



GPU Nuclear, Inc.
Route 441 South
Post Office Box 480
Middletown, PA 17057-0480
Tel 717-944-7621

October 29, 1999

1920 - 99 - 20550

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Dear Sir:

Subject: Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
LER No. 99-003-01, "Discovery of a Condition Outside the UFSAR Design
Basis for Control Room Habitability"

This letter transmits a Supplement 01 to Licensee Event Report (LER) No. 99-003, regarding the discovery of a condition considered to be outside the design basis of the Updated FSAR for Control Room Habitability. For a complete description of the evaluated condition, refer to the text of the report provided on Form 366A.

This condition did not adversely affect the health and safety of the public. For additional information regarding this LER contact Mr. Gregory M. Gurican of the TMI Nuclear Safety & Licensing Department at (717) 948-8753.

Sincerely,

A handwritten signature in black ink, appearing to read "James W. Langenbach". The signature is fluid and cursive.

James W. Langenbach
Vice President and Director, TMI

JWL/gmg

cc: TMI Senior Resident Inspector
Administrator, Region I
TMI-1 Senior Project Manager
File No. 99066

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)

Three Mile Island, Unit 1

DOCKET NUMBER (2)

05000289

PAGE (3)

1 OF 10

TITLE (4)

"Discovery of a Condition Outside the UFSAR Design Basis for Control Room Habitability"

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|--|-----|------|----------------|--------------------|-----------------|-------------------|-----|------------------|-------------------------------|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 03 | 10 | 99 | 99 | - 003 | -- 01 | 10 | 29 | 99 | | 05000 |
| <p>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)</p> | | | | | | | | | | |
| OPERATING MODE (9) | | N | | 20.2201(b) | | 20.2203(a)(2)(v) | | 50.73(a)(2)(i) | | 50.73(a)(2)(viii) |
| POWER LEVEL (10) | | 100 | | 20.2203(a)(1) | | 20.2203(a)(3)(i) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(x) |
| | | | | 20.2203(a)(2)(i) | | 20.2203(a)(3)(ii) | | 50.73(a)(2)(iii) | | 73.71 |
| | | | | 20.2203(a)(2)(ii) | | 20.2203(a)(4) | | 50.73(a)(2)(iv) | | X OTHER |
| | | | | 20.2203(a)(2)(iii) | | 50.36(c)(1) | | 50.73(a)(2)(v) | | Specify in Abstract below or in NRC Form 366A |
| | | | | 20.2203(a)(2)(iv) | | 50.36(c)(2) | | 50.73(a)(2)(vii) | | |

LICENSEE CONTACT FOR THIS LER (12)

NAME

Gregory M. Gurican, TMI Sr. II Licensing Engineer

TELEPHONE NUMBER (Include Area Code)

(717) 948-8753

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
|-------|--------|---------------|------------------|--------------------|-------|--------|-----------|--------------|--------------------|
| PM | HVAC | Damper D-1300 | Johnson Controls | | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

YES

(If yes, complete EXPECTED SUBMISSION DATE).

X NO

EXPECTED SUBMISSION DATE (15)

| MONTH | DAY | YEAR |
|-------|-----|------|
| | | |

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 10, 1999, the failure of a manual balancing damper in the supply duct of the Control Building Emergency Ventilation System (CBEVS) led GPU Nuclear (GPUN) Inc. to discover a condition which was outside UFSAR design basis. When the manual damper failed (in the closed position), a negative pressure was experienced in the Control Room (CR). The inability to meet the positive pressure requirement of the UFSAR design basis description is reportable in accordance with 10 CFR 50.73(a)(ii)(B). The TMI-1 UFSAR Section 7.4.5.2.1 states: "The main Control Room (CBE [Control Building Envelope] Elevation 355'-0") is a leak tight room maintained at a positive pressure of 0.10 inches w.g. by the CBEVS in the Emergency Recirculation mode of operation with or without single failure of Outside Air Intake Damper (OAI) AH-D-39, Exhaust Damper AH-D-37 and Damper AH-D-28." This failure of the manual damper simulated the potential single failure of AH-D-39 (an active damper 2 ft. downstream of the manual damper). The Technical Specification 3.15.1 required CR Emergency Air Treatment System remained operable on the basis that recirculation filters and fans were not affected by this equipment failure.

The CBEVS Normal and Abnormal Operating Procedures for initiation of emergency recirculation were changed in late 1985 to address a postulated failure of the isolation damper AH-D-28 and resultant negative pressures in the CBE. The procedure change established a new configuration which was not fully analyzed, tested, or reviewed for the potential creation of new single active failures; as a result, the single active failure of AH-D-39 was not recognized at that time. The root cause of the nonconformance with the UFSAR design basis was that the "Risk and Consequences of a Change were not Adequately Reviewed or Assessed" when the configuration change was implemented by procedure revision.

The cause and corrective actions of the failed manual air-balancing damper, which led to the discovery of the nonconforming condition, are included in this report. The failed damper was clamped open and normal outside airflow was restored to the Control Building shortly after discovery. This event did not involve any additional equipment failures or damage, nor were there any personal injuries as a result of this event. There were no adverse safety consequences resulting from this event, and the event did not affect the health and safety of the public.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
|---------------------------|------------|----------------|-------------------|-----------------|----------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Three Mile Island, Unit 1 | 05000289 | 99 | -- 003 -- | 01 | 2 OF 10 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

I. Plant Operating Conditions Before The Event:

TMI-1 was operating at 100% steady state power prior to and during the event described in this LER.

II. Status of Structures, Components, or Systems That Were Inoperable At The Start Of The Event And That Contributed To The Event:

None.

III. Event Description:

At approximately 1700 hours on March 10, 1999, the HVAC System Engineer was entering the Control Building through door #47 (separates the stairwell from the hallway to the Main Control Room). It was noticed that there was a negative pressure in the Control Building with respect to the stairwell. The System Engineer inspected the Control Building Ventilation System and found the Outside Air Intake control damper (AH-D-39) fully open as demanded, but a manually controlled balancing damper *[VI/DMP] located approximately 2 ft. upstream from AH-D-39 was failed closed (See attached Figure 1). This manual damper is 72" x 72" with connecting linkages from blade to blade. Two of the blades had broken linkages, so they were spinning in the duct. The rest of the blades (about 90% of the damper) were closed. The damper has two of the blade pins extending out through the duct, which have a handle with lock nut. But due to a loose setscrew the blade pins were no longer secured to the blades inside the duct, so turning the handles resulted in no blade movement.

During the investigation into the failed manual damper, the CR staff questioned the ability of the plant to meet the description of TMI-1 UFSAR Section 7.4.5.2.1, to maintain the CR at a positive pressure of 0.10 inches w.g. by the CBEVS "with or without a single failure of the outside air intake damper AH-D-39." The failed manual damper was judged to produce a similar effect as a failure of AH-D-39 in the closed position. At 1940 hours, the Plant Review Group (PRG) determined that TMI-1 was in a condition outside the design basis of the plant, and the NRC was notified at 1950 hours.

A Temporary Mechanical Modification (TMM #17) was installed to clamp open the balancing damper in a throttled position. With the damper in this position the Control Building Envelope was tested in its required configuration per plant operating procedures, and it was determined that the pressure differential from the Control Room to the stairwell outside door #47 was greater than +0.10 inches w.g. (+0.14 inches w.g.). Therefore, at 2330 hours on March 10, 1999 the ventilation system was confirmed to be in an operable status. However, the failure of the manual damper demonstrated that the CBEVS may not be capable of meeting the design basis as currently described in the UFSAR with the failure of AH-D-39, in the failed closed position. Repairs to a degraded control damper (AH-D-36) during the previous week to restore it to full design capability may have changed the Control Building Ventilation System balance and consequently increased the outside air flow through the supply duct. Since the manual damper is in a throttled position in the outside airflow path, this would have resulted in an increase in the linkage stress. Based on the damper design, the airflow tends to push the damper blades closed when the linkage is released. Considering the outside air demands during the prevailing weather conditions, the observed pressure change in the Control Room during the day of March 10, 1999 is believed to be the point in time where the linkage set screw released and the damper failed shut.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
|---------------------------|------------|----------------|-------------------|-----------------|----------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Three Mile Island, Unit 1 | 05000289 | 99 | -- 003 -- | 01 | 3 OF 10 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Furthermore, it is believed that the manual air-balancing damper failure condition existed for less than 24 hours based on CR Operator observations; however, without testing airflow and differential pressures (d/p) across the CR boundary doors this condition may have existed from the time that AH-D-36 had been repaired -- approximately one week earlier.

HISTORICAL INFORMATION:

- In November 1984 a Failure Modes & Effects Analysis (FMEA) was submitted to the NRC in response to NUREG-0737, TMI Task Action Plan Item III.D.3.4, "Control Room Habitability." The FMEA identified various potential single active damper failures and control room habitability testing was performed simulating these failure modes to determine the effects on positive pressure within the Control Building Envelope (CBE). The NRC criteria for the testing required that all areas of the CBE be maintained at a positive pressure of 0.10 inch water gauge or show that control room dose is within GDC-19 guidelines, as is re-stated in NRC SER dated December 23, 1985.
- During 1985, the single active failure which included AH-D-39 was the failure of the Gradual Position Switch (GPS). GPS failure results in AH-D-39 failed closed, AH-D-37 failed closed, and AH-D-36 failed open. In late 1985, and in meetings with the NRC Staff during 1986, the GPS was credited by allowing the operators to take manual action to reposition the control dampers from their emergency recirculation positions to a throttled open position in order to maintain the positive pressure requirement in the CR. The CBEVS Normal and Abnormal Operating procedures were changed in October 1985 to provide this operator guidance. Although the 1985 testing demonstrated that a positive pressure could not be maintained in all areas of the CBE, a positive pressure was maintained in the Control Room for all single failure modes considered at that time. The dose consequences were analyzed assuming a conservative in-leakage into all areas of the CBE and the results were within GDC-19 guidelines for this failure mode, i.e., failure of the GPS as well as the other single active failures identified in the FMEA.
- In 1986, GPU Nuclear concluded that no action was required to correct damper failures since the analyzed doses were well within the requirements of NUREG-0737 and GDC-19. However, GPU Nuclear had previously committed in 1985 to procedural controls which would set AH-D-39 to a pre-selected position, visual inspection of the dampers following initiation of emergency recirculation, and manual repositioning of dampers if necessary. The procedural changes implementing this new control configuration (throttled control dampers) however were not analyzed or tested for the effects on maintaining positive pressure in the Control Room to 0.10 inches w.g., as the single active failure of AH-D-39 failing to open on demand (remains closed) was not considered at that time.

IV. Identification of Root Cause:

The root cause of the nonconformance with the UFSAR design basis description was that the "Risk and consequences of a change were not adequately reviewed or assessed" [C10Cd], during the technical evaluation

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
|---------------------------|------------|----------------|-------------------|-----------------|----------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Three Mile Island, Unit 1 | 05000289 | 99 | -- 003 -- | 01 | 4 OF 10 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

performed in support of procedure changes made subsequent to the conduct of the 1985 CR Habitability studies.

Changes were made in late 1985 to the CBEVS Normal and Abnormal Operating Procedures for initiation of emergency recirculation. These changes were intended to address maintaining a positive pressure in the CR with a postulated failure of the isolation damper AH-D-28 (and the potential for negative pressures in the CBE). The revised configuration introduced the potential single failure of AH-D-39 in the closed position, while AH-D-37 and AH-D-36 are throttled via the Gradual Positioning Switch in accordance with the procedure as changed.

These procedural changes were supported by a safety evaluation and a technical evaluation. Due to the length of time since this event occurred, the underlying causes of why these evaluations did not consider the single failure of AH-D-39, while other dampers are throttled could not be determined. However, the processes governing safety evaluations and technical evaluations to include the procedures, training, and review expectations, have been significantly revised and strengthened in the years since this event occurred. Additionally, a procedure currently in place, entitled: "Conduct of Engineering" provides enhanced guidance on the thoroughness of performing technical reviews of engineering changes. It is believed that this along with other process improvements (e.g., safety review process) adequately addresses the root cause for this event.

UFSAR section 7.4.5.2.1 discusses the postulated "...single failure of Outside Air Intake Damper (OAI) AH-D-39..." which was based on failure of the GPS that when actuated by operator action in accordance with the revised procedures repositions the three control dampers AH-D-39, AH-D-37, and AH-D-28. Although not considered a causal factor in this event, additional actions will be taken to clarify this section of the UFSAR with the intent conveyed by other licensing basis documents to address the single failure aspects of the design basis for the CBEVS.

The cause of the manual damper failure was determined to be the lack of a periodic maintenance inspection (PM) activity which allowed the gradual loosening of a set screw on the actuator louver linkage to go uncorrected. [Code: (A4m) Inadequate Preventative Maintenance] A contributing cause of the manual damper failure was that the design basis importance of the manual balancing damper was not fully recognized and adequately established as part of the plant configuration. [Code: (A1Af) System / component configuration problem (as-built documentation)]

The investigation included interviews, historical events search and the application of Kepner-Tregoe (K-T), Change Analysis, and Barrier Analysis techniques. The principal change identified by K-T Change Analysis was the procedure and UFSAR revisions implemented in 1985. In accordance with the Root Cause Evaluation (RCE) report, barriers that were missing or were ineffective include: the safety evaluation and technical evaluation review processes. Additionally, the RCE report identified barriers which were ineffective for identifying the manual damper failure. Reliance upon routine system surveillance testing was considered a weak barrier. Although surveillance testing is intended to verify overall system functionality, it is not an adequate means to identify the gradual degradation of manual dampers.

V. Investigation of Previous Events & Extent of Condition:

A search was performed of the LER and CAP databases to identify any previous similar instances where questions of a potential failure mechanism were raised that the existing analysis had not addressed. The previous similar

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
|---------------------------|------------|----------------|-------------------|-----------------|----------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Three Mile Island, Unit 1 | 05000289 | 99 | -- 003 -- | 01 | 5 OF 10 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

events are:

LER 98-009 On August 20, 1998 it was recognized that operation within Makeup Tank pressure and level limits may not prevent gas entrapment in the Makeup & Purification/High Pressure Injection Pumps during a postulated LOCA with the most limiting single failure. The root cause was "misapplication or interpretation of design inputs." The preparer and the reviewers of the safety evaluation failed to recognize that the limiting single failure was not assumed in the gas entrapment analysis and that such an assumption was required if the MU/HPI System lineup were revised to operate with a common MU/HPI suction header.

LER 97-009 On July 25, 1997, it was identified that a loss of 'A' station DC distribution and a concurrent loss of offsite power would affect both trains of Engineered Safety Features equipment. If this failure were to occur concurrently with a large break LOCA, no procedural guidance was available to operators to allow them to bypass ESAS and take control of components as required to throttle reactor building spray flow and complete switchover to the reactor building sump. This design has existed since initial plant operation. The root cause of the condition was that the failure modes and effects analysis failed to consider the bypass of Train B of ESAS on a loss of offsite power and a loss of 'A' DC.

These events are similar in that they identify cases where a new failure mechanism was postulated that may not have been bounded by the original analysis. These previous instances are not considered to reflect a programmatic failure of the current engineering analysis process. This conclusion was reached on the basis of the small number of similar events identified and the fact that most of these design analyses were performed ten or more years ago. It is recognized that improvements made in the state of the art of accident modeling in conjunction with a larger bank of industry experience, has significantly improved the ability to identify new failure modes that were not previously considered. The self-identification of the condition reported in this LER also reflects the plant staff's questioning attitude and adherence to the UFSAR description.

The extent of condition with respect to manual damper failures was further investigated as described below under the Short Term Action taken to date.

VI. Assessment of Safety Consequences & Implications of the Event:

The CBEVS was still operable per Technical Specifications 3.15.1, "Emergency Control Room Air Treatment System" on the basis that the recirculation filter system specifications were not affected. Exposure to control room personnel would remain within the occupational dose guidelines of 10 CFR 20 by taking appropriate procedural actions to restore the damper position in the event of a postulated single failure. This condition of potential non-conformance with the design basis of the CBEVS was reported to the NRC on March 10, 1999 at 19:50 hrs.

There was no additional equipment damage or personnel injuries resultant from this event. When the manual damper on the Control Building intake failed closed, a negative pressure was experienced in the Control Building Envelope. Although there was no need to establish habitability requirements during the period in which this damper was failed, had there been a need to establish the emergency ventilation configuration, this negative pressure condition would have potentially allowed in-leakage of airborne radioactive contaminants into the Control Building Envelope.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
|---------------------------|------------|----------------|-------------------|-----------------|----------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Three Mile Island, Unit 1 | 05000289 | 99 | -- 003 -- | 01 | 6 OF 10 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Had a design basis accident occurred that required the Control Building Envelope to be maintained at a positive pressure, unfiltered in-leakage could have occurred with the manual damper failed closed. Given the conservative assumptions utilized in the dose analysis for the 1985 Control Room Habitability Evaluation, it is expected that this unfiltered in-leakage would result in little, if any, increased dose (whole body/skin) to control room operators. However if unfiltered in-leakage resulted in an appreciable increase in Control Room radioactivity, this would be promptly detected on the radiation monitor (RM-A-1), and appropriate controls would be implemented to reduce operator dose consequences with existing plant procedures. Personnel would be dispatched to determine the cause of the ventilation problem, and to make the necessary repair.

The RM-A-1 high alarm annunciates at the Derived Air Concentration (DAC) values in Table 1 of Appendix B in 10 CFR 20, so that operator doses received prior to the alarm annunciation would be a small fraction of the occupational dose limits. Following activation of these alarms, radiological conditions in the Control Room would be assessed in accordance with plant procedures. Protective measures such as respiratory protection, engineering controls, and/or administrative controls would be implemented as required by the results of the assessment to control operator doses until the ventilation system could be returned to its design configuration. Abnormal Operating Procedure 1203-34, "Control Building Ventilation System," guidance directs the operators to visually inspect the control/isolation dampers (AH-D-39, AH-D-37, and AH-D-28) position following initiation of emergency recirculation in response to receipt of a high radiation alarm. If dampers are not in their correct position, maintenance procedures are used to repair the component(s). These components are either inside the Control Building Envelope, or are in low dose areas post-accident.

Therefore, the Control Building Ventilation System currently meets its functional objectives, but is in a non-conforming condition since a new single active failure of the Outside Air Intake control damper (AH-D-39) was introduced that does not meet the UFSAR design basis description for Control Room Habitability. This failure was not identified until the event of March 10, 1999.

Of note, in corrective action response to LER 98-009 (see description above) GPU Nuclear Inc. had committed to perform a review of the configuration control process, including the calculation process, to determine if improvements are necessary to ensure appropriate and consistent application of the single failure criteria. This programmatic review is currently in process.

VII. Corrective Action Taken:

Immediate & Short Term Actions:

- Temporary Mechanical Modification (TMM) No.17 was installed on March 10, 1999 to secure the manual balancing damper in the required position (Job Order No. 00164443).
- Control Building Ventilation System was successfully tested on March 10, 1999 following installation of TMM-17 to ensure that system met its surveillance requirements and exceeded 0.10 inches w.g. of positive pressure in the Control Room.
- Engineering Change Documents have been revised to ensure that the balancing manual damper is documented

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
|---------------------------|------------|----------------|-------------------|-----------------|----------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Three Mile Island, Unit 1 | 05000289 | 99 | -- 003 -- | 01 | 7 OF 10 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

in the configuration management (GMS2) database, and on the appropriate plant design drawings (302-842). In addition, other manual dampers in the Control Building Ventilation System have also been so documented.

- **The following nuclear safety related ventilation systems were inspected to determine if there are any manual balancing dampers which exist that are not included in the Preventive Maintenance Program. As a result of the expanded scope of review several components not previously identified in the GMS-2 configuration management database were added to the database and included in expanded PM tasks.**
 - Emergency Feedwater Pump Rooms Cooling
 - Diesel Generator Rooms H&V System
 - NSCCW Pumps & DH Pumps Cooling System
 - Spent Fuel Cooling Pumps Cooling System
 - Intake Pump House & Diesel Fire Pump H&V System

Long Term Corrective Actions:

- Procedures and training for engineering personnel have been enhanced since 1985 to emphasize thoroughness of review of changes. The Engineering Procedure, EP-100T, "Conduct of Engineering" establishes the principles for thoroughness of review and verification of engineering work. This action is completed.
- Inspection of the CBEVS system to verify its physical condition (ductwork integrity and inleakage paths) and testing the system (in various configurations) if required, and a review will be performed to determine if the system complies with its design basis requirements. Based on the results of the inspections and/or testing together with the system review, procedural changes or proposed system modifications needed to restore the system to its design basis will be identified and a further course of action will be determined, as required. **This action was completed on August 21, 1999.**

Inspection:

All CBVES ductwork that operates at a negative pressure was physically inspected by either a smoke stick test or by an internal walkdown, prior to functional testing. [CAP Corrective Action No. T1999-0235-1.]. No gross duct breaches or damper damage were discovered. All control dampers are in satisfactory condition. Small duct seam and duct access door leaks that were identified as sources of unfiltered in-leakage were repaired. The emergency supply fan shaft penetration and the fan isolation damper blade pin penetration were identified as small areas of unfiltered inleakage into the system. These penetrations of the duct are the original design condition. Options for modification are being evaluated to reduce infiltration through these paths. As noted in the SER for Technical Specification Amendment 215, the NRC is working with Nuclear Energy Institute Control Room Habitability Task Force to resolve habitability issues including accounting for unfiltered inleakage. This issue will be resolved with the re-submittal required by Amendment 215.

Testing:

Control Room Habitability Envelope pressure differential testing was completed on August 21, 1999 by Functional Test Procedure No. 826.02, Revision 1. This test recorded pressure differential data across

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
|---------------------------|------------|----------------|-------------------|-----------------|----------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Three Mile Island, Unit 1 | 05000289 | 99 | -- 003 -- | 01 | 8 OF 10 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Control Room Emergency Envelope doors and recorded air flow data into and out of the envelope during baseline testing and control/isolation damper failure scenarios.

Testing Results and Conclusions:

The design basis conditions as stated in the UFSAR were met during the functional test. The test demonstrated that the required positive pressure was maintained in the Main Control Room (> 0.1 inch w.g.) for baseline testing and control/isolation damper failure scenarios, including the configuration described in LER 99-003-00. That is, with the air supply control damper (AH-D-39) failed in the closed position, and the other control dampers throttled as required by Abnormal Operating Procedure No. 1203-34 (Control Building Ventilation System – High Radiation), the required positive pressure was maintained in the Control Room.

Therefore, it is postulated that during the event of March 10, the procedural requirement to adjust the gradual control switch for the control dampers may have resulted in the negative pressure in the Main Control Room. The procedural guidance for the gradual control switch requires the Operator to adjust the switch to a specific dial position on the HVAC control panel. This control varies the pneumatic signal to the control damper's positioner. The required position of the panel dial was determined during 1986 testing as a means of increasing supply airflow to maximize Main Control Room pressurization, but it is not an accurate means of adjusting large pneumatically controlled dampers larger than 60" x 60". Some small error in pneumatic positioner adjustment or gradual control switch position could result in an unwanted pressure condition in the Control Room Emergency Envelope.

This variation is speculated to have caused exhaust flow rate (with the manual balancing damper failed closed) to be high enough to draw a negative pressure in the main Control Room, albeit the pressure across the Main Control Room doors was not quantified during the event. Since there is no accurate means to verify the setting on each control damper individually, and since the Main Control Room is maintained above the required positive pressure with the CR dampers in the full isolation recirculation, GPUN intends to eliminate the procedural guidance for throttling these dampers. This will enhance the system response and reduce operator burden. The procedure changes have been prepared and will be implemented on or before December 31, 1999.

The results of the recent testing showed some differences from the Habitability testing performed in support of the 1998 submittal to the NRC. However, review of the latest test results demonstrates that the dose consequences presented in the 1998 submittal continue to be bounding.

- A preventive maintenance (PM) task for inspection of the manual dampers in the Control Building Ventilation System has been established in the PM master schedule. **This action was completed on June 16, 1999. Repetitive Maintenance (PM) Task is a 4-year interval PM task which will be conducted in accordance with established air handling equipment procedures.**
- The manual balancing damper was repaired to secure the blade pins to the damper blades which act to drive and secure the damper and to repair blade to blade linkages. This action **restored** the manual damper to its design basis capability. **This action was completed on June 30, 1999. [CAP Corrective Action T1999-0235-03.]**

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
|---------------------------|------------|----------------|-------------------|-----------------|----------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Three Mile Island, Unit 1 | 05000289 | 99 | -- 003 -- | 01 | 9 OF 10 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Other Actions:

- UFSAR changes and or corrections will be made pursuant to 10 CFR 50.72(e) during the next refueling update of this licensing basis document. **This action is scheduled to be completed in April, 2000.**

See CAP Corrective Action T1999-0235-4.

- Pursuant to AL 98-10, TMI evaluated the appropriateness of including Control Room d/p testing as a part of the surveillance activities for the Technical Specifications of the CBEVS system. **Evaluation of potential changes to the Technical Specifications determined that this action should be based on resolution of the generic concerns being discussed between the industry (NEI) representatives and NRC related to Control Room Habitability issues. License Amendment No. 215 which provided interim (Cycle 13) approval of ESF Post-accident Leakage Limits and the assumptions of the revised CR Habitability Evaluation requires GPUN to resubmit the Technical Specification Change Request along with a supporting control room habitability evaluation six months prior to the end of Cycle 13. If needed, new surveillance testing requirements will be addressed at that time. CAP Corrective Action T1999-0235-09 will track this action targeted for completion on February 1, 2001.**
- A plan for periodic testing of the CBE was developed. **A Preventive Maintenance (PM) repetitive task will be established to perform periodic testing of the Control Building Emergency Envelope. This testing will be performed every 2 years.**

VIII. Date of Full Compliance:

The functional requirements of the Control Building Emergency Ventilation System were fully restored on March 10, 1999. **Inspections, tests, and repairs of duct were completed on August 21, 1999. Procedure changes to address the negative pressure when simulating damper failures will be completed by December 31, 1999. Full compliance with the design basis requirements for Control Room Habitability considerations will be achieved upon implementation of the procedure changes.**

*The Energy Industry Identification System (EIIIS), System Identification (SI) and Component Function Identification (CFI) Codes are included in brackets, [SI/CFI], where applicable, as required by 10 CFR 50.73 (b)(2)(ii)(F).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| | | | | | |
|---------------------------|------------|----------------|-------------------|-----------------|----------|
| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
| Three Mile Island, Unit 1 | 05000289 | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | 10 OF 10 |
| | | 99 | -- 003 -- | 01 | |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Figure 1

(*) Emergency Position

