



UNITED STATES  
ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS  
REGION I  
970 BROAD STREET  
NEWARK, NEW JERSEY 07102

July 12, 1972

TO: Files

THRU: E. M. <sup>cmh</sup>Howard, Chief, Reactor Construction  
Branch, Regulatory Operations, HQ

THREE MILE ISLAND UNIT 1 RING GIRDER PROBLEM

A presentation utilizing drawings, slides, and photographs was made by L. L. Beratan, RO:HQ, and A. A. Varela, RO:I, on the ring girder problem at Three Mile Island to the Region II inspection personnel on Thursday, May 25, 1972. About 20 available inspectors attended and considerable interest was evident by questions and discussions which followed.

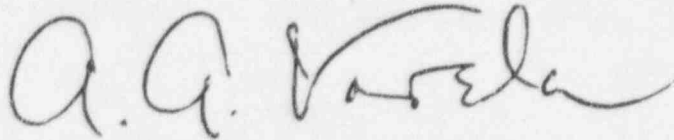
Following this, we were requested to make the same presentation to the Georgia Power Company on Thursday afternoon in the Atlanta corporate office. About 20 company attendees were present. Our efforts were directed to identify a construction problem, but the thrust was on the positive approach to effective quality assurance programming. Georgia Power expressed appreciation for the presentation.

On May 26, 1972, we made a presentation to Florida Power Company, Crystal River, Florida, at the project site of the Crystal River unit presently under construction.

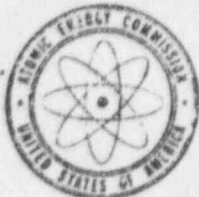
The audience of about 30 consisted of FPC representatives, who are their own construction managers; J. A. Jones; contractor individuals; and persons from QA of Gilbert Associates. About two hours was spent in this presentation and again we stressed the positive approach of effective quality assurance programming rather than underscore a construction failure. The response at this presentation indicated great interest. Since the Crystal River project is very similar to Three Mile Island Unit 1 and is designed by the same A-E, Gilbert Associates, both FPC and the contractor appreciated the timely experience-oriented information.

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Afterwards, we were taken on a site tour and were shown a model of the ring girder which they are studying for construction planning to eliminate, as much as possible, the built-in difficulties inherent in this type of design. Our presentation appeared to be well timed since ring girder concrete placement is only six months off. FPC, acting as their own construction managers, have not yet decided on how concrete will be placed to avoid honeycombing and voids, but I feel sure that whatever method their contractor uses will be under rigid quality control. Again, this was the positive aspect of our presentation.

A handwritten signature in cursive script, reading "A. A. Varela". The signature is written in dark ink and is positioned above the typed name and title.

A. A. Varela  
Reactor Inspector



UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

OCT 12 1973

H. D. Thornburg, Chief, Field Support & Enforcement Branch, RO

THREE MILE ISLAND UNIT 1, FAILURE OF VOLTAGE SUPPRESSION DIODES  
INSTALLED IN ENGINEERED SAFEGUARDS CIRCUIT BREAKERS - DOCKET NO. 50-289

This memo is in response to your request for review<sup>1</sup> of the above failures which occurred at the subject facility and to assess the related generic and safety implications. The licensee<sup>2</sup> reported that during testing of 480 volt AC safety related circuit breakers, numerous failures of the diodes (W IN 504) installed across the close and trip coils of the circuit breakers have occurred. Investigation into the problem disclosed that the voltage rating of the failed diodes is too low (400 volts) to handle the voltage transients occurring during actual circuit breaker operation. Based on this finding, the licensee has initiated a program to replace all potentially faulty diodes with a unit considered more suitable for this application. The replacement unit, a GE thyrector, Model 6 R20AP1B2 has a rating of 1500 volts.

We have discussed the diode problem with the knowledgeable people from the licensee; the AE, Gilbert Associates (GAI); the breaker manufacturer, Westinghouse; and personnel from Region I and Licensing.

The purpose of the voltage surge suppression circuitry is to protect sensitive instruments from voltage transients which can occur during the opening or closing of a circuit breaker. The reason for the licensee's concern of this interaction between the instruments and the circuit breakers is because the wiring for these components is installed in close proximity of each other. It is also worthy to note that the voltage suppression circuitry as discussed does not protect the relays nor contacts of the circuit breaker in which they are installed.

In our assessment of the related generic implications concerning these failures, our discussions with Westinghouse and GAI indicated that

<sup>1</sup>Action Control Form FO#154, Thornburg to Reinmuth, dated 9/5/73.

<sup>2</sup>RO Inspection Report No. 50-289/73-11 (Paragraph 7).

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instrument protection from voltage "spikes" using diodes in circuit breaker control circuitry has not been used at other nuclear power plants. In view of this, we conclude that the diode problem as discussed should not be generic. We have not, however, contacted all facilities to confirm this conclusion.

Another design deficiency was noted during our investigation into the diode problem in that the status of the "availability" of control power for the closing circuitry of these essential circuit breakers is not being monitored in the control room; i.e., by visual and/or audible annunciation. Additional information relating to this type of design deficiency was initially discussed in RO Report No. 71/008 dated August 31, 1971 regarding site inspection of Pilgrim Unit 1.

With regard to the related safety implications of the diode failures, it was found that many failures resulted in blown fuses and subsequent loss of the control power which is needed to close the circuit breakers. These observations combined with improper monitoring of control power lead us to believe that there is a high probability a failure of a safety related circuit breaker could go undetected.

In view of the above findings and with the oral concurrence of Licensing, it is our opinion that the licensee should perform modifications and demonstrate adequacy through appropriate testing. Additional changes may be desirable to comply with Regulatory Guide 1.22 and 1.47 with respect to control room indication of circuit breaker availability. Since these are design changes which may require further evaluation, we are forwarding copies of this memo to Licensing for their consideration.

As follow through we recommend the regional office monitor corrective actions accordingly.



G. W. Reinmuth, Chief  
Technical Assistance Branch, RO

cc: A. Giambusso, L  
R. Bernero, L  
T. Ippolito, L  
B. H. Grier, RO  
J. G. Davis, RO  
E. J. Brunner, RO:I  
J. P. O'Reilly, RO:I

MEMO ROUTE SLIP Form AEC-95 (Rev. May 14, 1947) AECM 0240		See me about this. Note and return.	For concurrence For signature.	For action. For information.
TO (Name and unit) RO Chief, Reactor Constr. Br. RO Chief, Reactor T&O Br. RO:HQ (5) DR Central Files Regional Directors, RO		INITIALS (3)	REMARKS METROPOLITAN EDISON COMPANY THREE MILE ISLAND UNIT 1 RO INSPECTION REPORT NO. 50-289/73-03	
		DATE		
TO (Name and unit) Regulatory Standards, Directorate of Licensing PDR Local PDR		INITIALS (3)	REMARKS The subject inspection report is forwarded for information.	
		DATE		
TO (Name and unit) NSIC TIC State of Pennsylvania		INITIALS	REMARKS	
		DATE		
FROM (Name and unit) E. J. Brunner, Chief Facility Test & Startup Br. RO:I		REMARKS		
PHONE NO. 3943	DATE 4/17/73			

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USE OTHER SIDE FOR ADDITIONAL REMARKS

GPO : 1971 O - 445-489

U. S. ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS  
REGION I

RO Inspection Report No.: 50-289/73-03

Docket No.: 50-289

Licensee: Metropolitan Edison Company

License No.: CPPR-40

Three Mile Island - Unit 1

Priority: \_\_\_\_\_

Category: B

Location: Middletown, Pennsylvania

Type of Licensee: PWR 831 MWe (B&W)

Type of Inspection: Unannounced, Routine

Dates of Inspection: March 26, 27 and 28, 1973

Dates of Previous Inspection: January 9, 10, and 11, 1973

Reporting Inspector: *D.F. Johnson*  
D. F. Johnson, Reactor Inspector

4/13/73  
Date

Accompanying Inspectors: None

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

Other Accompanying Personnel: None

Reviewed by: *E.J. Brunner*  
E. J. Brunner, Chief, Facility Testing &  
Startup Branch

4/13/73  
Date

## SUMMARY OF FINDINGS

### Enforcement Action

#### A. Violations

None

#### B. Safety

None

### Licensee Action on Previously Identified Enforcement Items

None

### Unusual Occurrences

None

### Other Significant Findings

#### A. Current Findings

1. Significant personnel changes have been made in the licensee's operating staff. (Details, Paragraph 2)
2. Information obtained during this inspection indicated the following status of completion regarding the Facility Procedure Program.
  - a. Operating Procedures -75%
  - b. Emergency Procedures -32% \*
  - c. Administrative Procedures -40%
  - d. Surveillance Test and Calibration Procedures -30%
  - e. Maintenance Procedures -45%
  - f. Alarm Procedures -37%
3. The RO estimate of the date for initial fuel load has been revised. (Details, Paragraph 3)

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\*The licensee expanded emergency procedures pursuant to RO:I inspector's comments resulting in a lower percentage of completion than previously reported in RO:I Inspection Report No. 50-289/72-18

B. Status of Previously Reported Unresolved Items

1. The licensee has expanded the scope of the Facility Procedure Program incorporating additional procedures as identified by RO. This item is considered resolved. (Details, Paragraph 4)
2. The licensee has agreed to the review of certain Facility Procedures by the General Office Review Board. Based on commitments obtained from the licensee, this item is considered resolved. (Details, Paragraph 8)

Management Interview

An exit interview was conducted on site at the conclusion of the inspection on March 28, 1973 with Messrs. R. M. Klingaman, Superintendent, J. G. Herbein, Assistant Superintendent, J. J. Colitz, Station Engineer, J. R. Floyd, Supervisor of Operations, and R. W. Zechman, Training Specialist. Items discussed are summarized as follows:

A. Facility Procedures

1. Previously Identified Deficiencies

The inspector stated that previous deficiencies identified by RO:I in a prior inspection were discussed with members of the licensee's staff. He indicated that resolution had been obtained for a majority of the items. (Details, Paragraph 5)

2. Current Procedure Review

The inspector stated that RO:I review of selected Emergency and Maintenance Procedures had revealed certain deficiencies which required resolution. He indicated that these had been discussed with members of the licensee's staff and that commitments for resolution had been obtained. The licensee stated that he was aware of the deficiencies and that he concurred with the commitments for resolution. (Details, Paragraph 6)

B. Training Program

The inspector examined in detail, the licensee's documentation concerning implementation of the following programs:

- Senior Reactor Operator Training
- Reactor Operator Training
- Auxilliary Operator Training



- Maintenance Department Training
- Training Records

The inspector reviewed the above programs with respect to scope and effectiveness and informed the licensee that inspection findings showed apparent conformance with FSAR and Technical Specification requirements and appear to satisfy the criteria of ANSI N.18.1. (Details, Paragraph 7)

C. Review and Approval of Facility Procedures

The inspector discussed with licensee representatives, the review, approval and audit responsibilities of the on-site and off-site Safety Review Committees. The inspector reviewed TMI Administrative Procedure #1001 "Control of Operating, Emergency, Maintenance and Surveillance Procedures" and informed the licensee that the approval procedures stated in administrative procedure #1001 are in conflict with the requirements of the FSAR and proposed Technical Specifications. The licensee stated his intentions are to adhere to the approval procedures as stated in Administrative Procedure #1001 and that if necessary, the FSAR and Technical Specifications would be amended to be in accordance with Administrative Procedure #1001. (Details, Paragraph 8)

## DETAILS

### 1. Persons Contacted

R. M. Klingaman, Superintendent  
J. G. Herbein, Assistant Superintendent  
J. J. Colitz, Station Engineer  
J. R. Floyd, Supervisor of Operations  
H. R. Morris, Jr., Supervisor of Maintenance  
R. W. Zechman, Training Specialist  
D. E. Barry, Foreman, Maintenance  
W. W. Peiffer, Foreman, Maintenance

### 2. Personnel Changes

The licensee informed the inspector of the following organizational changes:

- a. Mr. J. J. Colitz, formerly Operations Supervisor, has been promoted to Station Engineer.
- b. Mr. J. R. Floyd, formerly Nuclear Engineer, has been promoted to Operations Supervisor.
- c. Mr. G. F. Larizza, formerly Nuclear Engineer Unit #2, has been assigned as Nuclear Engineer Unit #1.

### 3. Plant Physical Inspection

The inspector conducted a physical inspection of the Three Mile Island 1 Plant. He discussed the results of this inspection with licensee representatives and stated that the milestone date for initial fuel load of November 1973 is doubtful, based on the observed status of construction. Licensee representatives informed the inspector that the estimate core loading date has been revised from November 1973 to February 1974.

### 4. Facility Procedure Program Revisions

The licensee has revised the Facility Procedure Program incorporating the following items as identified by RO:I in a previous inspection:

- a. Responsibilities and Authorities of Shift Personnel  
(RO Report No. 50-289/72-18, Paragraph 2.a.(1),B)

The licensee has written Administrative Procedure #1009, "Station Organization and Chain of Command", which states

the responsibilities and authorities of Three Mile Island shift personnel.

- b. Procedures for Bypass of Safety Functions and Jumper Control (RO Report No. 50-289/72-18, Paragraph 2.a.(1)(c))

The licensee has written Administrative Procedure #1013 "Bypass of Safety Functions and Jumper Control" that specifies procedures and instructions for the bypassing of safety functions and jumper control.

- c. Locking and Tagging Procedures  
(RO Report No. 50-289/72-18, Paragraph 2.a.(1)(d))

The licensee has written Administrative Procedure #1002 "Rules for the Protection of Men Working on Electrical and Mechanical Apparatus", this procedure incorporates detailed instructions on Three Mile Island's tagging procedures.

Administrative Procedure #1011 "Locked Valve Control" is being written and will include locking procedures.

- d. Schedule for Surveillance Testing and Calibration  
(RO Report No. 50-289/72-18, Paragraph 2.a.(1)(e))

The licensee has written Administrative Procedure #1010 "Schedule for Surveillance Testing and Calibration", which includes a complete schedule of surveillance and calibration tests to be performed.

- e. Standby Personnel Recall  
(RO Report No. 50-289/72-18, Paragraph 2.a.(1)(f))

The licensee has written Administrative Procedure #1014 "Recall of Standby Personnel", which includes instructions on when and how standby personnel can be recalled with cognizant telephone numbers of personnel to be called.

- f. Shift and Relief Turnover  
(RO Report No. 50-289/72-18, Paragraph 2.a.(1)(g))

The licensee has written Administrative Procedure #1012 "Shift Relief Turnover and Log Entries", that specifies what must be done by a relief shift prior to assuming control of the plant; it further specifies pertinent logs, equipment and plant status that must be checked by the oncoming shift.

- g. Temporary Changes to Procedures  
(RO Report No. 50-289/72-18, Paragraph 2.a.(2))

Administrative Procedure #1001, "Three Mile Island Procedure Controls" has been revised to include the requirement that temporary changes to procedures will be entered in the operating log, properly dated, initialed and cognizant personnel notified of the change.

- h. Scram Recovery  
(RO Report No. 50-289/72-18, Paragraph 4.a.(1))

The licensee stated Operating Procedure #1102-2 "Plant Startup" has been revised to include operator guidance and instructions for a recovery from a scram.

- i. Communication Systems  
(RO Report No. 50-289/72-18, Paragraph 4.a.(4))

The licensee has prepared a Systems Description for Three Mile Island communication systems which gives a detailed description of each individual system and contains system functions, mode of operation, safety precautions and maintenance.

Inspector's Comment - The above additions and revisions to the Facility Procedures were examined by the inspector, as a result of his findings, items a through i are considered to be resolved. There are no further questions in these areas.

- j. Containment Access Requirements  
(RO Report No. 50-289/72-18, Paragraph 2.a.(1)(a))

The licensee stated that containment access requirements will be included in Health Physics Procedures. HP #1630 is being prepared and will contain instructions and requirements for containment entry.

- k. Fire in Control Room  
(RO Report No. 50-289/72-18, Paragraph 3.a.(2))

The licensee stated fire protection procedures are written for station fires and are included in the emergency plan, a separate procedure for a specific fire in the control room will be written and included in the station emergency procedures.

1. Loss of Instrument Air  
(RO Report No. 50-289/72-18, Paragraph 3.c(1))

The licensee stated Procedure #1102.26 "Loss of Instrument Air" is under revision to incorporate the inspector's comments but is not complete at present.

- m. Refueling Procedure  
(RO Report No. 50-289/72-18, Paragraph 4.a.(2))

The licensee stated that initial fuel loading procedures are being written that will contain all fuel handling and loading equipment procedures; from these procedures a refueling procedure will be adapted.

Inspector's Comment - The inspector stated that items j,k, l,m remain unresolved and these deficiencies will be examined for resolution on a subsequent inspection.

5. Previously Identified Deficiencies in Facility Procedures

The licensee's actions on deficiencies identified in a prior inspection are as follows:

Inspector's Comment - A master list indicating the status of procedures should be maintained and kept up to date to include such data as date drafted reviewed, approved, etc. (RO Report No. 50-289/72-18, Paragraph 2.a.(6))

Licensee's Response - The licensee provided the inspector with an updated report indicating the status of the Facility Procedure Program.

Inspector's Comment - The inspector stated that upon review of the Facility Procedures index, it appears that a procedure for Emergency Boration is lacking. (RO Report No. 50-289/72-18, Paragraph 3.a.(1))

Licensee's Response - The licensee stated that emergency boration procedures are contained in Operating Procedure #1103-4 "Soluble Poison Concentration Control" and concurred that procedures for rapid boration are adequate.

Inspector's Comment - The inspector stated upon review of the Facility Procedure index, it appears that a procedure for Loss of Containment Integrity is lacking. (RO Report No. 50-289/72-18, Paragraph 3.a.(3))

Licensee Action - The licensee stated Operating Procedure #1101-3 "Containment Integrity and Access Limits" has been revised to include loss of containment integrity.

Inspector's Comment - The inspector reviewed procedure #1101-3 and verified coverage for loss of containment integrity. This item is considered resolved.

The inspector stated that upon review of Emergency Procedure #1202-07 "Loss of Boron", the following deficiencies were identified. (RO Report No. 50-289/72-18, Paragraph 3.b)

- a. The magnitude or change of boron concentration that constitutes an emergency condition should be indicated to ensure sufficient guidance to the operator in recognizing that an abnormal condition exists and to take the correction action required.

Licensee Action - The licensee stated that the exact magnitude or change of boron concentration is not known at present but will be determined at a later date. He further stated the procedure has been revised to allow space for entry of magnitude change when determined.

Inspector's Comment - The inspector stated procedure #1103-4 "Soluble Poison Concentration Control" will be reviewed for inclusion of magnitude or change of concentration on a subsequent inspection.

- b. The expected level change in the make up tank or pressurizer should be specified to ensure moderate dilution is recognized and corrective action taken.

Licensee's Action - The licensee agreed to revise the procedure to include specific level changes that will indicate an abnormal condition exists.

Inspector's Comment - The inspector will review procedure #1103-4 "Soluble Poison Concentration Control" for inclusion of make-up tank level on a subsequent inspection.

- c. Under symptoms for loss of boron, a simple statement that a power level increase will indicate this condition is insufficient. To enable the operator to recognize a particular abnormal condition, specific power levels expected should be stated and the type of transient, i.e., a slow step or rapid ramp indicated.

Licensee's Action - The licensee reviewed and evaluated the loss of Boron with respect to power level changes expected. The licensee's conclusion is that due to design limitations, the maximum flow rate for dilution is insufficient to cause a power transient, therefore, loss of boron does not constitute an emergency condition. Loss of boron will, therefore, be included in Operating Procedure #1103-4 "Soluble Poison Concentration Control" and deleted as an Emergency Procedure.

The inspector concurred with the licensee's conclusions.

- d. The inspector stated the use of abbreviations within the body of a procedure should be avoided whenever possible. If unavoidable, system and component abbreviations when used, should be written out the first time they appear in the procedure to ensure understanding by all.
- e. Caution statements within the body of a procedure should be capitalized and double spaced to ensure they stand out.
- f. Referencing other procedures should be avoided, if the information is important it should be specified in the procedure.
- g. Precautions should be in the body of the procedures preceding a specific step.

Licensee's Action - The licensee stated all procedures have been reviewed with respect to the context of the inspector's remarks and revised as applicable.

- h. In Step 3, the statement reads, "stop all pumps", this statement is too generalized, further direction and specifics of what pumps, what valves should be given.

Licensee's Action - The licensee stated procedure #1103-4 "Soluble Poison Concentration Control" has been revised to include specific pumps and valve numbers as applicable.

1. In manual action step 2, it states "sample and analyze for boron concentration". The inspector inquired as to who samples for boron concentration and how is sample obtained.

Licensee Response - The licensee stated all auxilliary operators are qualified to obtain sample water for analysis, but only day shift capability for analyzing boron concentration. The licensee is currently looking at the probability of purchasing a boron analyzing unit to have around the clock capability.

Inspector's Comment - The inspector stated all shifts should have the capability to ascertain the concentration of boron present in the primary coolant water. This item will be reviewed in a subsequent inspection.

The inspector stated that upon review of Operating Procedure #1103-6 "Reactor Coolant Pump Operation", the following deficiencies were identified. (RO Report No. 50-289/72-18, Paragraph 4.b)

- (1) Step 14 reads "carefully observe all parameters" without listing parameters to be observed or stating values.

Licensee's Action - The licensee has revised step 14 and included specific values for applicable parameters.

Inspector's Comment - The inspector reviewed procedure #1103-6 "Reactor Coolant Pump Operation" and verified entry of applicable parameters. This item is considered resolved.

- (2) Procedure 6.3.2.2 states, "when pump has stopped rotating and anti reverse rotation has been verified"; how does the operator know if the pump has stopped and anti reverse rotation has been verified? This indication should be in the procedure.

Licensee's Action - The licensee has revised step 6.3.2.2 to include operators zero speed switch indication for determining pump stoppage and reverse rotation.

Inspector's Comment - The inspector reviewed procedure #1103-6 "Reactor Coolant Pump Operation" and verified zero speed switch indication has been included. This item is considered resolved.



Inspector's Comment - Operating Procedure #1102-01 "Plant Pre-startup Check" does not appear to cover plant heatup.

Licensee's Action - The licensee stated Procedure #1102-01 "Plant Heatup to 525°F" has been written and approved and that Plant Pre-startup Check is an enclosure to #1102-01.

Inspector's Comment - The inspector reviewed procedure #1102-01 and verified plant heatup to 525°F is contained within the procedure. This item is considered resolved.

#### 6. Current Procedure Review

The inspector reviewed the following procedures and identified deficiencies to the licensee. The inspector's comments and licensee's responses are as follows:

a. Emergency Procedure #1202-1 "Load Rejection".

Inspector's Comment - The inspector stated the follow up action step 1 states, "Observe makeup, letdown and spray flow, initiate manual control if necessary to control pressurizer level and pressure". The inspector questions the ability of the operator to perform the above tasks without further guidance or direction. Specific values for flows should be stated, and if incorrect, operator actions should be included to restore flows to acceptable values. If the operator is required to control levels and pressures, the procedure should include instructions as to how he is to accomplish the required task.

Licensee's Response - The licensee agreed to revise procedure #1202-1 "Load Rejection" to incorporate the inspector's comments.

b. Emergency Procedure #1202-4 "Reactor Trip".

The inspector stated that all reactor trips should be listed in the symptoms section.

Manual Action states, "monitor and control if necessary, the following:

- pressurizer/makeup tank level
- reactor coolant pressure
- reactor coolant flow
- reactor coolant temperature

- main steam pressure
- steam generator level and feed flow

The procedure lacks sufficient direction and guidance for the operator to control these parameters. Detailed instructions should be incorporated in conjunction with specified values.

Licensee's Response - The licensee agreed to review all procedures with respect to the context of the inspector's remarks.

Inspector's Comment - The inspector stated a review of selected procedures to verify inclusion of the inspector's comments will be performed on a subsequent inspection.

- c. Maintenance Procedure #1401.1.1 "Reactor Coolant Pump Seal Removal and Replacement".
- d. Maintenance Procedure #1401-1.2 "Reactor Coolant Pump Internals Removal".
- e. Maintenance Procedure #1401-2.3 "Pressurizer Heater Replacement".
- f. Maintenance Procedure #1401-4.4 "Removal and Replacement of OTSG Manways".
- g. Maintenance Procedure #1401-4.3 "OTSG Orifice Plate Adjustment".

Inspector's Comment - The inspector's review of the above maintenance procedures indicated apparent inadequacies in the performance section. The above procedures lack a step-by-step procedure for performing the maintenance task.

Licensee's Response - The licensee agreed to revise the identified maintenance procedures and include a step-by-step procedure.

#### 7. Training Program

A review of the Three Mile Island Unit 1 training program pursuant to pertinent requirements contained in the FSAR, Chapter 12, Technical Specifications, Section 6, and ANSI N18.1, resulted in findings as follows:

a. Senior Reactor Operator Training Program

(1) Course outlines and schedules contain each segment of the training program including subject matter content, course duration, time devoted to each aspect of training, on-the-job training, and simulator training.

(a) SRO candidates have received the following formalized training.

- Supervisor training program conducted at Penn State Research Reactor Facility - 12 weeks
- Observation and on-the-job training at Saxton (PWR Reactor Facility - 24 weeks)
- PWR Technology course conducted by B&W at Lynchburg, Virginia - 8 weeks
- Lecture series on plant systems, instrument and operations given by shift supervisors and supplemented by NUS video tapes
- Simulator Training by B & W

(b) On-the-job training

- SRO candidates have participated in startup and operation at other nuclear power plant facilities.
- SRO candidates are performing system check offs, writing operating procedures and conducting review seminars for the control room operators. As site construction progresses, SRO candidates will actively participate in the startup program
- Written and oral plant walk-through exams administered by the shift supervisors

(c) Training program effectiveness is evaluated by the following methods:

- weekly exams
- daily quizzes
- oral exams
- audits of training sessions by the training supervisor and assistant plant superintendent
- reports on individuals progress to the training supervisor

- (d) The station engineer is assigned the responsibility for the conduct and administration of the Senior Reactor Operator, Control Operator and auxiliary operators training programs. A training specialist has been assigned to assist the station engineer in these duties.

b. Control Operator Training Program

- (1) Documentation of a formal training program for control operators is provided by a course outline and schedule containing specific subject matter taught, course duration, length of time devoted to each aspect of training and on-the-job training.
  - (a) A formalized classroom training program is in progress for control operators comprising 48 weeks of training in mathematics, health physics, nuclear theory and technology, instrumentation, systems and components.
  - (b) Instruction is provided by staff personnel supplemented by a series of video tapes from Nuclear Utilities Corporation (NUS).
  - (c) On-the-job training is provided consisting of system checkouts, emphasizing theory and operation with sign-offs by shift foreman, plant walk throughs and oral exams conducted by the station engineer, operations supervisor and the nuclear engineer.
  - (d) An audit team from General Physics Corporation are providing written and oral plant walk through exams, closely paralleling current AEC licensing exams both in format and depth of knowledge.
  - (e) Prior to hot operations, a comprehensive review will be conducted consisting of written, oral exams and plant walk throughs in preparation for AEC licensing exams.
- (2) Evaluation of training program effectiveness is provided by the following:

- (a) oral and written exams
- (b) training specialist performs audits of training sessions
- (c) General Physics Corporation provides individual evaluations
- (d) periodic audits by training supervisor and assistant plant superintendent
- (e) evaluation reports from instructors to training specialist

c. Auxilliary Operator Training Program

- (1) Formal training for auxilliary operators is identical to training for control operators described above.
- (2) Additional training in Health Physics will be given to auxilliary operators.
- (3) On the job training closely parallels control operator training with more emphasis on balance of plant systems.

d. Maintenance Department Training

- (1) A curriculum has been established for the maintenance department including a course outline containing subject matter content, course duration, classroom training and on-the-job training
- (2) Electrical formal training consists of 9 weeks comprising audio visual slide tape presentations in basic power plant terminology and concepts, electrical theory, maintenance of power equipment, A.C. power components. Classroom lecture series on safety and tagging procedures, plant familiarization of systems, components and instrumentation.
- (3) On-the-job training consists of 140 hours of vendor demonstrations of various equipment and participation in plant pre-startup testing.
- (4) Mechanical formal training consists of 60 hours of audio visual slide tape presentations or power plant terminology and concepts, equipment theory and operation and fluid systems maintenance. Classroom lecture series of 75 hours on plant

design features, safety and tagging procedures.

- (5) On-the-job training consists of 240 hours in vendor demonstrations on welding and various components, and 52 weeks with the General Public Utilities start-up and testing.
- (6) Instrumentation technician training consists of video tape presentations on Bailey Instrumentation, supplemented by live instruction in plant design features, theory and participation in TMI operator training course.
- (7) On-the-job training is provided by vendor courses and participation in startup program.
- (8) All maintenance department personnel are given Health Physics training.
- (9) Conduct and administration of the Maintenance Department Training is the responsibility of the Supervisor of Maintenance.

e. Training Records

Individual training profiles are maintained on each man for all Metropolitan Edison personnel by the training specialist and contain the following information:

- (1) Education - formal academic and technical
- (2) Military Training - job related
- (3) Previous work experience
- (4) Licenses held
- (5) Job Related Training - formal programs attended, dates and length of time devoted, both on and off site programs.
- (6) On-the-job training or experience.

Deficiencies in the training records identified by the inspector's review and licensee's responses are as follows:

Inspector's Comment - The inspector stated review of the foreman's individual training records by comparison indicate inconsistencies with the master training record maintained by the training specialist.

Licensee's Response - The licensee stated he was aware of this discrepancy and that an audit is presently being performed by supervisor to alleviate any inconsistencies between their records and the master record.

Inspector's Comment - The inspector stated review of the training records indicated, in some instances, omissions of individuals duration of time devoted to a particular aspect of training.

Licensee's Response - The licensee stated he would review each mans record and agreed to include time devoted to each aspect of training received.

Inspector's Comment - The inspector stated the on-the-job training documentation is too generalized and lacking in specific training received.

Licensee's Response - The licensee concurred with the inspector's comment and agreed to be more definitive in the area of on-the-job training.

Inspector's Comment - The inspector informed the licensee the Three Mile Island Training Program based on the inspector's findings of this inspection, appear to be adequate; there are no further questions in this area at this time.

#### 8. Review and Approval of Facility Procedures

Inspector's Comment - The inspector stated Three Mile Island's administrative procedure #1001 "Control of Operating, Emergency, Maintenance and Surveillance Procedures", is in conflict with the requirements for final approval of facility procedures as stated in Chapter 12 of the FSAR and Section 6 of the Technical Specifications. Administrative procedure #1001 states final approval and implementation can be made by signature of either the plant superintendent or the assistant plant superintendent. The FSAR and proposed Technical Specifications state plant superintendent approval only.

Licensee's Comment - The licensee stated the assistant plant superintendent will have the authority for final approval of plant procedures. He further stated if this is in nonconformance with the FSAR and Technical Specifications, consideration will be given for amendment of these documents.

Inspector's Response - The inspector stated that the plant superintendent is responsible for the safety of the plant, which includes approval responsibility of safety related procedures; if this authority is to be delegated, it should be so stated in the FSAR and Technical Specifications. This item is considered unresolved and will be examined in a subsequent inspection.

The inspector inquired as to the licensee's intentions for review of safety related procedures by the off-site review committee.

Licensee's Comment - The licensee stated the General Office Review Board will provide an independent review of selected procedures and provide comments if applicable to the plant staff of Metropolitan Edison Company.

Inspector's Comment - There are no further questions in this area at the present time.