U. S. NUCLEAR REGULATORY COMMISSION

Report No. 50-289/82-17

Docket No. 50-289

License No. DPR-50 Priority -- Category C

Licensee: General Public Utilities Nuclear Corporation

P. O. Box 480

Middletown, Pa. 17057

Facility Name: Three Mile Island, Unit #1

Inspection At: Middletown, Pa.

Inspection Conducted: September 8-10 and October 4-8, 1982

Inspectors: C Petrone 11/15/82
C. Petrone, Reactor Inspector date

S R D 11/15/82
S. Richards, Reactor Inspector date

D. Tondi, Section Leader, HFEB, NRR
date

R. Ramirez, Sr. Human Factors Engineer, HFEB, NRC
date

D. Serig, Engineering Psychologist, HFEB, NRR
date

Approved by: H S Bettenhausen 11/17/82
L. H. Bettenhausen, Chief, Test Program Section date

Inspection Summary:
Inspection on September 8-10, 1982 and October 4-8, 1982 (Report No. 50-289/82-17)
Areas Inspected; Routine announced inspection of actions taken to resolve deficiencies identified in NUREG-0752, "Control Room Design Review Report for TMI-1". The inspection involved 94 inspection hours by two region based inspectors, and 30 inspection hours by three Human Factors Engineering Branch personnel.

Results: No violations were identified.

DETAILS

A. PERSONS CONTACTED

Licensee Personnel

+* R. Toole, Operations and Maintenance Director, TMI-1
+ P. S. Walsh, Manager of Plant Analysis (GPU)
* C. Stephenson, Licensing Engineer, TMI-1
H. R. Morris, TMI M&C Engineer
T. Falkner, M&C, PES, Manager
D. Deiter, Quality Assurance
E. Krealling, Startup Engineer, TMI-1
D. McGettrick, Plant Engineer
I. Porter, Supervisor, Startup and Test, TMI-1
J. Sipe, I&C Foreman
* H. F. Hansen, Procedure Coordinator, TMI-1
* M. A. Nelson, PRG Chairman, TMI-1
* C. L. Incorvati, Lead QA Auditor, GPUN
L. Noll, Shift Supervisor, TMI-1
H. Olive, Shift Foreman, TMI-1
I. Feinberg, Project Engineer, GPUN
P. Simon, Human Factors Engineer, GPUN
J. Herman, Shift Supervisor, TMI-1
C. W. Smythe, Licensing Supervisor, TMI-1
S. C. Newton, Operator Training Manager

NRC Personnel

+* R. J. Conte, Senior Resident Inspector, TMI-1
* F. Young, Resident Inspector, TMI-1
+ D. Tondi, Human Factors Engineering Branch (HFEB), NRR
+ D. I. Serig, HFEB, NRR
+ R. Ramirez, HFEB, NRR
A. Fasano, TMI Resident Section Chief
* G. Meyer, Reactor Inspector, Region I
* E. T. Shaub, Reactor Inspector, Region I
* N. J. Blumberg, Reactor Inspecctor, Region I

+ Identifies those present at the Exit Meeting on 9/10/82.
* Identifies those present at the Exit Meeting on 10/8/82.

B. NUREG-0752 CONTROL ROOM DESIGN REVIEW

The Human Factors Engineering Branch (HFEB), NRR, conducted a human factors review of the TMI-1 control room design from July 21 to July 25, 1980. They performed a detailed inspection of the control panels, interviewed operators, and observed and videotaped operators as they walked through selected emergency procedures. The results of this review were published in NUREG-0752, "Control Room Design Review Report for TMI-1", December 1980, and in NUREG-0752 Supplement No. 1, April 1981.

NUREG-0752 identified human factors design deficiencies which require correction prior to restart and others which needed further analysis to determine a permanent or optimum solution. Those deficiencies which require further analysis will be addressed by the licensee in a Detailed Control Room Design Review (DCRDR) required by Item I.D.1 of NUREG-0737.

An inspection was performed to verify that those "Deficiencies To Be Corrected Prior to Restart" identified in NUREG-0752 had been satisfactorily resolved. On September 8-10, 1982, three members of the Human Factors Engineering Branch and one region based inspector performed an item-by-item review of those deficiencies to be corrected prior to restart. This was accomplished by a tour of the control room and other areas of the plant to determine if the discrepancies had been corrected in accordance with NUREG-0752. It was determined that nearly all the items had been resolved satisfactorily for restart. On October 4-8, 1982 two region-based inspectors returned to TMI-1 to follow up the remaining restart items and to perform a detailed review of the procedure changes and modification packages associated with the changes and modifications performed to satisfy NUREG-0752.

The results of this inspection are detailed below for each NUREG-0752 item. The "inspectors" referred to in the following paragraphs include both region based inspectors and HFEB specialists from NRR.

The numbering of each of the items below follow the listing in NUREG-0752 of "Deficiencies to be Corrected Prior to Restart". The first paragraph of each item re-states or paraphrases the NUREG-0752 requirement. The remaining paragraph(s) discuss the licensee's proposed or completed corrective action, and the extent of the inspector's review.

1.0 Annunciators and Alarms

a. The licensee's system lacks a separate acknowledge/silence control and permits operators to acknowledge alarms without reading alarm windows.

The licensee is evaluating an alarm system with a separate acknowledge and silence control which would permit saving the flashing tiles (last alarm received) for diagnostic purposes. The evaluation and final resolution of the alarm system deficiencies will be addressed in the licensee's Detailed Control Room Design Review, (DCRDR), TMI Action Plan (TAP) I.B.1, I.B.2. In the interim, the licensee has revised administrative procedure AP-1029 to require operators to review and understand the significance of each alarm and flashing tile before acknowledging (silencing) the alarm. Based on a review of this procedure and discussions with licensed reactor operators, this item is satisfactorily resolved for restart.

b. There is minimal annunciator prioritization. Some blue markings on (ESAF) alarm tiles are not readily identifiable.

The licensee has reviewed each alarm for importance and the response required for each. The window tiles for the important safety alarms have been color coded. In addition, the tiles associated with the ESAS, which had blue colored corners, were changed to tiles with blue borders and red backlighting. The inspectors verified that these tiles are now easily identifiable as ESAS alarm tiles.

This item is satisfactorily resolved.

c. Some annunciator tiles have busy legends.

Safety significant window tiles with crowded legends and small print font will be replaced.

The licensee replaced or reprinted the legends on all the safety significant window annunciator tiles and or many of the non-safety significant annunciator tiles. The inspectors observed that the annunciator tiles were much improved.

This item is satisfactorily resolved.

2.0 Process Computer

a. The CRT display was of poor quality and could increase the probability of reading error.

The inspectors observed that a new CRT display system had been installed in the control room. The new display is a significant improvement over the previous CRT display. The inspectors also reviewed selected portions of modification package RM-7, "Computer High Speed Printers and CRT Display", and identified no discrepancies.

This is resolved satisfactorily for restart. However, the licensee is required to address the standarization of color codes used on the CRT displays in its DCRDR (TAP I.D.1).

b. The process computer capability is limited and its vintage raises the question of reliability of information presented to operators.

The inspectors verified that the licensee has installed a new process computer and a high speed printer. The licensees representatives stated that all computer hardware had been

installed and that approximately 95% of the new computer's functions were operational. This computer will be used to supplement the existing Bailey computer during the next operating cycle.

This item is satisfactorily resolved.

3.0 Controls (General)

a. A number of controls (J handle, etc.) located near the front edge of the operating console could be inadvertently activated.

The front edges of these operating consoles have been extended; the controls are now approximately 6" back from the front edge of the operating consoles, meeting NUREG 0700 "Guidelines for Control Room Design Reviews".

This item is satisfactorily resolved.

b. Set point knobs on Bailey controllers do not lock, and can be accidently rotated.

The licensee now emphasizes the need to frequently check controller set point knob settings during operator training and retraining. The inspector verified that these instructions had been added to the training plan.

This item is satisfactory for restart. However the licensee is required to address this item further in its DCRDR.

c. Plant convention is violated for auto/manual positions on some multiple position rotary controls (Sync. Scope and Voltage Regulator).

The licensee has implemented an improved labeling program to compensate for problems associated with violation of convention concerning multiple position rotary controls. The inspectors verified that these new labels were installed and that the licensee has established a program to reattach any labels that might come loose.

This item is satisfactorily resolved.

d. Legend switch covers are interchangeable.

The licensee has moved the switch identifying information from the switch covers and placed it on the control panel next to the switch. Only information such as ON, OFF, OPEN, CLOSED, etc. is now placed on these switch covers.

This item is satisfactorily resolved for restart. However, the licensee is required to address this item further in its DCRDR (TAP I.D.1, I.D.2.).

e. Legend indicators contain numerous burned out bulbs.

The inspectors verified that bulbs which are normally lit are checked by each shift as required by the Control Room Operators Log Sheets.

For those bulbs which are not normally lit in the Engineered Safeguards (ES) and Emergency Feedwater (EFW) Systems, surveillance procedures are being modified to check indicator light bulbs when the status of the component is changed during testing. The licensee has committed to revise these ES/EFW System Surveillance Procedures prior to Restart. These procedures are tracked by the licensee as code number 41 in the licensee "Procedure Commitments For TMI-1 Restart" and include procedures 1300-3A through 3K, 3M, and 1303-4.11, 4.13, 4.14, 4.16, 4.18, 4.19, 5.1, 5.2, 11.9, 11.10, and 11.11. Completion of these procedure revisions is an Unresolved Item (289/82-17-01).

The licensee has also committed to modify technical specification surveillance procedures for other systems during their biannual (e.g., every two years) procedure review. The inspectors reviewed AP 1001K, "Periodic Review of Procedures", and verified that it had been revised to require that each surveillance procedure include provisions for checking indicator lights. These surveillance procedures (other than ES and EFW) will be revised during the biannual reviews.

Except for revising ES/EFW procedures, this item is resolved satisfactorily for restart. However, the licensee is required to investigate systems and techniques for effective communication of indicator and display lamp status information to operators, where "push to test" lamp status information is not already available, and report its findings and proposals in its DCRDR. (TAP I.D.1, I.D.2)

f. Many illuminated legend switches are difficult to read.

The inspectors verified that improved labeling had been installed to lessen the operator's dependence on information contained on illuminated legends. Illuminated legends important to safety, which were difficult to read, were replaced.

This item is satisfactorily resolved.

g. Bailey controllers indicate demand signal rather than valve position.

The licensee now emphasizes during operator training and retraining that controller indicators display the controller demand signal, rather than actual valve position. The inspectors verified this by review of the revised training lesson plan. In addition, the licensee has improved labeling of the controllers, the meter selector switches, and certain controller meter scales.

The inspectors also verified that the licensee has installed emergency feedwater flowmeters in the immediate vicinity of the controllers, and near the backup manual controllers.

During a previous inspection (289/82-03), the inspector reviewed Modification Task RM-13D, Emergency Feedwater (Alternate Manual Control), including the associated documentation, and determined that this task had been completed satisfactorily.

The inspectors reviewed selected portions of modification task PM-10; Emergency Feedwater Console CC "Human Factors Improvement," including SECM 300, which replaced the existing front section of console CC consisting of emergency feedwater controls and displays. The inspectors reviewed the package for technical adequacy and completion of required verification signoffs and data entries. This review included the following:

-- Safety evaluation,
-- Welding engineering work package,
-- QC final acceptance inspection records,
-- AS-Installed drawings,
-- TIE-IN sequence documents,
-- Work Authorization Notice, and
-- Component Operational Check TP 250/2.1.

No deficiencies were identified during the review of PM-10.

This item is satisfactorily resolved.

4.0 Displays (General)

a. Panel legend lights do not provide positive status indication because of poor contrast with panel background. The inspectors verified that panel legend lights have been adjusted or replaced to provide consistency of illumination and improve contrast with the panel background. Certain green colored tiles were also replaced to improve contrast.

This item is satisfactorily resolved.

b. Glare is present on all vertical indicators resulting in reduced readability.

The licensee installed light baffles and new label plates where necessary. The inspectors verified that these steps have satisfactorily corrected the glare problem.

This item is satisfactorily resolved.

c. Normal operating ranges or set points are not indicated on vertical meters.

The inspectors verified that the licensee had modified these meters to indicate normal operating ranges or set points. The licensees representative stated that all meters (including safety-related and non-safety-related) were reviewed and normal operating ranges or set points were indicated on those meters whose range or set point could be identified.

This item is satisfactorily resolved.

d. Most meters fail at mid-scale position (and therefore could go unnoticed).

The inspectors verified that a system of annunciators and indicators of signal upsets in the power supplies to the ICS and NNI control systems have been installed. In addition, distinctive marks have been placed on instruments to identify the mid-scale point and assist operators in identifying instrument failures.

This item is satisfactorily resolved.

e. For some motor-driven valves, an open circuit breaker inhibits valve position indication because indicators are powered from the same bus; when the breaker opens power is lost to the valve position indicator as well as the motor-driven valve operator.

The inspectors verified that a second independently powered position indication circuit is provided for ESAS valves to show valve position after the circuit breaker for a particular motor-driven valve is tripped.

This item is satisfactorily resolved.

f. Backlighted legends are difficult to read. Room lighting is dim, contrast is minimal, lettering is crowded and busy, and discoloration on scratched surfaces is frequent.

Same requirement as for Item 3.f.

This item is satisfactorily resolved.

g. No lamp test capability on control boards or panels.

Same requirement as for Item 3.e.

This item is satisfactorily resolved.

5.0 Labeling (General)

a. Color meaning is not consistent.

The inspectors observed that the licensee has established a color code for labels and system mimics.

This item is satisfactorily resolved for restart. However, the licensee is required to address this item further in its DCRDR (TAP I.D.1, I.D.2).

b. In general, labels are used only at the component level, not at the group, function, system, or panel level.

The inspectors verified that the licensee has established and implemented a hierarchial system of labeling.

This item is satisfactorily resolved.

c. The use of color labels is not consistent, for example, black/white background and print.

Same requirement as for Item 5.a.

This item is satisfactorily resolved.

d. Makeshift labeling was observed on many components including pencilled-on switch nomenclature, hand lettered labels and vertical meter scale values, and the use of dymo tape.

The inspectors verified that all of the makeshift labels had been replaced with permanent label plates that have consistent color coding and letter size.

This item is satisfactorily resolved.

e. Labels are not all permanently attached.

The inspectors verified that all temporary labels has been replaced by permanently attached labels.

This item is satisfactorily resolved.

f. Little or no use of demarcation lines to separate systems, subsystems, functional grouping, etc.

The inspectors verified that demarcation lines had been added to panels to separate controls and displays by system and functional grouping.

This item is satisfactorily resolved.

g. Labels are wordy, because the function of a system is repeated on each switch of a group.

The inspectors verified that the licensee had implemented a hierarchial system of labeling as noted in 5.a and had improved labeling to provide operators with clear, readable labels.

This item is satisfactorily resolved.

6.0 Control Display Relationship

6.1 General

Related controls and displays do not consistently have both nomenclature and component designation.

The inspectors observed that the licensee had changed nomenclature and component designations making them consistent for related components.

This item is satisfactorily resolved.

6.2 Makeup and Purification System

a. Makeup pumps are not grouped together.

The inspectors observed that the labeling and demarcation had been improved and that the relationships between the two control display segments are clearly distinguishable.

This item is satisfactorily resolved.

b. Lacks positive indication of flow when makeup pump is running in the makeup mode. Individual makeup pump flow indication is not provided. However, an indication of total makeup pump flow is provided.

The inspectors verified that the licensee had changed its lesson plan to include instructions for the operators to observe flow transients when a makeup pump is started.

This item is satisfactorily resolved.

c. It is impossible to verify a required reading of 3 gpm flow on the RC Makeup Flow Meter which has Scale Values of 0 to 16 (x10).

The required reading of 3 gpm from the makeup system operating procedure is accomplished locally on a meter which has a scale of 0 to 4 gpm. The inspectors verified that operations procedure 1104-2, "Makeup and Purification System Operating Procedures", Rev 36, had been revised to clarify that the 3 gpm reading is adjusted locally. The inspectors also verified that the RC Makeup Flow Meter had been relabeled to correct the scale value, and that the "Makeup and Purification System" lesson plan had been revised to instruct operators to observe flow transients when starting a makeup pump. This review closes out a previous oustanding item (IFI 289/81-33-02).

This item is satisfactorily resolved.

d. Letdown flow meter is in gpm while scale on controller is in percent and must be converted before setting.

The conversion between flow rate and valve position is not important because the operator will adjust valve position based on the flow meter reading to achieve desired flow rates rather than by adjusting for valve position. Therefore, this is not now considered a deficiency.

e. There is no Engineered Safeguards/Safety Injection annunciator window.

The Engineered Safeguards System activation was indicated by a mislabeled alarm window. The inspectors verified that this annunciator window had been replaced with one more appropriately labeled.

This item is satisfactorily resolved.

f. Engineered Safeguards Actuation Panel has blue status lights which are difficult to interpret as being "on".

The ESAF planel blue status lighted windows were modified by the addition of an extra bulb to improve brightness and contrast. The inspectors observed that the status of these lights was no longer difficult to determine.

This item is satisfactorily resolved.

g. Valve positions (containment isolation) at the bottom of Engineered Safeguards Actuation Panel cannot be seen from the main console. There appeared to be no color sequence or pattern to help check which valves should be opened or closed.

Valve position indications at the bottom of the FSAF panel are repeated on the upper ESAF panel section and therefore are not required to be read by an operator in front of the operator's console. The blue/yellow indicator lights used on the upper panel provide the operator information that is needed to determine whether the Engineered Safeguards positions are achieved. Therefore, this is not now considered a deficiency.

h. The DHR temperature and DHR cooler temperature indicators are side by side but have different scale multipliers.

The inspectors verified that the meter scales for these temperature indicators were now consistent.

This item is satisfactarily resolved.

i. DHV - 5, 6, 7 valve controls are not included in the mimic.

The inspectors verified that a new mimic had been completed which included these valve controls.

This item is satisfactarily resolved.

6.3 HVAC System

a. No separation or demarcation of grouped J Handle control switches (9 in a row).

The inspectors verified that new demarcation bins and labels had been used to functionally group controls and displays associated with control room ventilation.

This item is satisfactorily resolved for restart; however the licensee will address labeling and demarcation of the remaining HVAC system controls in its DCRDR.

b. Labeling does not contain information which indicates time required for depressing and holding the manual fan start control to start a fan (varies by fan, 30 to 90 sec.).

The inspectors verified that labels have been installed to instruct operators to depress and hold fan start buttons the required amount of time (until the red light lights).

This item is satisfactorily resolved.

7.0 Sound Levels

a. The IBM-Selectric printer is 65 dbA while typing. This level is 5 to 6 dbA above ambient and 4 to 5 dbA above most alarm levels.

The process computer printers have been replaced with units which are approximately 8 dbA quieter than the original printers. Therefore, this item is no longer considered a deficiency.

b. Main control board alarm is below ambient noise level.

c. Panel Left (PL) alarm is only 1 dbA above ambient noise level.

d. Right Panel Front (RPF) alarm is only 1 dbA above ambient noise level.

e. Liquid Waste System alarm is below the ambient noise level.

The licensee replaced these alarms with new alarms that are louder and that have distinctive sounds. The inspectors verified that these new alarms could be heard easily above the ambient noise.

These items are satisfactorily resolved.

8.0 Other Observations

a. Diesel Generator Governor has no indication on the J-handle switch for fast/slow speed control; this is inconsistent with other speed controls.

The inspectors verified that the yellow indicator lights which indicate "idle" and "high" speeds had been changed to white indicator lights and that new labels had been added which contain the speed control information.

This item is satisfactorily resolved.

b. The Decay Heat Removal (DHR) System controls for loop A and B were not associated with their displays which are located approximately 8 feet away.

The inspectors verified that these controls had been relabeled for clarity.

This item is satisfactarily resolved.

d. Discrimination between systems and subsystems is difficult because of lack of use of demarcation lines and color coding.

The inspectors verified that demarcation lines had been added to all systems and panels to aid in discriminating between systems and subsystems. The use of color coding was limited because in some cases it tended to make the display too busy.

This item is satisfactorily resolved.

e. Auxiliary Feedwater system lacks a flow meter.

A flow meter for the auxiliary feedwater system has been installed. Details are listed in item 3 g.

This item is satisfactorily resolved.

f. Control/Display arrangements for the Integrated Control System (ICS) (e.g. feedwater, steam generator level) are not apparent.

The inspectors verified that improved labeling and demarcating of the ICS controls had been added to clarify these controls and displays.

This item is satisfactorily resolved.

9.0 Remote Shutdown Panel (RSP)

a. The panel is not independent of the Control Room - all actions other than the starting and stopping of RC pumps are required to be performed in the control room and local areas of the plant.

A newly designed remote shutdown panel and a revised emergency procedure using the new panel for cooldown operation independent of the control room will be implemented. As indicated in Supplement 1 to NUREG 0752, Item 9.0.a, the existing remote shutdown panel and emergency operating procedures provide adequate remote shutdown capability for restart. However, the licensee has commited to implement a newly designed remote shutdown panel and revised emergency operating procedures by the end of the first refueling outage after restart. This is being tracked as an outstanding item (82-BC-37).

This item is satisfactorily resolved for restart.

b. Emergency lighting is not provided at this panel.

The inspectors verified that additional emergency lighting had been provided at the Remote Shutdown Panel. The inspectors also verified that these emergency lights provided sufficient illumination to read the meters and labels on the Remote Shutdown Panel. The inspectors reviewed selected portions of modification package PM-11 "Remote Shutdown Communication and Lighting" including ECM S-276, and identified no discrepancies.

This item is satisfactorily resolved.

c. Communication from the RSP is by sound powered microphone with no microphone/head set located in the area.

The inspectors verified that a headset is now located in the area. In addition a Redundant Communication System (Red Page Phone) is located next to the Remote Shutdown Panel. The inspectors also reviewed Operations Surveillance OPS-548, "Cooldown from Outside the Control Room Readiness Surveillance" which is performed monthly to verify the operability of the Sound Powered Phone and the Red Page Phone systems. This procedure appeared to be technically adequate.

In addition to the Red Page Phone and Sound Powered Phone, a normal plant page phone is located at the Remote Shutdown Panel. The inspectors verified that this phone was operable. The inspectors also verified that the shift supervisor has a key for the Technical Support Center (located in the same room as the Remote Shutdown Panel). This key will allow the operators to use the telephones in the Technical Support Center if necessary.

This item is satisfactorily resolved.

d. No Scott air packs are provided at the RSP.

Scott air packs will not be needed in the RSP area during emergencies because habitability of the area is assured by the air recirculation system. Therefore, this item is not considered to be a deficiency.

However, during their review of AP-1053, Revision 4, the inspectors did note that the licensee maintains two SCBA's (self contained breathing apparatus) Scott air packs near the entrance to the RSP area.

This item is satisfactorily resolved.

10.0 Communications in the Control Room

a. Sound powered microphones/headsets are not readily available.

The inspectors verified that the sound powered microphones/headsets are now available in the control room and that the operators were aware of their location. In addition, the inspectors reviewed Operations Surveillance Procedures OPS-S48 and verified these sound powered microphones/headsets are tested during the performance of this monthly surveillance. The inspectors also verified that in the Replacement Operator Training Program Description, Appendix A, OJT Program, page A.5, step 5.15 had been added to require operators to locate and demonstrate the ability to operate all control room communications equipment.

This item is satisfactorily resolved.

b. There are weaknesses in the radio communications system when communicating with a technician outside the CR area.

The plant paging system will be used for in-plant communications; the two-way radios will not be used. However, the licensee is studying the overall communications system at TMI-1 to determine improvements that can be made and will report on its findings in the detailed control room design review report. (TAP I.B.1, I.B.2)

This item is resolved satisfactorily for restart.

c. There are some inoperable page telephones in the plant area. Some areas in the plant are not reachable by telephones.

The licensee has two page telephone systems. One is the plant page (gray) telephone system which is repaired by issuing work authorization requests. The other system is the Redundant Communication System (known as the Red Page Phone) which has telephones in the locations required for cooldown from outside the control room. This system is checked during performance of the monthly readiness surveillance OPS-S48. The plant paging system will be included in the in-plant communications study described in item 10.0.b.

This item is satisfactorily resolved for restart.

11.0 Operator Emergency Equipment

Three Scott Air Packs are kept in the CR; however, during emergency operations, eleven people are planned to be in the CR.

Scott Air Packs are not required for operator use in the control room. Habitability of the control room is assured during emergency conditions by the control room air recirculation system. However, the units kept in the control room will be available for use by operators in the control room if needed.

The inspectors verified that administrative procedure AP-1053 now requires five Scott Air Packs to be maintained in the control room and another twenty-six Scott Air Packs in other strategic areas of the plant. These are checked monthly and after each use.

This item is satisfactorily resolved. (TAP III.D.3.4.2, Control Room Habitability Mods)

12.0 Emergency Procedures

a. Immediate action steps in some procedures are too detailed and some require an excessive number of steps to be completed immediately.

b. Some immediate action steps which require two operators to implement are not so noted.

c. Some procedures have "notes" which are actually immediate action steps.

d. Some procedures reference control and display labels which have functions different from the functions actually used on the labels.

These items were not reviewed during this inspection. They had been previously addressed as TMI Action Plan (TAP) I.C.7, Nuclear Steam System Supplier (NSSS) vendor review of procedures and TAP I.C.8, Pilot Monitoring of Selected Emergency Procedures for NTOL's.

TAP I.C.7 had been reviewed and closed during inspection 50-289/82-16. (289/82-BC-60.). TAP I.C.8 was addressed in a letter from J. F. Stolz (NRR) to H. D. Hukill (MET.ED) dated April 22, 1981. This letter transmitted a Safety Evaluation Report (SER) which stated that the NRC staff had reviewed 35 plant operating procedures, including 10 emergency procedures, and concluded that additional staff review of a few selected emergency procedures had been judged to provide no significant improvement to safety. The NRC staff concluded that no further effort was required under this item.

Based on these prior reviews, this item is considered resolved satisfactorily for restart.

13.0 Lighting

a. Normal and emergency lighting was not specifically designed for reading labels, displays and meters, i.e., problems with contrast, glare and illumination levels.

b. Direct glare from overhead lights on both controls and displays make readability difficult.

The inspectors verified that the changes in lighting made by the licensee resulted in normal and emergency lighting levels that were acceptable for reading labels, displays, and meters.

These items (a and b) are satisfactorily resolved.

c. No lighted exit sign in the control room.

A lighted exit sign is not needed in the control room because the control room will be illuminated for all anticipated situations. Therefore, this item is not considered to be a deficiency.

14.0 General Comments

a. No formal system exists for providing operators feedback about suggestions made.

The licensee has a formal system by which operators receive feedback on suggestions made through the operator's filing of a GPU Problem Report. Therefore this item is not considered to be a deficiency.

b. Sub-cooling instrumentation is not in place and operating.

Sub-cooling margin instrumentation and displays will be installed and operating.

The inspector reviewed the licensee's implementation of Task LM-1, "Tsat Meter, Indicator, and Alarm". This task provided for the installation of circuitry which computes the temperature margin to a saturated condition for each reactor coolant loop hot leg and supplies this data to an alarm indication, to a visual control room indication, and to the plant computer. Task LM-1 did not provide for the installation of any temperature or pressure detectors to provide input to the Tsat instrumentation. The documents associated with this task, reviewed by the inspector, included Engineering Change Memoranda, Inter-Office Memoranda, Anchor Installation Documents, Engineering Change Notices, Field Change Requests, Quality Control Inspection Reports and Material Nonconformance Reports, Cable Pulling and Termination

Slips, As-Built Drawings, Electrical Test and Calibration Packages, and the Task Turnover Package. The inspector also discussed the task implementation with cognizant licensee personnel and visually examined the completed installation in the applicable areas of the control tower.

The inspector reviewed Surveillance Procedure (SP) 1302-6.6, Saturation Margin Channel Calibration, and determined that the input voltages used to simulate the temperatures specified on data sheets 12 and 13 were incorrect voltages for the temperatures listed. Discussions with licensee personnel revealed that an additional error in section 8.3 of procedure SP 1302-6.6 would prevent accurate calibration because the procedure does not properly address test signals for both temperature inputs to the instrumentation. Licensee personnel stated that the procedure would be revised in conjunction with the completion of task LM-38, Remote Shutdown Panel Installation, which interfaces with task LM-1. The inspector reviewed the initial calibration procedure used for task LM-38 to calibrate the Tsat instrumentation and observed that the procedure did not contain the errors noted in SP 1302-6.6. This item is unresolved pending NRC review of SP 1302-6.6 after completion of task LM-38 (289/82-17-02).

The inspector had no further questions concerning task LM-1. NRC review of task LM-1 is considered complete and Outstanding Item (50-289/82-BC-29) is closed.

c. In-core thermocouples have been connected to the process computer, a monitoring program (software) has been written, and the system is in the checkout process. The applicant's system contains 52 in-core thermocouples with a readout range up to $2300^{o}F$. Thermocouple information will be displayed on the Bailey computer console by use of a CRT and hard copy printed on demand. A backup system display with a capability for selective reading of a minimum of 16 operable thermocouples, 4 from each quadrant, all within a time interval no greater than 6 minutes, powered from a source independent of the process computer/CRTs will be required prior to restart.

Modification Package RM-4A, connection of in-core thermocouples to the process computer, had been reviewed during a previous inspection (289/82-14). No discrepancies were identified.

Modification Package RM-4B, installation of in-core thermocouple backup display system, was reviewed during this inspection. This review included a sample of field questionnaires, work authorization notices, installation procedures, and QC inspection reports. However, the system is not fully installed; the review was limited to those documents complete at this time. This item is being tracked as outstanding item 82-BC-38 and will be reviewed prior to restart. (TAP II.f.2)

C. SUMMARY OF NUREG-0752 ITEMS:

With the exception of the outstanding items identified in items 3.0.e, 14.0.b and 14.0.c above (289/82-17-01; 289/82-17-02; 289/82-BC-38) those NUREG-0752 items required for restart have been satisfactorily resolved. The completion of this review also closes outstanding item 82-BC-58. Remaining open items will be tracked individually as noted in the paragraphs above.

D. UNRESOLVED ITEMS

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Three unresolved items are discussed in paragraph B: items 3.0.e, 14.0.b and 14.0.c.

E. EXIT INTERVIEW

The scope and findings of this inspection were presented to those persons identified in paragraph 1.0 at meetings held on September 9, 1982 and October 8, 1982.