

May 4, 2006

Mr. Christopher M. Crane  
President and CEO  
AmerGen Energy Company, LLC  
200 Exelon Way, KSA 3-E  
Kennett Square, PA 19348

SUBJECT: THREE MILE ISLAND STATION, UNIT 1 - NRC INTEGRATED INSPECTION  
REPORT 05000289/2006003

Dear Mr. Crane:

On March 31, 2006, the U. S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Three Mile Island, Unit 1 (TMI) facility. The enclosed inspection report documents the inspection results, which were discussed April 14, 2006, with Mr. Rusty West and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents one NRC-identified finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. Additionally, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. However, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these violations as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis of your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector at Three Mile Island.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

We appreciate your cooperation. Please contact me at 610 337-5200 if you have any questions regarding this letter.

Sincerely,

*/RA/*

Ronald R. Bellamy, Ph.D., Chief  
Reactor Projects Branch 7  
Division of Reactor Projects

Docket No: 50-289  
License No: DPR-50

Enclosure: Inspection Report 05000289/2006003  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION 1

Docket No: 05000289

License No: DPR-50

Report No: 050000289/2006003

Licensee: AmerGen Energy Company, LLC (AmerGen)

Facility: Three Mile Island Station, Unit 1

Location: PO Box 480  
Middletown, PA 17057

Dates: January 1, 2006 - March 31, 2006

Inspectors: David M. Kern, Senior Resident Inspector  
Javier M. Brand, Resident Inspector  
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Karl Diederich, Reactor Inspector  
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Division of Reactor Projects (DRP)

Enclosure

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## SUMMARY OF FINDINGS

IR 05000289/2006003; 1/1/2006 - 3/31/2006; AmerGen Energy Company, LLC; Three Mile Island, Unit 1; Identification and Resolution of Problems.

The report covered a 13-week period of inspection by resident inspectors and announced inspections by regional inspectors. One Green non-cited violation (NCV) was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

### A. NRC-Identified and Self-Revealing Findings

#### **Cornerstone: Mitigating Systems**

- **Green.** The inspectors identified a non-cited violation (NCV) of Technical Specification 6.8.1 in that station personnel did not properly establish and implement work instructions for replacement of the 'B' control building chiller (AH-C-4B) expansion joints. Specifically, three control building chiller expansion joints were incorrectly installed. This performance deficiency reduced the reliability and availability of area cooling for the control room and vital alternating current (AC) and direct current (DC) electrical power supplies for numerous safety-related mitigating systems. The licensee entered this issue into their corrective action program as issue report 457180 and initiated a root cause evaluation.

This violation is more than minor because it affected the reliability and availability of control building cooling, which supports control room operation of mitigating equipment and maintains emergency AC and DC room temperatures within required values to support continued availability of power to mitigating equipment including the building spray, high pressure injection, decay heat removal, and emergency feedwater systems. Additionally, if left uncorrected the issue would become a more significant safety concern, because the work instructions and work practices for replacing expansion joints are generic and could degrade reliability of all other systems which include expansion joints. This finding is of very low significance since the condition did not involve an actual failure of an expansion joint or loss of a system safety function. A contributing cause of this finding is a cross-cutting issue in the area of human performance. Work instructions were not sufficiently complete and accurate to perform the task, the work activity was not properly coordinated to address changes in work scope, work practices demonstrated a lack of knowledge of expansion joint installation, and workers proceeded in the face of uncertainty without involving work planners. (Section 4OA2.2)

B. Licensee Identified Violations

A violation of very low significance regarding technical specification requirements was identified by the licensee. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. The violation and corrective actions are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Three Mile Island, Unit 1 (TMI) began the period at 100 percent rated thermal power. On March 4, 2006, operators briefly reduced power to 85 percent for periodic freedom of movement testing of main turbine control valves and control rod drive mechanisms. Full power was reestablished on March 5. On March 10, both condenser off gas radiation monitors became inoperable. Operators began a plant shutdown as required by the Offsite Dose Calculation Manual (ODCM) and Technical Specification (TS) 3.0.1 (Section 4OA3). Early on March 11, technicians repaired the two radiation monitors and the plant shutdown was discontinued. The plant was stabilized at 70 percent reactor power. The reactor was restored to 100 percent power later that day, and the plant remained at or near full power for the remainder of the inspection period.

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R01 Adverse Weather Protection (71111.01 - 2 samples)

##### a. Inspection Scope

The inspectors performed two inspection samples. The inspectors walked down risk significant plant areas for several days in January and February 2006 and assessed AmerGen's protection for cold weather conditions. Several heavy snow storms and periods of sustained heavy winds were forecast for this period. The inspectors were sensitive to outside instrument line conditions and the potential for unheated ventilation. The inspectors also reviewed implementation of procedures WC-AA-107, "Seasonal Readiness," Rev. 1 and OP-AA-108-111-1001, "Severe Weather Guidelines," Rev. 2 for cold weather conditions. Additional documents reviewed during the inspection are listed in the Attachment. Specific systems inspected and assessed to determine whether they were properly maintained to address the effects of cold weather included:

- The emergency feedwater system, including the condensate storage tanks and the turbine driven pump steam supply exhaust piping.
- The reactor building emergency cooling system including reactor river water pumps, cross-connections to nuclear services closed cooling water, and the cooling water intake and screen pump house.

##### b. Findings

No findings of significance were identified.

Enclosure



1R04 Equipment Alignment (71111.04Q - 4 samples; 71111.04S - 1 sample)a. Inspection ScopePartial System Walkdowns

The inspectors performed four partial system walkdown samples on the following systems and components:

- 'A' control building chiller train while the 'B' control building chiller was out of service for planned maintenance from February 16-21.
- 'C' and 'D' 120 volt vital busses and their power supply alignments while the 'A' vital bus was deenergized to support maintenance on the 'A' 120 volt vital inverter and transfer of the 'A' vital bus to the 'E' 120 volt vital inverter from March 6-13.
- 'A' nuclear service river water cooling (NSRW) train while the 'B' NSRW train was out of service for planned maintenance from February 27-28.
- 'C' NSRW train while the 'B' train was out of service for planned maintenance from February 27-28.

The partial system walkdowns were conducted on the redundant and standby equipment to ensure that trains and equipment relied on to remain operable for accident mitigation were properly aligned. Additional documents reviewed during the inspection are listed in the Attachment.

Complete System Walkdown

The inspectors performed one complete system walkdown sample on the following system:

- On March 28 and 29, the inspectors verified configuration alignment of the emergency feedwater system. The inspectors conducted a detailed review of the alignment and condition of the system using OP-TM-424-271 "Standby Lineup and Flow Path Verification Check of EFW System," Rev. 2, and procedure OP-TM-424-000, "Emergency Feedwater System," Rev. 2. In addition, the inspectors reviewed and evaluated the corrective action program reports for impact on system operation and interviewed the system engineer.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05 - 10 samples)a. Inspection Scope

The inspectors performed ten inspection samples. The inspectors conducted fire protection inspections for several plant fire zones, selected based on the presence of equipment important to safety within their boundaries. The inspectors conducted plant walkdowns and verified the areas were as described in the TMI Fire Hazard Analysis Report, and that fire protection features were being properly controlled per surveillance procedure 1038, "Administrative Controls-Fire Protection Program," Rev. 63. The plant walkdowns were conducted throughout the inspection period and included assessment of transient combustible material control, fire detection and suppression equipment operability, and compensatory measures established for degraded fire protection equipment in accordance with procedure OP-MA-201-007, "Fire Protection System Impairment Control," Rev. 2. In addition, the inspectors verified that applicable clearances between fire doors and floors met the criteria of Attachment 1 of Engineering Technical Evaluation CC-AA-309-101, "Engineering Technical Evaluations," Rev. 7. Fire zones and areas inspected included:

- Fire Zone AB-FZ-2a, Auxiliary Building Elev. 281', 'A' Makeup Pump Room
- Fire Zone AB-FZ-2b, Auxiliary Building Elev. 281', 'B' Makeup Pump Room
- Fire Zone AB-FZ-2c, Auxiliary Building Elev. 281', 'C' Makeup Pump Room
- Fire Zone CB-FA-2F, Control Building Elev. 322', East Battery Area
- Fire Zone CB-FA-2G, Control Building Elev. 322', West Battery Area
- Fire Zone CB-FA-3A, Control Building Elev. 338', 4160 V Switchgear 1D Room
- Fire Zone CB-FA-3B, Control Building Elev. 338', 4160 V Switchgear 1E Room
- Fire Zone CB-FA-2A, Control Building Elev. 322', 480 V Switchgear 1A & 1P Room
- Fire Zone CB-FA-2B, Control Building Elev. 322', 4160 V Switchgear 1B & 1S Room
- On January 26, the inspectors reviewed issue report (IR) 446186, which evaluated spurious alarms on the safety-related relay room carbon dioxide Cardox system panel PLB-4-7. The evaluation determined that operability of the Cardox system was not affected and that normal system pressure and level remained unaffected. The inspectors interviewed the operations shift manager and verified that actions addressed the repeated panel alarms.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06 - 2 samples)a. Inspection Scope

The inspectors performed two inspection samples. The inspectors performed visual inspections of flood barriers, system boundaries, and water line break sources located in portions of the auxiliary building and the turbine building where internal flooding could

adversely affect safety-related systems needed for safe shutdown of the plant. The review included (1) the auxiliary building heat exchanger vault, and (2) the potential effects of a steam or water main break in the turbine building and the potential effects on the emergency feedwater system. Documents used to support this inspection included:

- UFSAR Section 2.6.4, "Flood Studies"
- TMI Fire Hazard Analysis Report, Section 6.0, "Protection Against Water Spray to Conform with 10 CFR 50, Appendix R"
- Section 10, "Internal Flooding Analysis", from TMI Unit-1 Probabilistic Risk Assessment (Level 1) Update

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11Q - 1 sample)

a. Inspection Scope

On March 21, the inspectors observed licensed operator requalification training at the control room simulator for the 'A' operator crew. The inspectors reviewed the operators' ability to correctly evaluate the simulator training scenario and implement the emergency plan. The inspectors observed the operators' simulator drill performance and compared it to the criteria listed in simulator exercise guide SROUS-19, "NRW Failure and OTSG tube leak and main steam line break," Rev. 7. The inspectors observed supervisory oversight, command and control, communication practices, and crew assignments to ensure they were consistent with normal control room activities. The inspectors observed operator response during the simulator drill transients and verified simulator indications, controls, and plant response matched the actual plant. The inspectors evaluated training instructor effectiveness in recognizing and correcting individual and operating crew errors, including post-training remediation actions. The inspectors attended the post-drill critiques in order to evaluate the effectiveness of problem identification. The inspectors verified that emergency plan classification and notification training opportunities were tracked and evaluated for success in accordance with criteria established in Nuclear Energy Institute 99-02, "Regulatory Assessment Performance Indicator Guideline," Rev. 3.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12 - 2 samples)a. Inspection Scope

The inspectors performed two inspection samples. The inspectors evaluated Maintenance Rule (MR) implementation for specific attributes of MR scoping, characterization of failed structures, systems, and components (SSCs), MR risk categorization of SSCs, SSC performance criteria or goals, and appropriateness of corrective actions. The inspectors verified that the issues were addressed as required by 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and AmerGen procedure ER-AA-310, "Implementation of the Maintenance Rule," Rev. 5. Additional documents reviewed during the inspection are listed in the Attachment.

- IR 439289 described an air tubing failure in the "A" emergency diesel generator (EG-Y-1A) that occurred on January 6, 2006. The inspectors verified that appropriate corrective actions were initiated and documented in the IR. Extent of condition follow-up, operability, and functional failure determinations were reviewed to verify they were appropriate for the tubing failure.
- IR 446001 described a trip of the station blackout diesel generator (EG-Y-4) due to an air ejector rubber hose clamp failure that occurred on January 25. The inspectors verified that appropriate corrective actions were initiated and documented in the IR. Extent of condition follow-up, operability, and functional failure determinations were reviewed to verify they were appropriate for the air ejector rubber hose clamp failure.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 6 samples)a. Inspection Scope

The inspectors performed six inspection samples. The inspectors reviewed the scheduling and control of maintenance activities in order to evaluate the effect on plant risk. This review was against criteria contained in AmerGen Administrative Procedure 1082.1, "TMI Risk Management Program," Rev. 5 and WC-AA-101, "On-Line Work Control Process," Rev. 11. Additional documents reviewed during this inspection are listed in the Attachment. The inspectors reviewed the routine planned maintenance, restoration actions, and/or emergent work for the following equipment removed from service:

- On February 7, reactor building cooling fan AH-E-1B was removed from service for inspection and cleaning of the cooling coils (Risk Document 1165, Rev. 1).
- On February 13-21, control building chiller AH-C-4A was removed from service for a maintenance overhaul. In addition to the chiller overhaul, planned maintenance included installation of a modification to correct an oil drainage deficiency and replacement of piping expansion joints (Risk Document 813, Rev. 4).
- On February 27, the 'B' NSRW cooling pump NS-P1B was removed from service for scheduled preventive maintenance to examine the motor and feeder cable, and to sample and change the motor bearing oil (Risk Document 621, Rev. 5).
- On March 9, the 'D' inverter was returned to service and aligned to supply the 'D' vital bus following repairs to replace a degraded synchronization circuit board (Risk Document 1168, Rev. 3).
- On March 14, rod drive control system operation with group 6 programmer secondary power supply unavailable and normal primary power supply operating abnormally (Risk Document 1177, Rev. 1).
- On March 28, operation with the MS-V-4A valve while temporary test equipment was installed per engineering change request (Risk Document 749, Rev. 3).

b. Findings

No findings of significance were identified.

1R14 Operator Performance During Non-Routine Evolutions and Events (71111.14 - 3 samples)

a. Inspection Scope

The inspectors performed three inspection samples. The inspectors reviewed human performance during the following non-routine plant evolutions, to determine whether personnel performance caused unnecessary plant risk or challenges to reactor safety. The inspectors evaluated whether the evolutions were properly implemented according to the applicable procedures and TS limiting condition for operations. Additional documents reviewed during this inspection are listed in the Attachment.

- On February 15, the digital turbine control station (DTCS) monitor failed. Associated control room alarms and turbine protective functions were not affected, but the normal method of monitoring turbine parameters and performance was not available. Alternate monitoring of turbine controls and appropriate communication protocols were established from the DTCS

engineering work station located one floor below the control room and contingencies for power plant transients were reviewed.

- On March 9, operators deenergized the 'D' 120 volt vital AC bus in order to transfer this bus from the 'F' to the 'D' vital inverter power supply. Numerous TS required components were deenergized by procedure during this evolution. This was a first-time evolution since installation of the new 'F' vital inverter during the last refueling outage.
- On March 14, operators received several alarms instantaneously as they observed the integrated control system and control rod drive systems unexpectedly transfer from automatic control to manual control. Operators maintained manual reactor control and determined a fault had occurred in the Group 6 control rod drive circuitry. Technicians identified indications of a motor fault, direction error, three phases (vice two phases) of power to the drive motor, and loss of power to the programmer secondary gate drives. Station personnel developed and implemented a troubleshooting plan to determine the cause of the faults. The plan incorporated contingencies for unanticipated control rod motion prior to transferring Group 6 control rods to the auxiliary power bus on March 14.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 5 samples)

a. Inspection Scope

The inspectors performed five inspection samples. The inspectors reviewed operability evaluations for degraded equipment issues. The inspectors verified that degraded conditions in question were properly characterized, operability of the affected systems was properly evaluated, applicable extent of condition reviews were performed, and no unrecognized increase in plant risk resulted from the equipment issues. The inspectors referenced NRC IMC Part 9900, "Operable/Operability-Ensuring the Functional Capability of a System Component" and AmerGen procedure LS-AA-105, "Operability Determinations," Rev. 1, to determine acceptability of the operability evaluations. Additional documents reviewed during this inspection are listed in the Attachment.

- On October 22, 2005, the '1D' inverter failed and could not maintain its required frequency. Engineers developed a complex troubleshooting plan and continued to assess the cause using IR 388972. Technicians identified an intermittent contact opening of a relay in the inverter synchronizing board. The inverter was properly monitored and the synchronizing board was ultimately replaced.

- In December 2005, operators observed unusually high vibrations on the main steam line 'B' train piping to the main condenser bypass valves. The vibration caused frequent contact between the pipe and pipe hanger MK-MS-120, which was becoming deformed. Engineers evaluated the vibration and performed a complex troubleshooting plan to identify the cause of the vibration (IRs 426871, 448560, 451321). Engineers concluded there was not an immediate operability concern.
- On February 6, reactor building spray sodium hydroxide tank suction isolation valve BS-V-2A closing time (21.36 seconds) was determined to exceed surveillance test acceptance criteria (21.0 seconds). Valve opening time remained acceptable and consistent with previous tests. Engineers determined that the valve remained operable based on diagnostic test results (IRs 453332 and 450799).
- On February 20, operators received alarm G2-6, "Asymmetric Rod." Technicians, engineers, and operators determined control rod 7-5 was misaligned from its group. Operators realigned rod 7-5 with Group 7. Engineers assessed rod position records and performance data for the last four-year period and determined the rod position indication was accurate. Operations personnel concluded control rod 7-5 remained operable. Engineers developed a complex troubleshooting plan and continued to assess the cause of the misalignment using IR 456197.
- Technicians identified several degraded conditions during preventive maintenance on reactor building outboard purge isolation valve AH-V-1D on March 3-5. Post-maintenance stem friction, seat hardness, and valve leakage did not meet acceptance criteria and the valve was declared inoperable in accordance with TS (IRs 461764, 461841, and 462228). Operability Evaluation OPE-06-002, "AH-V-1D," Rev. 0, established compensatory actions and corrective actions to permit continued plant operation.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19 - 7 samples)

a. Inspection Scope

The inspectors reviewed and/or observed seven post maintenance test (PMT) samples to ensure (1) the PMT was appropriate for the scope of the maintenance work completed; (2) the acceptance criteria were clear and demonstrated operability of the component; and (3) the PMT was performed in accordance with procedures. Additional documents reviewed during this inspection are listed in the Attachment. The following PMTs were observed and/or evaluated:

- On February 21-22, operators performed testing in accordance with work order R2072469 following replacement of 'A' control building chiller expansion joints AH-XJ-40B, 41B, 42B, and 43B.
- On February 27, PMT of the 'B' NSRW cooling pump using procedure OP-TM-541-442, "Routine Starting And Stopping Of NSRW Pumps," Rev. 1, following planned preventive maintenance.
- On March 9, operators loaded the 'D' 120 volt vital bus onto the 'D' vital inverter in accordance with procedure 1107-2B to restore normal configuration alignment and verify proper inverter frequency control. Testing was performed as specified in work order C2011618 following corrective maintenance to address degraded inverter frequency control.
- On March 11, technicians performed testing on the 'A' vital inverter in accordance with procedure 1420-INV-3, "Station Static Inverter Maintenance," Rev. 27 and work order R2044329 following planned biennial preventive maintenance.
- On March 23, PMT of the 1B reactor river water pump was performed using procedure 1300-3KB, "IST of RR Pump 'B' and Valves," Rev. 0, following preventive maintenance and packing replacement.
- On March 29, PMT of the 2A emergency feedwater pump was performed using portions of procedure OP-TM-424-201, "IST of EF-P-2A," Rev. 2, following corrective maintenance (work order C2012470).
- On March 30, PMT of 'A' emergency diesel generator (EDG) building ventilation fan AH-E-29A following corrective maintenance. This PMT was used to restore the 'A' EDG to an operable status following the failure of a support system. (work order A2139032)

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 6 samples)

a. Inspection Scope

The inspectors performed six inspection samples. The inspectors observed and/or reviewed the following operational surveillance tests, concentrating on verification of the adequacy of the test to demonstrate the operability of the required system or component safety function. Inspection activities included review of previous surveillance history to identify previous problems and trends, observation of pre-evolution briefings, and initiation/resolution of related IRs for selected surveillances. Additional documents reviewed during the inspection are listed in the Attachment.

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- On December 29, 2005, procedure OP-TM-424-203, "IST Of EF-P-1 And valves," Rev. 2. The inspectors also reviewed IR 437426, which evaluated a low pressure condition on the steam supply pressure line to emergency feedwater pump EF-P-1.
- On February 8, procedure OP-TM-212-201, "IST Of DH-P-1A And Valves From ES Standby Mode," Rev. 5.
- On March 3-4, procedure 1303-5.5A, "Control Room Filtering System 'A' Operational Test," Rev. 0.
- On March 8, procedure ST1303-11.39A, "HSPS - EFW Auto Initiation," Rev. 34, completed under work order R2079701, for Emergency Feed Train 'A' logic testing.
- On March 15, procedure OP-TM-424-202, "IST of EF-P-2B," Rev. 2, completed under work order R2079143, for motor-driven Emergency Feed Pump 2B.
- On March 29, procedure 1303-4.13, "RB Emergency Cooling and Isolation System Analog Test," Rev. 36.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 - 1 sample)

a. Inspection Scope

The inspectors selected one sample for review. The inspectors reviewed the following temporary modification (TM) and associated implementing documents, interviewed the respective system engineer, and walked down the in-plant system to verify the plant design basis and the system or component operability was maintained. Procedures CC-AA-112, "Temporary Configuration Changes," Rev. 8, and CC-TM-112-1001, "Temporary Configuration Change Implementation," Rev. 1, specified requirements for development and installation of TMs.

- On February 15, as detailed by IR 454437, the Control Room Digital Turbine Control System monitor stopped working properly. On February 16, TM 06-00154-001 was put in place to bypass the EHC-OWS-SW peripheral selector switch.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness [EP]**

1EP4 Emergency Action Level (EAL) and Emergency Plan Changes (71114.04 - 1 sample)

a. Inspection Scope

An in-office inspection was conducted on February 21-23, 2006, that reviewed the circumstances surrounding a licensee-identified problem within their EAL scheme. Specifically, the inspectors reviewed the IR, technical evaluation, extent of condition, and the associated corrective actions pertaining to incorrect threshold values for the condenser off-gas monitor in Table R1 for a site area emergency and a general emergency. This review does not constitute an approval of the changes and, as such, the changes are subject to future NRC inspection. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 4, and the applicable planning standard in 10 CFR 50.47(b) and the requirements in 10 CFR 50.54(q) and 10 CFR 50 Appendix E were used as reference criteria.

b. Findings

A violation of NRC requirements was identified. Further details regarding this issue are documented in Section 4OA7, Licensee-Identified Violations.

1EP6 Drill Evaluation (71114.06 - 1 sample)

a. Inspection Scope

The inspectors selected one sample for review. The inspectors observed an emergency event training evolution conducted at the Unit 1 control room simulator to evaluate emergency procedure implementation, event classification, and event notification. The event scenario involved multiple safety-related component failures and plant conditions warranting a simulated Site Area Emergency event declaration. The licensee counted this training evolution for evaluation of Emergency Preparedness Drill/Exercise Performance (DEP) Indicators. The inspectors observed the drill critique to determine whether the licensee critically evaluated drill performance to identify deficiencies and weaknesses. Additionally, the inspectors verified the DEP performance indicators (PIs) were properly evaluated consistent with Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Rev. 3. Additional documents reviewed during this inspection are listed in the Attachment.

- On March 21, Licenced Operator Requalification Unannounced Scenario/ DEP exercise observed from control room simulator.

b. Findings

No findings of significance were identified.

4. **OTHER ACTIVITIES**4OA1 Performance Indicator Verification (71151 - 3 samples)a. Inspection Scope

The inspectors reviewed selected station records to verify NRC PIs had been accurately reported to the NRC as required by NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Rev. 3. The three PI samples listed below were verified for the period March 2004 to December 2005.

Initiating Events Cornerstone

- Unplanned Scrams per 7000 Critical Hours
- Scrams with a Loss of Normal Heat Removal
- Unplanned Transients per 7000 Critical Hours

The inspectors reviewed operator logs, licensee event reports, monthly station operating reports, corrective action program database documents, calculation methods, definition of terms, and use of clarifying notes. The inspectors also verified accuracy of the number of reported critical hours used in the calculations.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 - 2 samples).1 Review of Issue Reports and Cross-References to Problem Identification and Resolution (PI&R) Issues Reviewed Elsewhere

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. This review was accomplished by reviewing a list of daily issue reports, by reviewing selected issue reports, attending daily screening meetings, and accessing the licensee's computerized database. Documents reviewed are listed in the Attachment.

Section 4OA2.2 describes a finding for deficient work instructions and maintenance practices which led to incorrect installation of three expansion joints on control building chiller AH-C-4B. The inspectors identified a deficient evaluation of degraded expansion

joints and untimely corrective actions to an earlier NCV. The untimely corrective action was a contributing factor to this finding, but was not the root cause.

2. Annual Sample: Review of Corrective Actions to NRC NCV 50-289/2005004-01, Deficient Maintenance Procedures Result in Expansion Joint Degradation

a. Inspection Scope

The inspectors reviewed licensee corrective actions to address expansion joint maintenance program deficiencies identified in the NCV listed above. Issue reports 320086 and 320094 documented that the NRC identified that numerous safety-related and nonsafety-related expansion joints were degraded and/or beyond their vendor specified service lives. Additionally, the licensee maintenance program did not incorporate vendor or industry guidance regarding periodic inspections. The inspectors reviewed the IRs to ensure the full extent of the identified issues were evaluated and that appropriate corrective actions were specified. In addition, the inspectors reviewed pertinent engineering documentation, interviewed station personnel, and performed in-plant walkdowns of expansion joints and expansion joint replacement maintenance activities. Additional documents reviewed during the inspection are listed in the Attachment.

b. Findings and Observations

Introduction. The inspectors identified a Green NCV of TS 6.8.1 in that station personnel did not properly establish and implement work instructions for replacement of the 'A' control building chiller (AH-C-4B) expansion joints. Specifically, following replacement of four expansion joints, the inspectors identified that three of the four were incorrectly installed. This performance deficiency reduced the reliability and availability of area cooling for the control room and vital alternating current (AC) and direct current (DC) electrical systems.

Description. In 2005, as corrective action to the original NCV listed above, in-plant walkdowns assessed expansion joint material condition. These walkdowns identified that several control building chiller expansion joints appeared to have excessive lateral misalignment, an unidentified coating material, and a limited softening of the exterior wall. Station personnel scheduled expansion joint replacement activities for the next available control building chiller system outages, February and May 2006 respectively.

The work was scheduled to be actively performed 24 hours per day, due to the significant impact a loss of control building cooling has on plant safety. Abnormal Operating Procedure (AOP) 034, "Loss of Control Building Cooling," Rev. 5 directs that the reactor be shutdown if both control building chillers become inoperable for eight hours.

On February 14, the day prior to beginning replacement of the control building chiller AH-C-4B expansion joints (AH-XJ-40B, 41B, 42B, and 43B), the inspectors asked the

maintenance supervisor whether the work activity included verification of acceptable alignment tolerances. The supervisor said they would be verified.

On February 21, following replacement of the four expansion joints, the inspectors identified the following deficiencies:

- AH-XJ-40B was a different design (single arch vice wide arch) expansion joint than was specified in Work Order (WO) A2121075. This design had more limiting lateral and axial alignment tolerances than the specified wide arch expansion joint.
- AH-XJ-41B exceeded the vendor specified lateral alignment requirements, but had been accepted without requesting engineering evaluation of this deficiency.
- AH-XJ-42B flange bolts were not installed in accordance with vendor instructions. The threaded end of the bolt was facing the rubber expansion joint and thread protrusion was excessive. The bolt threads were nearly contacting the expansion joint which would cause premature wear and potential expansion joint failure.
- The pre-job briefing did not address AH-XJ-42B and 43B.
- The method to measure lateral alignment offsets was not specified in the work instructions and documented measurements were inconsistent.
- Neither the work order, nor procedure 1410-Y-36, "Expansion Joint Replacement," Rev. 8 directed maintenance personnel to verify alignment tolerances met vendor specified limits.
- Revision of procedure 1410-Y-36 to address alignment tolerance requirements, as corrective action to NCV 50-289/2005004-01, was untimely. This action was scheduled under IR 385572, but no controls were established to ensure the procedure was revised prior to replacing any more expansion joints.
- The pre-job walkdown was deficient in that work instruction deficiencies and procurement of incorrect materials were not identified prior to beginning the job.
- After beginning the work, maintenance personnel recognized that the A2121075 work instructions were deficient and requested additional information from engineering. However, supplemental engineering and vendor information was not properly integrated into work order A2121075. This is usually done informally (via email, etc.) and was not controlled by procedure.
- The post-job walkdown did not identify that an incorrect model of expansion joint for AH-XJ-40B had been installed.

The inspectors discussed the above observations with maintenance staff, engineers, and station management (IR 457180). Station personnel initiated immediate actions to correct the inspector identified discrepancies on AH-XJ-40B, 41B, and 42B. Plant staff identified additional discrepancies as documented in IRs 454700 and 463499. The additional work scope extended the AH-C-4B outage less than one day. Based on these discussions, station management concluded that the causes of the deficient work activity were complex and some aspects may reflect programmatic issues. The inspectors expressed continued concern that maintenance practices for expansion joints were not properly controlled and agreed that the deficiencies may be programmatic. Station management elevated the evaluation of IR 457180 to require a root cause assessment.

Analysis. Deficient maintenance work instructions, continuation of work without getting resolution to known deficiencies, and incorrect installation of three control building chiller expansion joints constituted a performance deficiency.

This issue affected the mitigating systems cornerstone. It was more than minor because it affected the reliability and availability of control building cooling which supports control room operation of mitigating equipment and maintains emergency AC and DC room temperatures within required values to support continued availability of power to mitigating equipment including the building spray, high pressure injection, decay heat removal, and emergency feedwater systems. Additionally, if left uncorrected the issue would become a more significant safety concern, because the work instructions and work practices for replacing expansion joints are generic and could degrade reliability of all plant systems which include expansion joints.

This finding was evaluated using NRC Manual Chapter 0609, "Significance Determination Process," Appendix A, Phase 1, and was determined to be of very low significance since the condition did not involve an actual failure of an expansion joint or loss of a system safety function. The inspectors determined the AH-C-4B expansion joints would not have immediately failed and would have continued to perform their design function for a substantial portion of the operating cycle.

A contributing cause of this finding is a cross-cutting issue in the area of human performance. Work instructions were not sufficiently complete and accurate to perform the task, the work activity was not properly coordinated to address changes in work scope, work practices demonstrated a lack of knowledge of expansion joint installation, and workers proceeded in the face of uncertainty without involving work planners.

Enforcement. TS 6.8.1.A requires that written procedures shall be properly established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Rev. 2, February 1978. Regulatory Guide 1.33, Appendix A recommends written procedures for maintenance that can affect the performance of safety-related equipment. Further, this maintenance should be properly preplanned and performed in accordance with the documented instructions. Work Order A2121075 and procedure 1410-Y-36 provided instructions for replacement of four expansion joints on control building chiller AH-C-4B. Procedure MA-MA-716-010-1008,

requires that upon identifying the need to change the work scope of a WO, the maintenance supervisor shall contact work planning personnel to support the work scope change process. Contrary to the above, WO A2121075 and procedure 1410-Y-36 did not properly specify expansion joint model numbers, alignment tolerances, torque specifications, bolt orientation, and alignment measurement method. Additionally, upon identification of a need to change work scope, maintenance personnel did not contact work planning personnel to support the work change process. Because this violation was of very low safety significance and was entered into the TMI corrective action program (IR 457180), this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy. **NCV 05000289/2006003-01, Deficient Work Instructions and Maintenance Implementation on Control Building Chiller.**

#### Additional Inspector Observations

Technical evaluation A2112366-01 was performed to address the inspectors' original concern (NCV 50-289/2005004-01) regarding whether installed expansion joints, including those beyond their service life, were acceptable for continued use (Assignment IR 320086-07). The inspectors determined the evaluation was too narrowly focused, had several errors, and had been approved by engineering management despite numerous deficiencies. A partial list of the errors included (1) the evaluation did not address expansion joints for safety-related reactor river water pumps RR-P-1A and 1B; (2) the evaluation stated new expansion joints were installed without researching their manufacture date and verifying the shelf-life had not expired; (3) the evaluation stated control building expansion joints were inspected to the required criteria and found to be acceptable; (4) the evaluation stated three differing dates for when the degraded control building expansion joints would be replaced; (5) the evaluation was inaccurate regarding the status of corrective actions to implement the expansion joint performance centered maintenance template. The evaluation documented the scheduled implementation completion date of August 2005. However, the inspectors determined that implementation was behind schedule and was now scheduled for implementation by August 2006. Engineers initiated IR 369736 to revise the technical evaluation and review its approval process.

Corrective action to revise procedure 1410-Y-36 was untimely. The assigned action completion date was March 16, 2006, with no interim measures in place to preclude use of the deficient procedure or to supplement work instructions for expansion joint replacement. This was a contributing cause to the mis-installation of control building expansion joints in February 2006. Issuance of the revised procedure was subsequently extended further to May 2006. The inspectors verified station personnel had put future expansion joint replacements on hold until work instructions were properly upgraded. Licensee actions to place the replacement work orders on hold were adequate, but were done outside of the corrective action process.

.3 Annual Sample: Emergency Safeguards Actuation System (ESAS) Relay Fire

a. Inspection Scope

The inspectors reviewed IR 426075, which evaluated the November 22, 2005 fire. The relay caught fire during performance of surveillance test 1303-5.2B, "B Emergency Loading Sequence and HPI Logic Channel Component Test," Rev. 0. This relay is a fourteen-contact relay and it was cycled twice prior to the fire. Operators employed a small amount of carbon dioxide which extinguished the fire after a few seconds. This event was selected based on its potential for impacting the mitigating systems cornerstone. The inspectors performed field walkdowns and interviewed the system engineer, the corrective maintenance organization specialists, and electrical technicians. The ESAS system consists of multiple safety-related relays in three separate channels used to form two out of three electric logic for the start circuit of safety-related components needed to detect and mitigate accident conditions. Each of the three channels is installed in separate cabinets. Failure of one of the relays or channels does not render the ESAS actuation logic inoperable.

Laboratory analysis and inspections determined that binding, grinding, and roughness in the relay armature did not allow the relay to completely pick up and make direct contact with the stationary magnet assembly. This caused excessive current and resulted in overheating and eventually the relay coil caught fire. The cause of the failure was attributed to increased friction due to accumulation of debris wear particles between the rod and bore in the magnetic assembly. A misaligned contact (Contact # 6) was also a contributing factor for the increased friction. The inspectors noted that TMI had a long history of similar relay overheating and fires dating back to 1999. The inspectors verified that multiple corrective actions had been implemented to address these issues and that no similar failures had occurred since May 23, 2001. The inspectors verified that the failed relay was replaced and that an appropriate extent of condition review was performed. In addition, the inspectors verified that corrective actions and enhanced inspections were implemented and/or planned to prevent recurrence of this event.

b. Findings and Observations

No findings of significance were identified.

4OA3 Event Followup (71153 - 1 sample)

a. Inspection Scope

On March 10, at 9:25 p.m., an auxiliary operator reported that there was no process flow to either of the two condenser off gas radiation monitors (RM-A5 and RM-A15). The shift manager declared both radiation monitors inoperable and implemented actions required by the Offsite Dose Calculation Manual (ODCM). The primary purpose of the condenser off gas monitors is to provide early detection of a steam generator tube leak. ODCM Table 2.1-2 specifies that if at least one condenser off gas radiation monitor is



not operable within one hour, TS 3.0.1 applies. TS 3.0.1 requires that if the equipment cannot be returned to an operable condition within one additional hour, the plant must be shut down to hot standby within the next six hours. Additional documents reviewed during this inspection are listed in the Attachment.

Troubleshooting identified grit and blue fluid blocking the common discharge line from RM-A5 and RM-A15. Only condenser vapor should be in this line. Initial attempts to clear the debris from the line were not successful. Accordingly, operators began a plant shutdown at 11:25 p.m. in accordance with procedure 1102-4, "Power Operation," Rev. 110. At 3:15 a.m. technicians successfully restored flow to both radiation monitors and RM-A5 and RM-A15 were declared operable. The shift manager exited the TS 3.0.1 action statement, halted the plant shutdown at 70 percent reactor power, and returned the unit to full power later that morning.

The inspectors monitored the organization's response to the inoperable radiation monitors from the outage control center, the control room, and turbine building to evaluate plant conditions and assess whether operator actions were appropriate to place the plant in a stable condition and minimize risk. Additionally, the inspectors reviewed associated regulatory requirements and records, interviewed station personnel, and performed visual inspections of off gas radiation monitors and associated piping. These activities were performed to verify the condition of the radiation monitors and evaluate corrective actions. This event, results of the licensee's prompt investigation, causal analysis, and associated performance deficiencies were documented in IRs 464899, 464927, and 464988.

b. Findings

No findings of significance were identified.

4OA5 Other

.1 (Closed) Unresolved Item 05000289/2005301-01: Use of Rapid Cooldown in Steam Generator Tube Rupture Emergency Operating Procedure

The inspectors identified a minor violation of TS 6.8.1, for failure to adequately establish, implement, and maintain procedures required by Regulatory Guide 1.33. Specifically, procedure OP-TM-EOP-005, "OTSG Tube Leakage," Rev. 2 was determined to be deficient for two reasons. First, the use of dose rates versus integrated dose did not match the radiation limits provided in the Technical Basis document. This violation was determined to be minor because the difference in timing for initiating the emergency cooldown based on the dose rate versus the integrated dose was negligible. Second, the procedure required the operators to unnecessarily invoke 10CFR50.54(x) in responding to an analyzed transient that contained adequate procedural guidance. This violation was determined to be minor because it would not have resulted in any increased risk to the health and safety of the public and would only result in the licensee having to make one additional report to the NRC per 10CFR50.72 to notify them of invoking 10CFR50.54(x). This failure to comply with Technical

Specification 6.8.1 constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's enforcement policy. Issue report 336615 was initiated to correct the procedure deficiencies. This closes unresolved item (URI) 05000289/2005301-01.

#### 4OA6 Meetings, Including Exit

##### Exit Meeting Summary

On April 14, the resident inspectors presented the inspection results to Mr. Rusty West and other members of the TMI staff, who acknowledged the findings. The regional specialist inspection results were previously presented to members of AmerGen management. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

#### 4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an NCV.

- 10 CFR 50.54(q) requires that the licensee follow their emergency plans. Section 3 of the Three Mile Island Station Emergency Plan Annex, Classification of Emergencies, states that emergency action level values are based upon criteria established under NUMARC/NESP-007, "Methodology for Development of EALs," Rev. 2. NUMARC/NESP-007 directs licensees to use site specific values for various radiation monitors to determine if a release has exceeded corresponding dose levels. The licensee identified that two thresholds for the condenser off-gas monitor in Table R1 were incorrect. Specifically, the thresholds for site area and general emergency declarations were too high ("Off-Scale High") and, thus, non-conservative. The errors resulted from a calculation that used an incorrect detector sensitivity value. The licensee discovered this error as a result of a fleet-wide review of EAL values. Upon discovery of this error, the licensee took immediate action to correct the condenser off-gas monitor thresholds before restarting the unit. The issue was addressed in IR 394673 which initiated a prompt investigation, a technical evaluation, extent of condition review, and the associated corrective actions. The inspectors determined this issue to be of very low safety significance because it would not have delayed the declaration of any emergency due to redundancy within the EAL scheme, such as the fission product barrier matrix and dose assessment thresholds.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

C. Arnone, Director, Operations  
S. Baker, Radiation Protection Manager  
G. Chick, Plant Manager  
E. Eilola, Director, Site Engineering  
J. Heischman, Director, Maintenance  
A. Miller, Regulatory Assurance  
D. Mohre, Nuclear Oversight Services Manager  
T. Nahay, Director, Work Management  
C. Smith, Regulatory Assurance Manager  
R. Walton, Chemistry Manager  
C. Wend, Radiation Protection Manager  
R. West, Vice President, TMI Unit 1

Others

M. Murphy, Pennsylvania Bureau of Radiation Protection

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened and Closed

05000289/2006003-01	NCV	Deficient Work Instructions and Maintenance Implementation on Control Building Chiller (Section 4OA2.2)
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Closed

05000289/2005301-01	URI	Use of Rapid Cooldown in Steam Generator Tube Rupture Emergency Operating Procedure (Section 4OA5)
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**LIST OF DOCUMENTS REVIEWED**

**Section 1R01: Adverse Weather Protection**

Drawings:

302-082, "Emergency Feedwater," Rev. 23  
302-610, "Nuclear Services Closed Cycle Cooling Water," Rev. 75  
302-611, "Reactor Building Normal and Emergency Cooling Water," Rev. 12

Procedures:

WC-AA-107, "Seasonal Readiness," Rev. 1  
10015, "Equipment Storage Inside Class I Buildings," Rev. 2

Other Documents:

Work Order R2060121, "Operations Winterization Checks"  
IRs 431209, 431467, 462287  
System Engineering Challenge Review Report for Winterization 2005

**Section 1R04: Equipment Alignment**

Drawings:

302-847, "Control Building Chilled Water," Rev. 21  
302-610, "Nuclear Services Closed Cooling Water," Rev. 75  
302-842, "Control Building and Machine Shop Ventilation," Sheet 1, Rev. 54  
302-842, "Control Building and Machine Shop Ventilation," Sheet 2, Rev. 7  
E-206-051, "250/125 volt DC System & 120 volt AC Vital Instrumentation," Rev. 30

Procedures:

OP-TM-AOP-034, "Loss of Control Building Cooling," Rev. 5  
OP-TM-424-000, "Emergency Feedwater System," Rev. 2  
OP-TM-424-271, "Standby Lineup and Flow Path Verification Check of EFW System," Rev. 2  
1107-2B, "120 Volt Vital Electrical System," Rev. 14, Interim Change 20010

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Procedures:

1082.1, "TMI Risk Management Program," Rev. 5  
WC-AA-101, "On-Line Work Control Process," Rev. 11

Other Documents:

OnLine Station Risk Evaluation Document #749, "MS-V-4A/4B," Rev. 3  
OnLine Station Risk Evaluation Document #893, "Inverter 1B," Rev. 4  
OnLine Station Risk Evaluation Document #994, "Reactor Demand Hand Auto Station," Rev. 1  
OnLine Station Risk Evaluation Document #1171, "1A Inverter," Rev. 3  
OnLine Station Risk Evaluation Document #1173, "622," Rev. 1  
OnLine Station Risk Evaluation Document #1177, "622," Rev. 1  
OnLine Station Risk Evaluation Document #1178, "Inverter 1E," Rev. 1  
Three Mile Island Work Week Plan for Week 0613, Rev. 1

Issue Reports:

311629                      464460                      465924                      467258                      471490                      471761

**Section 1R14: Operator Performance During Non-Routine Evolutions and Events**

Procedures:

1107-2B, "120 Volt Vital Electrical System," Rev. 14, Interim Change 20010  
1430-TCS-1, "Turbine Control System Maintenance," Rev. 7  
OP-TM-621-471, "Integrated Control System Manual Control," Rev. 1, Interim Change 19852  
OP-TM-621-473, "Unit Load Demand Manual Control," Rev. 1  
OP-TM-622-451, "Transferring Rods to Auxiliary Power Supply," Rev. 0  
OP-TM-AOP-064, "Uncontrolled Rod Motion," Rev. 0, Interim Change 20041  
OP-TM-AOP-070, "Primary to Secondary Plant Upset," Rev. 0  
MA-AA-716-004, "Conduct of Troubleshooting," Rev. 4

Other Documents:

Work Order A2137805, "Motor Fault Received on Diamond Rod Control Panel"

IR 465924

Plant Operating Review Committee meeting 2006-07 agenda dated March 14, 2006

**Section 1R15: Operability Evaluations**

Drawings:

302-011, "Main Steam," Rev. 67

Procedures:

OP-AA-108-101, "Control of Equipment and System Status," Rev. 3

OP-TM-214-201, "Inservice Testing of BS-P-1A and Valves," Rev. 4

OP-TM-622-201, "Control Rod Movement," Rev. 1

OP-TM-622-414, "Exercising One or More Control Rods," Rev. 1, Interim Change 19556

MA-AA-716-004, "Conduct of Troubleshooting," Rev. 4

Other Documents:

Work Orders R2030351, R2078164

IRs 445036, 450799, 453332, 456197, 461764, 461841, 462228 Complex Troubleshooting Plan, "Group 7 Rod 5, N-8, mechanism 35," dated February 28, 2006

Equipment Status Tag Log (EST) 2006-057

TMI Operations Daily Orders dated March 10, 2006

**Section 1R19: Post Maintenance Testing**

Procedures:

OP-TM-424-201, "IST of EF-P-2A," Rev. 2

1300-3KB, "IST of RR Pump 'B' and Valves," Rev. 0

Work Orders:

A2138896    A2139032    C2012470    R2081775    R2054124

**Section 1R22: Surveillance Testing**

Drawings:

302-842, "Control Building and Machine Shop Ventilation," Sheet 1, Rev. 54

302-842, "Control Building and Machine Shop Ventilation," Sheet 2, Rev. 7

302-842, "Control Building and Machine Shop Ventilation," Sheet 3, Rev. 2

Procedure:

1303-4.13, "RB Emergency Cooling and Isolation System Analog Test," Rev. 36

**Section 1EP6: Drill Evaluation**

Procedures:

EP-AA-1000, "Exelon Nuclear Standardized Radiological Emergency Plan," Rev. 16

EP-AA-1009, "Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station," Rev. 6

OP-TM-212-101, "Shifting DHR Trains A and B from ES Standby to DHR Standby," Rev. 2

OP-TM-1202-12, "Excessive Radiation Levels," Rev. 51

OP-TM-1202-38, "Nuclear Services River Water Failure," Rev. 40  
OP-TM-1203-44, "Hazardous Releases," Rev. 38  
OP-TM-EOP-001, "Reactor Trip," Rev. 6  
OP-TM-EOP-003, "Excessive Primary-to-Secondary Heat Transfer," Rev, 3  
OP-TM-EOP-005, "OTSG Tube Leakage," Rev. 3  
OP-TM-EOP-010, "Emergency Procedure Rules, Guides, and Graphs," Rev, 5  
OS-24, "Conduct of Operations during Abnormal and Emergency Events," Rev. 11  
ILT Simulator Exercise Guide SROUS-19, "NRW Failure and OTSG tube leak and main steam line break," Rev. 7

**Section 40A2: Identification and Resolution of Problems**

Procedures:

CC-MA-103-1001, "Implementation of Configuration Changes," Rev. 6  
HU-AA-104-101, "Procedure Use and Adherence," Rev. 1  
LS-AA-125, "Corrective Action Program Procedure," Rev. 8  
MA-MA-716-010-1000, "PIMS Work Order Process Manual," Rev. 3  
MA-MA-716-010-1008, "Work Order Work Performance," Rev. 2  
OP-TM-AOP-034, "Loss of Control Building Cooling," Rev. 5

Issue Reports:

320086	320094	369736	385572
453906	453912	454043	454045
457180	463499	454700	368810
236298	325952		

Other Documents:

Vendor Manual VM-TM 2795, "Mercer Rubber Expansion Joints," Rev. 0  
Work Orders C2009430 C2009431 C2009432 C2010971 C2010974  
A2121075

**Section 40A3: Event Follow-Up**

TMI Operations Daily Order dated March 11, 2006

**Section 40A5: Other**

NRC Generic Letter 83-31, "Safety Evaluation of Abnormal Transient Operating Guidelines"

**LIST OF ACRONYMS**

AC	Alternating Current
ADAMS	Agencywide Documents and Management System
AmerGen	AmerGen Energy Company, LLC
CFR	Code of Federal Regulations
DC	Direct Current
DEP	Drill/Exercise Performance
DRP	Division of Reactor Projects
DTCS	Digital Turbine Control Station
EAL	Emergency Action Level
EDG	Emergency Diesel Generator
ESAS	Emergency Safeguards Actuation System
IMC	Inspection Manual Chapter
IR	Issue Report
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
NSRW	Nuclear Service River Water
ODCM	Off-site Dose Calculation Manual
PARS	Publicly Available Records
PI	Performance Indicator
PMT	Post-Maintenance Test
SDP	Significance Determination Process
TM	Temporary Modification
TMI	Three Mile Island, Unit 1
TS	Technical Specifications
WO	Work Order