(1)	_____	_____
10. BYPASS AND SAFETY FUNCTIONS AND JUMPER CONTROL 1013		(1)	_____	_____
11. CORRECTIVE MAINTENANCE AND MACHINERY HISTORY 1026		(1)	_____	_____
12. PREVENTIVE MAINTENANCE 1027		(1)	_____	_____
13. OPERATOR AT THE CONTROLS 1028		(1)	_____	_____
14. CONDUCT OF OPERATIONS 1029		(1)	_____	_____
15. NUCLEAR PLANT STAFF WORKING HOURS 1031		(1)	_____	_____
16. OPERATIONS MEMOS AND STANDING ORDERS 1033		(1)	_____	_____

NOTE 1: SRO, RO

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APPENDIX "C"  
DIRECT SRO - PROCEDURE QUALIFICATION  
ADMINISTRATIVE PROCEDURES

READ AND DISCUSS THE FOLLOWING ADMINISTRATIVE PROCEDURES.

NAME: \_\_\_\_\_

PROCEDURE	QUAL	SIGNATURE	DATE
17. INSTRUMENTS OUT-OF-SERVICE CONTROL 1036	(1)	_____	_____
18. CONTROL OF CAUTION AND DNO TAGS 1037	(1)	_____	_____
19. EVENT REVIEW AND REPORTING REQUIREMENTS 1044	(1)	_____	_____
20. RULES FOR THE PROTECTION OF EMPLOYEES WORKING ON ELECTRICAL AND MECHANICAL APPARATUS 1002	(1)	_____	_____

NOTE 1: SRO, RO

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APPENDIX "C"  
 DIRECT SRO - PROCEDURE QUALIFICATION  
 CODE OF FEDERAL REGULATIONS

READ AND DISCUSS THE FOLLOWING SECTIONS OF THE CODE OF FEDERAL REGULATIONS.  
 USE THE ATTACHED STUDY GUIDE

NAME: \_\_\_\_\_

CODE	QUAL	SIGNATURE (1)	DATE
1. NOTICES, INSTRUCTIONS AND TO WORKERS: INSPECTION 10 CFR 19	(2)	_____	_____
2. STANDARDS FOR PROTECTION AGAINST RADIATION 10 CFR 20	(2)	_____	_____
3. REPORTS OF DEFECTS AND NON-COMPLIANCE 10 CFR 21	(2)	_____	_____
4. DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES 10 CFR 50	(2)	_____	_____
5. OPERATORS' LICENSE 10 CFR 55	(2)	_____	_____
6. PHYSICAL PROTECTION OF PLANTS AND MATERIALS 10 CFR 73	(2)	_____	_____
7. REACTOR SITE CRITERIA 10 CFR 100	(2)	_____	_____

NOTE 1: YOUR SIGNATURE INDICATES THAT THE CANDIDATE DEMONSTRATED SATISFACTORY KNOWLEDGE IN THE SUBJECT AREA.

NOTE 2: SRO



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THI-1  
 APPENDIX D: NON-LICENSED OPERATOR QUALIFICATION CHECKLIST  
 SECTION : OUTBUILDINGS

NAME:	NUMBER	PROCEDURE	TASK	SOCIAL SECURITY NUMBER:	EMPLOYEE NUMBER:		
					TASK EXAMINER SIG.	DATE	HOURS
	1	OPS-S123	FS-P-G Test				
	2	OPS-S144	Sevege Lift System				
	3	OPS-S148	Site Air Compressors and Air Handler				
	4	OPS-S149	Air Handler For Site Air Compressor				
	5	1104-22	Manually Desludge Pretreatment				
	6	3303-M1	Run the Circ Water Diesel				
	7	3303-M1	Run the River Water Diesel				
	8	1104-22	Properly Fill All Chemical Addition Tanks in Pretreat.				
	9	1104-22	Operate Pretreatment Manually				
	10	1104-22	Switch Pretreatment from Manual to Auto				
	11	1104-35/36	Change Chlorine Bottle (River Water or Circ. Water)				
	12	1104-33	Manually Operate Screens and Rakes				
	13	1104-37	Switch H.D.C.T.Fans for Defcelng Operating				
	14	N/A	Open and Close Disconnects In Switchyard				
	15	1104-45D	Reset A Fire Deluge Valve				

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TMI-1  
APPENDIX E: NON-LICENSED OPERATOR CHECKLIST  
SECTION : PRIMARY

NUMBER	PROCEDURE	TASK	EMPLOYEE NUMBER:		
			SOCIAL SECURITY NUMBER:	TASK EXAMINER SIG.	DATE
			HOURS		
1	OPS-S022	Penetration - Pressurization Checks			
2	OPS-S024	Rx. Bldg. Atmosphere Cleanup			
3	OPS-S031	RB Main Steam Line Snubber Inspection			
4	OPS-S048	Cooldown - Outside Control Room Readiness			
5	OPS-S098	RB Entry Data Requirements & Inspections			
6	OPS-S114	Backwash Nuclear River Water Cooler			
7	OPS-S128	Ops Check Fuel Transfer System Air Motors			
8	OPS-S158	Hand Rotation of Reactor Coolant Pump			
9	OPS-S227	DR-P-1A/B Periodic Operation			
10	OPS-S231	Monitor Transfer Tube Bellows Leak Rate			
11	OPS-S235	Waste Gas Separator Blowdown			
12	1104-53	Change Resin in Waste Evap. Cond. Demins.			
13	1104-29Y	Precoat the Precoat Filter & Place In Service			
14	1104-52	Resin Regeneration & Replacement for Debor. Demin.			
15	1104-54	Replace Resin In Makeup & Purif. Demin.			

TOTAL HOURS THIS PAGE



TMI-1  
APPENDIX E: NON-LICENSED OPERATOR CHECKLIST  
SECTION : PRIMARY

NAME:	SOCIAL SECURITY NUMBER:		EMPLOYEE NUMBER:	
	NUMBER	PROCEDURE	TASK	TASK
16	1104-51	Cation Demin. Resin Replacement	TASK EXAMINER SIG.	DATE
17	1104-29N	Decant. Spent Resin and Used Precoat Tank		HOURS
18	1104-27	Manually Purge RH-A-7		
19	1104-29Q	Startup, Operate, & Shutdown, Misc. Evap.		
20	1104-29S	Perform A Liquid Release		
21	1104-27	Perform A Gas Release		
22	1104-29S	Manually Flush RH-L-6		
23	1104-29A	Place R.C. Bleed Tank on Cleanup		
24	1104-29C	Place BMST on Cleanup		
25	1104-29K	LMST Transfer		
26	1104-2	Place Seal Injection Filter In Service		
27	1104-2	Remove Seal Injection Filter From Service		
28	1104-2	Adjust Seal Injection Flow to RCP's		
29	1104-2	Adjust #1 Seal Return Back Pressure		
30	1104-2	Adjust Makeup Bypass Flow		

TOTAL HOURS THIS PAGE

TMI-1  
 APPENDIX E: NON-LICENSED OPERATOR CHECKLIST  
 SECTION : PRIMARY

NAME:		SOCIAL SECURITY NUMBER:		EMPLOYEE NUMBER:	
NUMBER	PROCEDURE	TASK	TASK EXAMINER SIG.	DATE	HOURS
31	1104-2	Transfer HUP Cooling From DC to NSCC			
32	1104-2	Seal Return Filter Replacement			
33	1104-4	Add Oil to DH-P-1A/B			
34	1507-3	Move Fuel with Spent Fuel Bridge			
35	1507-5	Move a Control Rod with S.F. Bridge			
36	1507-5	Operate & Shutdown Fuel Handling Bridge			
37	1507-7	Operate Fuel Transfer System			
38	1104-62	Startup, Operate & Shutdown H-2 Recombiner			
39		Reset Damper. In Air Intake Tunnel			
40	1104-45 I	Remove Air Intake Tunnel Halon System From Service			
41	1104-45 I	Return Air Intake Tunnel Halon System To Service			
42	1104-4	Place Decay Heat Removal In Service			
43	1104-4	Lineup Pressurizer Aux. Spray			
44	1104-47B	Adjust CA-P-1 Stroke			

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Revision No. 0-00

TMI-1  
APPENDIX F: NON LICENSED OPERATOR CHECKLIST  
SECTION : SECONDARY

NUMBER	PROCEDURE	SOCIAL SECURITY NUMBER: T.M.K	TASK EXAMINER SIG.	EMPLOYEE NUMBER:	
				DATE	HOURS
1	1104-23 Startup IWT				
2	1104-23 Shutdown IWT				
3	1104-23 Regenerate Cat Ion and An Ion String on IWT				
4	1104-23 Regenerate Mixed Bed on IWT				
5	1104-18 Neutralize IWT Waste Tank				
6	1104-18 Fill and Flush IWT Chem. Moat				
7	1104-18 Determine Level of IWT Vacuum Pumps				
8	1104-18 Take on Acid or Caustic For IWT				
9	1104-23 Demonstrate Manual Operation of Air Valves at IWT				
10	OPS-S001 Main Generator Core Monitor Annual				
11	OPS-S010 Main Generator Core Monitor Weekly				
12	OPS-S012 Amertap System Ball Inspection & Pump Lubrication				
13	OPS-S029 Electro-Hydraulic Control System Surveillance				
14	OPS-S032 EG-Y-1A/B Fuel Pump/Air Start Surveillance				
15	OPS-S041 Instrument Air Compressors 1A-P-1A/B				

TOTAL HOURS THIS PAGE



Title TMI-1 DIRECT SENIOR REACTOR OPERATOR TRAINING PROGRAM

TMI-1  
APPENDIX F: NON LICENSED OPERATOR CHECKLIST  
SECTION : SECONDARY

NUMBER	PROCEDURE	TASK	EMPLOYEE NUMBER:		HOURS
			SOCIAL SECURITY NUMBER:	TASK EXAMINER SIG. DATE	
16	OPS-5078	Main Generator Core Monitor Q'tly.			
17	OPS-5094	Run Time ES Components-4160V D/E Swgr			
18	OPS-5105	Feed Pump Turbine Emer. Gov. Exercise			
19	OPS-5117	Backwash Secondary River Coolers			
20	OPS-5121	Amertap Normal Backwash			
21	OPS-5125	Instrument Air System			
22	OPS-5153	Exercise Main Turbine Turning Gear			
23	OPS-5160	Exercise A & B FMPT Turning Gears			
24	1106-13	Remove A Powdex Vessel From Service			
25	1106-13	Precoat A Powdex Vessel			
26	1106-13	Place a Powdex Vessel In Service			
27		Fill Main Turbine Boot Seals			
28		Shift The Oil Filters On Ar In Feed Pump			
29	1104-34	Add Oil To Feed Pump Oil Cooler			
30		Rack Out And Rack In 480 Volt Brk			

TOTAL HOURS THIS PAGE

TMI-1  
APPENDIX F: NON LICENSED OPERATOR CHECKLIST  
SECTION : SECONDARY

NAME:

SOCIAL SECURITY NUMBER:

EMPLOYEE NUMBER:

NUMBER	PROCEDURE	TASK	TASK EXAMINER SIG.	DATE	HOURS
31		Rack Out And Rack In 4160 Volt Brk			
32	1106-2	Place 8th Stage Heating On Line			
33	1106-8	Purge Generator With CO-2			
34	1105-8	Fill Generator with H <sub>2</sub> .			
35	1106-8	Fill Generator With I.A.			
36	1106-10	Place Gland Seal Steam In Operation			
37	1106-4	Place an Aux Boiler In Service			
38	1104-9	Adjust Circ Water Blowdown			
39	1303-4.16	An Emergency Diesel Generator In E.S. St/By			
40	1303-4.16	Perform Emergency Diesel Run Surveillance			
41		Place Turbine Bypass EF-V-30A/B Valve In Manual      Auto			
42	1300-3F A/B	Test Run EF-P-2 A/B			
43	1300-3G A/B	Test Run EF-P-1			
44	Rdgs.Sheet	Complete Secondary Readings			

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The TMI-1 DIRECT SENIOR REACTOR OPERATOR TRAINING PROGRAM

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APPENDIX "G"  
WATCHSTANDING CHECKLIST

PERFORM THE FOLLOWING EVOLUTIONS AND ATTACH COMPLETED READING SHEETS

		<u>CANDIDATES SIGNATURE UPON COMPLETION</u>
1.	TAKE AO OUTBUILDING READINGS FOR ALL SHIFTS	(7-3) (3-11) (11-7) _____ _____ _____
2.	TAKE AO PRIMARY PLANT READINGS FOR ALL SHIFTS	(7-3) (3-11) (11-7) _____ _____ _____
3.	TAKE AO SECONDARY PLANT READINGS FOR ALL SHIFTS	(7-3) (3-11) (11-7) _____ _____ _____
4.	TAKE CRO READINGS FOR ALL SHIFTS	(7-3) (3-11) (11-7) _____ _____ _____

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APPENDIX "H"  
ORAL EXAM SUMMARY SHEET CONTINUED

CANDIDATE: \_\_\_\_\_ EXAMINER: \_\_\_\_\_ DATE: \_\_\_\_\_

FURTHER ACTION REQUIRED (IF NONE, SO STATED)

\_\_\_\_\_

SIGNATURE OF EXAMINER\* \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_  
SUPV., LICENSED OPER. TRNG.

\*FORWARD COMPLETED SUMMARY TO SUPERVISOR, LICENSED OPERATOR TRAINING.

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APPENDIX "I"  
SHIFT FOREMAN TRAINEE DUTIES CHECKLIST

SIGNATURE (SF/SS)

1. CONDUCT SHIFT RELIEF AS A SHIFT FOREMAN
2. MAKE A LEFT HAND LOG ENTRY IN ACCORDANCE WITH AP 1012
3. REVIEW ONE COMPLETE SET OF OPERATOR READING SHEETS
4. DEMONSTRATE PROPER HANDLING OF A CHEMICAL DEVIATION SHEET
5. DEMONSTRATE PROPER HANDLING OF TECH SPEC SURVEILLANCE DATA AND SCHEDULES.
6. DEMONSTRATE PROPER HANDLING OF OPS SURVEILLANCE DATA AND SCHEDULING
7. DEMONSTRATE PROPER HANDLING OF ISI DATA IN THE ALERT RANGE
8. DEMONSTRATE CORRECT HANDLING OF WORK REQUEST (COMPLETION/INITIATION)
9. DEMONSTRATE PROPER HANDLING OF QA HOLD POINT STAMP
10. MAKE THE PROPER LOG AND CHECKLIST ENTRIES NECESSARY TO COMPLETE A VALVE LINEUP CHANGE WITHOUT A TCN.
11. AUDIT THE TCN AND STP BOOKS
12. PROPERLY ISSUE A JUMPER OR LIFTED LEAD
13. DEMONSTRATE KNOWLEDGE OF ALL COMMUNICATION SYSTEMS INCLUDING NRC PHONES NAWAS LINES, AND EMERGENCY PLANNING PHONED
14. DEMONSTRATE PROPER METHOD OF RECALL OF PLANT PERSONNEL INCLUDING USE OF RECORD-A-PHONE
5. PROPERLY APPROVE AND DISCUSS TESTING REQUIREMENTS FOR ESAS COMPONENT TAG OUTS.
6. CONDUCT A CREW TURNOVER BRIEFING
7. DEMONSTRATE KNOWLEDGE OF DUTIES OF MEMBERS ON THE FIRE BRIGADE

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APPENDIX "J"  
DESIGNATION OF FOREMAN AS FINAL OJT EXAMINER

DATE: \_\_\_\_\_

SHIFT \_\_\_\_\_, are hereby designated to serve as  
SHIFT FOREMAN  
the final verification examiner for Replacement SRO's on \_\_\_\_\_ Shift for OJT  
LETTER

sections noted below:

List Sections: \_\_\_\_\_

SHIFT \_\_\_\_\_, SHIFT SUPERVISOR

cc: Operator Training Section

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APPENDIX "K"  
SIMULATOR TRAINING

A nuclear plant simulator provides a means of training individuals to control the plant during routine conditions and to cope with nuclear plant transients and accidents. This training should prepare the candidate to supervise proficiently routine evolutions and carryout abnormal/emergency actions for the control room. Candidates shall practice manipulating the controls of an applicable simulator as described in reference 5.6.

As a minimum th license candidate shall participate in training sessions that include those listed below. The use of a simulator for performance of reactivity manipulations addressed in this program is authorized.

The following control manipulations and plant evolutions are required: Those control manipulations which cannot be performed at the plant shall be performed on a simulator.

- (1) Plant or reactor startups to include a range that reactivity feedback from nuclear heat addition is noticable and heatup rate is established.
- (2) Plant shutdown.
- (3) Manual control of steam generators or feedwater, or both, during startup and shutdown.
- (4) Any significant (10 percent) power changes due to manual changes in control rod position or recirculation flow.
- (5) Loss of coolant including:
  - (a) Significant steam generator tube leaks
  - (b) Inside and outside primary containment
  - (c) Large and small, including leak determination
  - (d) Saturated reactor coolant response
- (6) Loss of core coolant flow/natural circulation.
- (7) Loss of all feedwater (normal and emergency).
- (8) Boration or dilution, or both during power operation.
- (9) Any reactor power change of 10 percent or greater where load change is performed with load limit control.
- (10) Loss of instrument air (if simulated plant specific).
- (11) Loss of electrical power (or degraded power sources, or both)
- (12) Loss of condenser vacuum.
- (13) Loss of service water if required for safety.
- (14) Loss of shutdown cooling.
- (15) Loss of component cooling system or cooling to an individual component.
- (16) Loss of protective system channel.
- (17) Mispositioned control rod or rods (or rod drops)
- (18) Inability to drive control rod
- (19) Condition requiring use of emergency boration or standby liquid control system.

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- (20) Fuel cladding failure or high activity in reactor coolant or off gas.
- (21) Turbine or generator trip.
- (22) Loss of normal feedwater or normal feedwater system failure.
- (23) Malfunction of automatic control system(s) which affect reactivity.
- (24) Malfunction of reactor coolant pressure/volume control system.
- (25) Reactor trip.
- (26) Main steam line break (inside or outside containment).
- (27) Nuclear instrument failure(s).

Participation at simulators shall be in groups of no more than four (4) people manipulating the controls or directing the activities of individuals during plant exercises.

An examination using the simulator shall be conducted while at operating power with plant malfunctions and while starting up the reactor. The certification examination shall demonstrate the candidates ability to:

- (1) Manipulate the controls in a safe and competent manner.
- (2) Predict instrument response and use instrumentation available.
- (3) Follow the facility procedures.
- (4) Recognize significance of alarms and annunciators, diagnose the problems they represent, and respond with appropriate actions.
- (5) Communicate properly and effectively.

A startup certification is required by each candidate who has not previously completed one for Unit 1. The use of the simulator for this requirement is authorized.

LICENSED OPERATOR REQUALIFICATION TRAINING PROGRAM DESCRIPTION

TMI - 1

Submitted: *S. L. Newton* 17/7/81  
S. L. Newton                      DATE  
Operator Training Manager

Approved: *R. A. Knief* 17/20/81  
R. A. Knief                      Date  
Manager, Plant Training

Approved: *M. J. Ross* 17/25/81  
M. J. Ross                      Date  
Manager of Operations

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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 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 shall be conducted on a cyclic basis so that all program requirements are completed in a period not to exceed two years.

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

The operator requalification program shall 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 shall be maintained in a fully auditable manner.

Guidelines pertaining to duration of training in the requalification program are estimates of the time needed for retraining of licensed personnel. The training sessions needed to cover special nuclear plant operating situations or significant nuclear industry operating experiences may result in adjustments to these estimates. The duration of training shall also be adjusted as appropriate in order to assure that licensed personnel performance meets or exceeds established performance standards.

2.0. REFERENCES

- a) 10 CFR 55, Appendix A, Draft Revision 5/14/80
- b) NRR letter of March 28, 1980 on Qualifications of Reactor Operators
- c) NUREG 0737, Enclosure 3
- d) ANS 3.1, Draft Revision 10/80



- e) Reg. Guide 1.8, Draft Revision 9/80
- f) INPO-Nuclear Power Plant Requalification Program of Licensed Personnel

### 3.0 DEFINITIONS

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

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.

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.

Licensed Operator (RO) - Any individual who possesses an operator's license pursuant to Title 10, Code of Federal Regulations, Part 55, "Operators' Licenses".

Licensed Senior Operator (SRO) - Any individual who possesses a

senior operator's license pursuant to Title 10, Code of Federal Regulations, Part 55, "Operators' Licenses".

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.

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.

#### 4.0 PROGRAM DESCRIPTION

##### 4.1 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 licensed personnel proficiency and competency.

#### 4.2 PRE-PLANNED LECTURE SERIES

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

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

##### 4.2.1 Fundamental Review Lecture Series

The Fundamentals Review training sessions cover areas in which the knowledge required of a licensed individual is relatively constant.

##### 4.2.1.1 Lecture Series Topics

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

- 1) Theory and Principles of Reactor Operation.

- 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) Plant Protection Systems.
- 7) Engineered Safety Systems.
- 8) Radiation Control and Safety and Plant Chemistry.
- 9) Applicable Portions of Title 10, Chapter I, Code of Federal Regulations.
- 10) Fuel Handling and Core Parameters

4.2.1.2 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 of Operations and the Operations and Maintenance Director.

The scope of the lecture series should be 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.

#### 4.2.2 Operational Proficiency Lecture Series

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

##### 4.2.2.1 Lecture Series Topics

The Operational Proficiency lecture topics are selected to ensure coverage of essential plant operational guidelines 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.
- 3) Administrative Procedures, Conditions



and Limitations and Changes Thereto.

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

4.2.2.2 Lecture Series Topic Selection

The topics presented in the Operational Proficiency Series shall include all the topics listed in Section 4.2.2.1, unless the applicable information is covered in another appropriate manner, such as staff discussion sessions or Operational Review Program (Section 4.4) discussion sessions.

The scope of the lecture series should be determined by the Supervisor, Licensed Operator Training and the Operator Training Manager taking into account the Manager of Operation's and the Operations and Maintenance Director's inputs. The depth of the coverage in each topic should

reflect the knowledge required of the  
Licensed Senior Operator

4.2.3 Pre-Planned Lecture Series Schedule

The Pre-planned Lecture Series shall be scheduled on an annual 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 determined by unit operations or projected operations and must take into account planned and unplanned outages and available simulator time. It shall typically involve approximately 240 contact hours of instruction divided among the program topics and appropriately scheduled throughout the year. Records of the topics covered in each session shall be maintained by the Training Department.

4.2.4 Pre-Planned Lecture Series Attendance

Attendance of all licensed personnel shall be recorded. Absences should be approved in advance by

the Manager of Operations or the Operations and Maintenance Director, Unit 1, and should be limited to one training week per year. Additional absences unless approved by the Manager of Operations shall result in the individual being removed from licensed duties and placed in an accelerated requalification program until such time as the missed material is made up. In any case, the individual who misses training shall be responsible for the material presented in his absence and shall take the quiz that was given on the missed material. Those personnel whose annual written examination scores indicate that a mandatory upgrading of their knowledge level is required, as indicated by a grade of less than 80% in any section, must attend the applicable pre-planned lecture series presentation. Mandatory attendance requirements shall be determined by the Supervisor, Licensed Operator Training.

4.2.5 Pre-Planned Lecture Series Training Methods

The pre-planned lecture series shall use training sessions supported by prepared lesson plans.

4.2.5.1 Lecture Presentation

For each training session in the lecture

series, a lesson plan shall be prepared, reviewed, and approved in accordance with Training Department Procedures TD 1103 and TD 1104.

The incorporation of training aids such as trainee handouts, films, slides, models, transparencies, and videotape presentations is encouraged. The lesson plan shall become the reference source for the information covered during the lecture and shall be retained as part of the program records.

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.

#### 4.2.5.1 Study Periods

Study periods should be scheduled in conjunction with the Pre-Planned Lecture Series to provide licensed trainees 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 training sessions implemented by an instructor conducted as part of the Pre-planned Lecture Series.

4.2.5.3 Instructor Qualifications

1. Training Department and facility instructors who teach systems, integrated responses and transient courses shall have demonstrated their competence to the NRC by successful completion of a senior operator examination.

2. "Guest" lecturers who are experts in a particular subject area need not possess the above qualification. The scheduling and appearance of "Guest" lecturers shall be approved in writing by the Operator Training Manager or Manager, Plant Training.



3. Training Department instructors should attend the first Instructor Development Program presented following their selection as instructors. Waivers may be approved by the Manager, Plant Training based on previous experience.

4.2.6 Pre-Planned Lecture Series 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.

4.2.6.1 Lecture Series Quiz

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

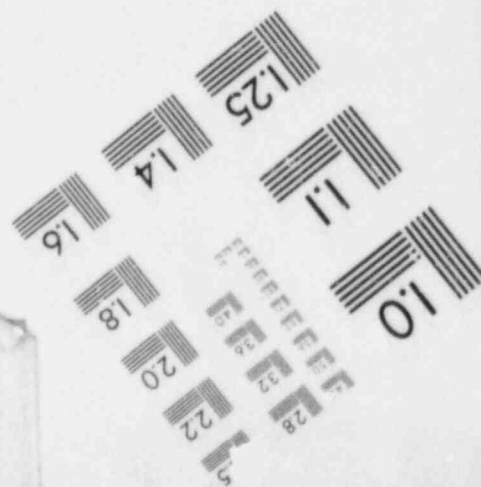
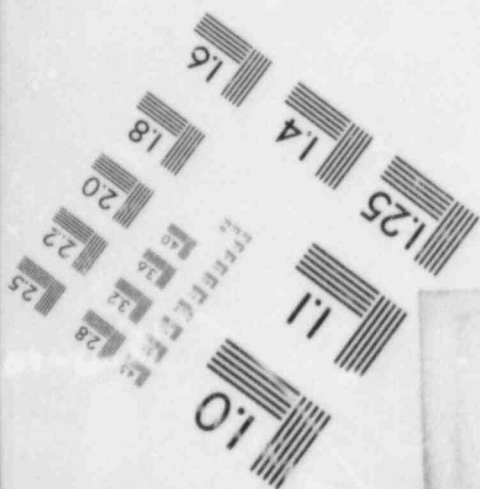
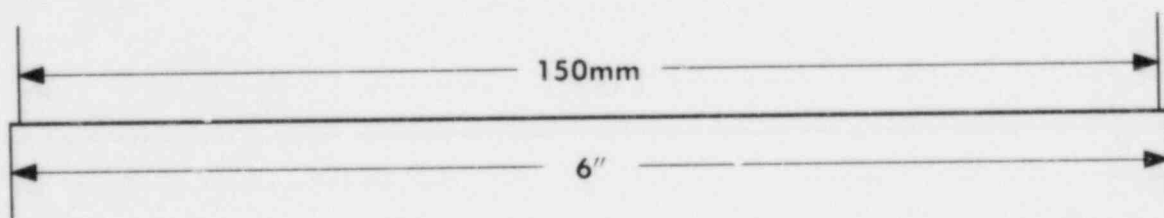
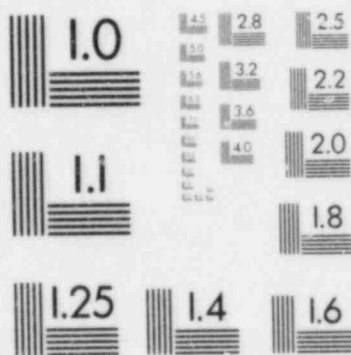
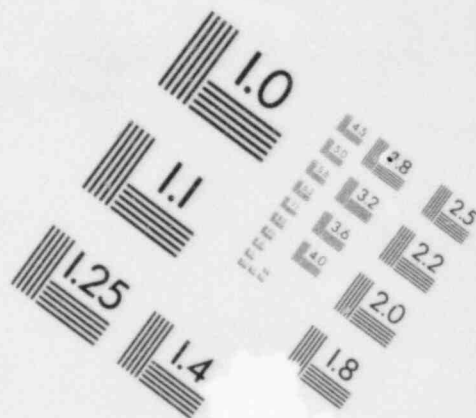
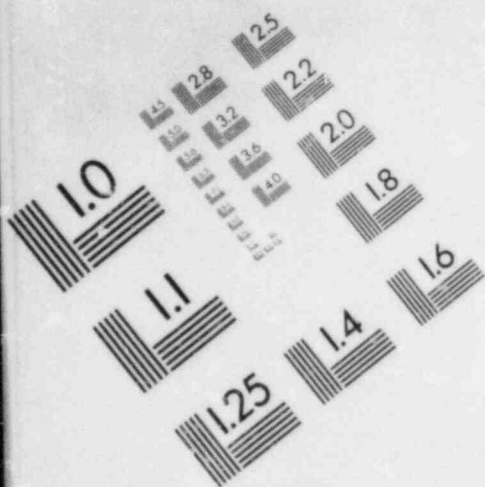
4.2.6.1.1 Quiz Administration

During or at the completion of a group of lectures, an evaluation of trainee knowledge shall be made. The evaluation shall contain 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, such that all abnormal and emergency procedures are tested on a biannual basis.

A variety of question types may be used, but questions requiring analysis or detailed discussion should predominate. An answer key with predetermined question point values should be prepared for evaluation and record keeping purposes.

IMAGE EVALUATION  
TEST TARGET (MT-3)



4.2.6.1.2 Quiz Standards

Quizzes shall be evaluated and a grade determined for each trainee. A performance standard of 80% shall be established for a written quiz. Trainees who do not meet these performance standards should complete a remedial review process within six (6) weeks consisting of:

- 1) Trainee review of the training session material associated with identified knowledge deficiencies.
2. Trainee review of associated reference material identified by the instructor.
- 3) Administration of a second quiz covering at least the identified knowledge deficiencies.

If the second quiz is completed satisfactorily, the trainee should receive credit for completion of the required lecture. If the second quiz is unsatisfactory, the Supervisor Licensed Operator Training shall notify the Manager of Operations with copies to the Operations and Maintenance Director and the Director, TMI-1, 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 4.6.1).

Trainees whose attendance at all or part of the training sessions covered by a particular quiz is mandatory based on the previous annual



examination, but must achieve a score of at least 80% on the applicable sections of the first quiz or be assigned an accelerated requalification program per section 4.6.1.

4.2.6.2 Lecture Series Effectiveness

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

4.2.6.2.1 Lecture Series Evaluation

An overall evaluation of the annual lecture series should be conducted on at least an annual basis. The evaluation should encompass the instructors, training materials, presentation techniques, quiz techniques, and classroom facilities.

This evaluation should be conducted by individuals designated by the Supervisor, Licensed Operator Training and should consider input from the trainees, Manager of Operations and the program instructors. Significant problems should be considered and resolved by the Supervisor, Licensed Operator Training and the Operator Training Manager.

4.2.6.2.2 Presentation Evaluation

Evaluation of selected lecture series training sessions shall be conducted periodically. The evaluations should be directed toward ensuring overall quality of instruction for the lecture series. The evaluation should encompass instructor preparation, presentation techniques, and

technical content of the lecture. This evaluation should be conducted by personnel designated by the Manager, Plant Training or the Operator Training Manager.

Problems identified by these evaluations should be resolved by the instructor and the Supervisor, Licensed Operator Training.

#### 4.3 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 and Plant Evolutions
- 2) Nuclear Plant Simulator 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 manipulation of the controls. Training to achieve proficiency should be planned so that skills training exercises are repeated until proficiency is demonstrated.

#### 4.3.1 Reactivity Manipulations and Plant Evolutions

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

##### 4.3.1.1 Normal Plant Evolutions

On an annual basis, each licensed individual shall participate in the following plant evolutions either at the nuclear plant or at a nuclear plant simulator:

- 1) Plant or reactor startup and power escalation to a range where reactivity feedback from nuclear heat addition is noticeable and heatup rate is established.
- 2) Plant shutdown.

- 3) Manual control of steam generator water level and/or feedwater flow during plant startup and/or shutdown.
- 4) Boration and/or dilution during power operation.
- 5) Reactor power changes of 10% or greater where rod control is in manual.
- 6) Reactor power changes of 10% or greater where load change is performed with load control on manual.
- 7) Operation of turbine controls in manual during turbine startup.
- 8) Decay heat removal system operation.
- 9) Incore monitoring system operation.
- 10) Control room calculations including heat balance, coolant inventory balance, and reactivity balance.

Individual performance during these plant evolutions shall be monitored and deficiencies corrected so that satisfactory proficiency is demonstrated.

4.3.1.2 Abnormal/Emergency Plant Evolutions

On an annual basis, each licensed



individual shall participate in training exercises covering the following plant abnormal/emergency conditions either at a nuclear power plant simulator or during the plant drill program:

- 1) Reactor trip
- 2) Turbine or generator trip
- 3) Loss of coolant including:
  - a) Significant steam generator leaks
  - b) Significant pressurizer leaks
  - c) Large and small leaks located inside and outside primary containment (including leak rate determination for small leaks inside containment)
  - d) Saturated reactor coolant system response
- 4) Loss of coolant flow/natural circulation
- 5) Loss of all feedwater (normal and emergency)
- 6) Control room inaccessibility
- 7) Loss of shutdown cooling.

On a two-year cyclic basis, each licensed individual shall participate in training exercises covering the following plant abnormal/emergency conditions either at a nuclear plant simulator or during the plant drill program.

- 1) Nuclear instrumentation failure(s)
- 2) Loss of protective system channel(s)
- 3) Mispositioned control rod(s) (or rod drops)
- 4) Inability to drive control rods
- 5) Conditions requiring use of emergency boration or standby liquid control system.
- 6) Fuel cladding failure or high activity in reactor coolant or offgas
- 7) Malfunction of automatic control system(s) which affect reactivity
- 8) Malfunction of reactor coolant pressure/volume control system
- 9) Loss of instrument air
- 10) Loss of electrical power and/or degraded power sources
- 11) Loss of condenser vacuum

- 12) Loss of service water
- 13) Loss of component cooling system or cooling to an individual component
- 14) Loss of normal feedwater or normal feedwater system failure
- 15) Main steam line break (inside or outside containment).

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 procedures and technical specifications during the training exercises should not be minimized.

Individual and operational team performance during the abnormal/emergency training exercises shall be monitored and deficiencies corrected so that satisfactory proficiency is demonstrated.

4.3.1.3 Performance of Reactivity Manipulations and Plant Evolutions

Reactivity manipulations and plant

evolutions shall be conducted either at the nuclear plant or at a suitable nuclear plant simulator.

4.3.1.3.1 Performance of Normal Plant Evolutions

Normal plant evolutions shall be either performed at the nuclear plant or performed at a suitable nuclear plant simulator (Section 4.3.2).

4.3.1.3.2 Performance of Abnormal/  
Emergency Plant Evolutions

Abnormal/emergency plant evolutions shall be either performed at a nuclear plant simulator (Section 4.3.2) or conducted during the plant drill program (Section 4.3.3).

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 of Operations), credit for completion of a training exercise may be taken.

#### 4.3.2 Nuclear Plant Simulator 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. Licensed individuals shall participate in a structured training program utilizing a nuclear plant simulator on an annual basis.

During the 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. Assignment to simulator training sessions which are direct interactions with the nuclear plant control panel should be made on a crew basis with other licensed individuals integrated into



the crews not to exceed one additional individual per crew.

Each licensed individual shall complete nuclear plant simulator training sessions involving at least twenty (20) hours of direct interaction with the simulator nuclear plant control panel on an annual basis. Brief post-evolution critiques conducted at the simulator nuclear plant control panels may be considered as part of the direct interaction session.

Lecture sessions conducted in conjunction with a simulator training program covering topics designated in the Pre-planned Lecture Series may be credited toward fulfilling the requirements of Section 4.2.

Reactivity manipulations, plant evolutions, and exercises which should be considered in the simulator training program include:

- 1) Normal Plant Evolutions (Section 4.3.1.1).
- 2) Abnormal/Emergency Plant Evolutions (Section 4.3.1.2).
- 3) Verification of Plant Operating Procedure Adequacy
- 4) Demonstration of plant response to conditions identified from nuclear industry operating

experiences.

Instructors presenting simulator training sessions shall have demonstrated their competence to the NRC by successful completion of a Senior Operator Examination.

#### 4.3.3 Plant Drill Program

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

##### 4.3.3.1 Plant Drills

On an annual basis each licensed individual 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 4.3.1.2) which are not adequately covered in the nuclear plant simulator training program (Section 4.3.2).

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 may be conducted with the approval of the Manager of 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.

#### 4.3.3.2 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.

Each plant drill structured to include carrying out actions should be planned in a prepared drill scenario, approved by the Manager of Operations. The Operations and Maintenance Director and Director TMI-1 shall approve scenarios for major emergency drills. 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 Auditor 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 of Operations.

4.3.4 Skills Evaluation System

Licensed personnel performance and competency related to performing licensed duties shall be periodically evaluated. Repeated errors or other indicators of degraded proficiency should be reviewed by the Manager of Operations and the Operator Training Manager and appropriate training initiated.

Evaluation of licensed personnel job performance should be utilized to relate job performance to requalification training. The Manager of Operations should provide the Supervisor, Licensed Operator



Training or the Operator Training Manager with periodic observations identifying job performance results related to requalification training.

Each licensed individual's performance shall be evaluated during the following situations:

- 1) Nuclear Plant simulator exercises
- 2) Plant drills

The Supervisor, Licensed Operator Training should ensure evaluations are conducted during the simulator and drill exercises.

#### 4.3.5 Skills Training Participation

In the event that skills training guidelines for participation in normal plant evolutions (Section 4.3.1.1), abnormal/emergency plant evolutions (Section 4.3.1.2) or plant drills (Section 4.3.3.1) are not met, exercises which will fulfill the requirements 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-I via the Operator Training Manager and the Manager, Plant Training and provide a

recommendation regarding the licensed individual's removal from licensed duties.

In addition to meeting the requirements for participation noted above, Off shift licensed personnel assigned to the Operations Department shall actively participate in control room operation a minimum of one shift per month. Licensed instructors from the Training Department staff shall actively participate in control room operation a minimum of two shifts per month. During this period these licensed personnel must assume (actual or under instruction) and perform the duties of the on shift licensed operator as indicated by completing Appendix A and forwarding to the Training Department.

Based on schedule constraints, satisfactory participation shall be defined as meeting the requirements on a quarterly basis. If an individual has not spent six shifts in the control room over a given quarter, 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 4.6.2.

#### 4.4 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.

##### 4.4.1 Modification Review

A continuing system shall be established by the Manager of 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 shall be reviewed prior to the licensee assuming shift operation responsibilities.

The Manager of 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 of 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 4.2.2) should be considered by the Supervisor, Licensed Operator Training.

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.

#### 4.4.2 Operating Experience Review

A continuing system shall be established by the Manager of Operations so 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 of Operations should ensure that all on-shift licensed personnel review the information in a timely manner.

Technical Functions personnel assigned to assess plant operating experience and the Supervisor, Licensed Operator Training shall specify operating experience to be analyzed for training purposes, with information transmitted to all licensed personnel for review. Subsequent coverage of operating experience in the Operational Proficiency Lecture Series (Section 4.2.2) should be considered by the Supervisor,



Licensed Operator Training. Selected nuclear plant accident/transient situations shall be analyzed and integrated into the Nuclear Plant Simulator Exercises (Section 4.3.2) or the Plant Drill Program (Section 4.3.3).

#### 4.5 ANNUAL REQUALIFICATION EXAMINATION

In order to determine each licensed individual's knowledge of topics covered in the requalification program and provide a basis for determining areas in which retraining is needed, an annual requalification examination shall be given. The annual examination shall be given to all licensed individuals prior to the completion of each annual requalification program cycle and shall consist of an oral examination and a written examination.

##### 4.5.1 Annual Written Examination

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

##### 4.5.1.1 Written Examination Content

The written examination shall contain examination questions covering the

following topics:

- 1) Theory and Principles of Reactor  
Operation
- 2) Heat Transfer, Fluid Flow and  
Thermodynamics
- 3) Features of Facility Design
- 4) General and Specific Plant Operating  
Characteristics
- 5) Plant Instrumentation and Control  
Systems
- 6) Plant Protection System
- 7) Engineered Safety Systems
- 8) Radiation Control and Safety
- 9) Applicable Portions of Title 10,  
Chapter I, Code of Federal Regulations
- 10) Fuel Handling and Core Parameters
- 11) Normal, Abnormal and Emergency  
Operating Procedures
- 12) Technical Specifications
- 13) Administrative Procedures, Conditions  
and Limitations
- 14) Nuclear Industry Operating Experience

The topics shall be grouped into at least  
six (6) examination categories for

evaluation purposes. The examination shall be structured so that the level of questioning is consistent with the individual's license level (RO or SRO).

4.5.1.2 Written Examination Administration

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

- 1) An examination question file shall be assembled containing questions and answers on each examination topic.
- 2) Questions should be formulated from many sources including:
  - a) Licensed personnel training program.
  - b) Requalification programs
  - c) Plant documents such as technical specifications and procedures.
  - d) Previous examinations.
  - e) Manager of 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 and approved 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 Supervisor, Licensed Operator Training shall prepare the written examination(s) utilizing the examination question file. The number of different examinations prepared should be consistent with preventing examination compromise. The examination may be administered in segments. The examination, answer key and grading system

should be reviewed and approved by the Supervisor, Licensed Operator Training, Operator Training Manager, or Manager of Operations prior to examination administration.

The Supervisor, Licensed Operator Training shall designate qualified personnel to grade the written examination and shall review the graded examinations for grading techniques and consistency.

4.5.1.3 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 4.6.1).

Under special circumstances where a grade of less than 70% has been scored in a single section, the Director, TMI-1 may document the special circumstances and authorize an oral and written reexamination of the failed section within one (1) week. 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-1.

4.5.2 Annual Oral Examination

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

4.5.2.1 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.

4.5.2.2 Oral Examination Administration

The oral examination shall be conducted under a structure ensuring consistency of questioning and evaluation. The following guidelines should be considered.

- 1) A checklist identifying the areas to be covered shall be used.
- 2) Overall evaluation shall be made on a pass/fail basis.
- 3) Comments on individual strengths and weaknesses shall be made.

The Supervisor, Licensed Operator Training and the Manager of Operations shall establish the oral examination schedule.

Personnel assigned to conduct an oral evaluation shall be designated by the

Supervisor, Licensed Operator Training and approved by the Manager of Operations. Oral examinations shall be conducted by a Licensed Senior Operator or personnel who have successfully completed education and training programs required for a senior operator's license. 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.

4.5.2.3 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 4.6.1).

#### 4.6 SPECIAL RETRAINING PROGRAMS

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

##### 4.6.1 Accelerated Requalification Program

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

##### 4.6.1.1 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 4.5.1.3.
- 2) Annual requalification oral examination performance deficiencies per Section 4.5.2.3.
- 3) Pre-planned lecture series quiz performance deficiencies per Section 4.2.6.1.2.

- 4) Significant licensed duty performance deficiencies identified by the Manager of Operations and/or the Supervisor, Licensed Operator Training.

4.6.1.2 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 and the Manager of Operations.

4.6.1.3 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) Pre-planned lectures
- 4) Skills training exercises at the plant or utilizing a simulator.

Personnel assigned to implement the training exercises shall be qualified in accordance with Section 4.2.5.3 or 4.3.2 as appropriate.

Program duration should be dictated by the extent of training required and trainee's performance.

#### 4.6.1.4 Performance Standards

Successful completion of the accelerated requalification program shall be determined by administering an examination. 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

examination, and 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-1, via the Operator Training Manager and Manager, Plant Training regarding the individual's permanent removal from licensed duties or additional upgrading efforts to be considered.

If appropriate, another accelerated requalification program shall be structured to correct deficiencies.

4.6.2 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.

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 or power level 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 5.5 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 of 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 4.5.1) shall be administered to the licensed individual prior to resuming licensed duties. Consideration should be given by the Manager of 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-1, which must be forwarded to the NRC.

4.6.3 Newly Licensed Individuals

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 licensing examination less than three(3) months prior to an annual requalification examination may be excused from taking the current annual written and oral examinations.

4.7 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 of 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 through the Director of Nuclear Assurance and the operations organization through the Director, TMI-1.

Requalification program deficiencies or required changes which need immediate action or significant program modification should be evaluated by the Supervisor, Licensed Operator Training as soon as practicable. Necessary corrective action shall be structured by the Supervisor, Licensed Operator Training and reviewed as above.

4.8 RESPONSIBILITIES

A. Supervisor, Licensed Operator Training is responsible for the following:

- Determining the scope of the Fundamentals Review and Operational Proficiency Lecture Series.
- Determining mandatory attendance requirements at requalification lectures based on weaknesses on previous annual requalification examination.
- 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 biannually.
- Preparing notification for plant management and the Director, TMI-1 of unsatisfactory quiz results from the lecture series.
- Designating individuals to conduct overall evaluation of the annual lecture series and resolving problems described in these evaluations.
- Resolving problems identified by evaluation of lecture series training sessions.

- Reviewing plant drill critiques and initiating additions or modifications to training programs to correct performance deficiencies noted.
- Ensuring performance evaluations are conducted during simulator and drill exercises.
- Preparing notification for plant management and the Director, TMI-1 of unsatisfactory skills training participation.
- Specifying changes and modifications to be analyzed for review in the operational review program.
- Determining expanded coverage of plant design changes, equipment modifications, procedure changes, and technical specification changes in the Operational Proficiency Lecture Series.
- Specifying, in conjunction with Technical Functions, operating experience to be analyzed for training purposes and integrating the information into the training program.
- Designating personnel to prepare and grade the annual written examination, approving the examination, answer key and grading system, and reviewing the graded

examination for grading techniques and consistency.

- Designating personnel to review and update the examination question file.
- Establishing the annual oral examination schedule.
- Designating personnel to conduct oral examinations.
- Identifying significant licensed performance deficiencies requiring accelerated requalification programs.
- Formulating individual accelerated requalification programs and designating individuals to conduct the associated examinations.
- Preparing recommendations to plant management and the Director, TMI-1 regarding the permanent removal from licensed duties or additional upgrading efforts to be considered for those individuals failing to meet the standards of the accelerated requalification program.
- Designating licensed SRO's to conduct oral examinations for those individuals failing to maintain an active status.

- Conducting an annual requalification program review and evaluation, submitting a report on this review, and taking immediate corrective action where necessary.
  - Establishing the requalification program records identified in Section 4.9.
- B. Operator Training Manager is responsible for the following:
- Approving the scope of the Fundamentals Review and Operational Proficiency Lecture Series.
  - Approving scheduling and appearance of "Guest" lecturers.
  - Designating personnel to evaluate selected lecture series training sessions.
  - Reviewing repeated personnel errors or other indicators of degraded proficiency and initiating appropriate training.
  - Approving the annual written examination, answer key and grading system.



- Approving accelerated requalification programs.

C. Manager, Plant Training is responsible for the following:

- Approving waivers of attendance requirements for the Instructor Development Program.
- Designating personnel to evaluate selected lecture series training sessions.
- Ensuring that the Training Department's Administrative Support Section maintains the records identified in Section 4.9.

D. Manager of Operations is responsible for the following:

- Providing inputs to the Training Department on topics to be presented in the Fundamentals Review and Operational Proficiency Lecture Series.
- Approving absences of licensed personnel from lecture series.
- Approving Plant Drill Scenarios, the conduct of plant drills and additions or modifications to training

programs as a result of drill critiques.

- Reviewing repeated personnel errors or other indicators of degraded proficiency and initiating appropriate training.
- Providing periodic observation to the Training Department identifying job performance results related to requalification training.
- 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.
- 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.
- Approving the annual written examination, answer key, and

grading system.

- Establishing the annual oral examination schedule.
- Approving personnel designated to conduct oral examinations.
- Identifying significant licensed performance deficiencies requiring accelerated requalification programs.
- Approving accelerated requalification programs.
- Approving SRO's designated to conduct oral examinations for those individuals failing to maintain an active status.
- Establishing and maintaining operational review series participation records.

4.9 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 establishing the following requalification

program records:

- 1) Oral and written examination results for each licensee.
- 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's Administrative Support Section.

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

#### 4.10 PROGRAM APPROVAL

- The Director of Unit 1, through the Operations and Maintenance Director and the Manager of Operations, certifies operators for requalification and relicensing. The Manager of Operations retains the responsibility to ensure that the overall level of training of plant operators is satisfactory through the approval of program

content, schedules and administrative procedures and changes thereto.

- The Manager, Plant Training through the Operator Training Manager, is responsible to ensure that the training program is developed to meet the requirements established by the Director of Unit 1 through the Manager of Operations and that proper records and documentation are provided and maintained.
  
- Lesson plans for implementation of the training program shall be reviewed by the Supervisor, Licensed Operator Training and approved by the Operator Training Manager.
  
- All changes to this program description shall be approved by the Manager of Operations and Manager, Plant Training.



APPENDIX A

OFF SHIFT LICENSED OPERATOR

WATCH STANDING DOCUMENTATION

I certify that \_\_\_\_\_ has satisfactorily  
Off Shift: Licensed Operator

assumed and performed the SS/SF/CRO duties (actual or under  
(Circle One)

instruction) for the 11-7/7-3/3-11 shift on \_\_\_\_\_  
(Circle One) : Date

\_\_\_\_\_  
Shift Supervisor