

November 2, 2006

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

SUBJECT: THREE MILE ISLAND STATION, UNIT 1 - NRC INTEGRATED INSPECTION  
REPORT 05000289/2006005

Dear Mr. Crane:

On September 30, 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 October 11, 2006, with Mr. Thomas J. Dougherty, TMI Plant Manager 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. However, because of the very low safety significance and because it is entered into your corrective action program, the NRC is treating this violation as a non-cited violation (NCV) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest the 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 Inspectors 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 05000289/2006005  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION 1

Docket No: 05000289

License No: DPR-50

Report No: 050000289/2006005

Licensee: AmerGen Energy Company, LLC (AmerGen)

Facility: Three Mile Island Station, Unit 1

Location: PO Box 480  
Middletown, PA 17057

Dates: July 1 - September 30, 2006

Inspectors: David M. Kern, Senior Resident Inspectors  
Javier M. Brand, Resident Inspectors  
Steve Barr, Senior Emergency Preparedness Inspectors  
John G. Caruso, Senior Operations Engineer  
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## SUMMARY OF FINDINGS

IR 05000289/2006005; 7/1/2006 - 9/30/2006; AmerGen Energy Company, LLC; Three Mile Island, Unit 1; Post Maintenance Testing.

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 Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI "Corrective Action" for untimely action to correct degraded performance of the borated water storage tank (BWST) low level alarm. Differential pressure instrument DH-DPIS-914 failed six of its last eight calibration tests. The most recent test failure, on July 11, 2006, found the BWST low level alarm instrument to be inoperable. Previous corrective actions were untimely and permitted the BWST low level alarm to remain unreliable for extended periods of time. Actions (i.e., instrument replacement or reduced surveillance interval) to restore instrument reliability were not implemented. Issue reports 523284 and 525514 were initiated to document and correct the problem.

This issue is more than minor because it affected the human performance attribute of the Mitigating Systems cornerstone. Specifically, the unreliable BWST low level alarm reduced the likelihood that operators would successfully perform the risk critical manual decay heat removal suction swap-over function. This, in turn, reduced the reliability of the low pressure recirculation, low pressure injection, and reactor building spray safety functions in response to a design basis loss of coolant accident. Additionally, the inspectors determined station personnel had not implemented the station-wide instrument performance trending program for over 4 years. This finding is of very low safety significance because it did not involve an actual loss of safety function. This finding has a cross-cutting aspect in the area of problem identification & resolution. (Section 1R19)

### B. Licensee Identified Violations

None.

## REPORT DETAILS

### Summary of Plant Status

Three Mile Island, Unit 1 (TMI) operated at or near 100 percent rated thermal power for the entire inspection period.

#### 1. REACTOR SAFETY

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

#### 1R02 Evaluations of Changes, Tests, or Experiments (IP 71111.02 - 16 samples)

##### a. Inspection Scope

The inspectors reviewed five safety evaluations (SEs), which were associated with plant modifications completed during the past two years. The selected SEs were reviewed to verify whether changes to the facility or procedures, as described in the Updated Final Safety Analysis Report (UFSAR), were evaluated and documented in accordance with 10 CFR 50.59, and that safety issues pertinent to the changes were properly resolved or adequately addressed. The reviews also included the verification that AmerGen had appropriately concluded that the changes and tests could be accomplished without obtaining license amendments. The SEs reviewed are listed in the Attachment.

The inspectors also reviewed eleven 10 CFR 50.59 screened-out evaluations for which AmerGen determined that no SE was required. These reviews were performed to verify that AmerGen's threshold for performing SEs was consistent with 10 CFR 50.59. The screened-out evaluations reviewed are listed in the Attachment.

In addition, the inspectors reviewed the administrative procedures that were used to control the screening, preparation, and issuance of the SEs to verify that the procedures adequately covered the requirements of 10 CFR 50.59.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment (71111.04 - 4 samples)

##### a. Inspection Scope

##### Partial System Walkdowns

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

- On July 13, 'B' emergency diesel generator (EDG) and vital 4 kilovolt electrical system, while the 'A' EDG was out of service due to a low glycol level in its radiant air cooler.

- On July 25, 'A' train of the control building emergency ventilation system while the 'B' train was out of service for HEPA filter inspection and charcoal filter sampling.
- On September 26, 'B' train of the decay heat removal (DH) system while the 'A' train was out of service for planned maintenance.

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. The inspectors also reviewed use of overtime by operations department personnel to determine whether there was a related impact on equipment configuration control (IR 508420). 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 September 5, 2006, the inspectors conducted a detailed review of valve and component alignment and material condition of the emergency feedwater system.

#### b. Findings

No findings of significance were identified.

#### 1R05 Fire Protection (71111.05)

##### .1 Annual Drill Observation (71111.05A - 1 sample)

#### a. Inspection Scope

The inspectors observed an announced fire brigade drill on August 30, 2006, to evaluate the readiness of station personnel to respond to and fight fires. The drill demonstrated response to a fire in the Unit 1 Control Building 1D 4160 volt switchgear room. The inspectors observed fire brigade members regarding their use of protective clothing and appropriate turnout gear, including self-contained breathing apparatus, and their approach and methods in the combat of the fire as well as their interaction with the control room. The inspectors observed implementation of the fire fighting strategies by the fire brigade and communications between participants throughout the drill. The inspectors reviewed the drill scenario objectives, determined whether drill scenario objectives were met, and observed the post drill critique to verify that the licensee identified, discussed, and entered adverse conditions into the corrective action program. Documents reviewed during the inspection included:

- OP-AA-201-003, "Fire Drill Performance," Rev. 7



b. Findings

No findings of significance were identified.

.2 Area Walkdowns (71111.05 - 10 samples)

a. Inspection Scope

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. 66. 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. 3. 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. Additional documents reviewed during this inspection are listed in the Attachment. Fire zones and areas inspected included:

- Fire Zone CB-FA-2A, Control Building Elev. 322', 480 V ES CC-1A & 1P Switchgear Room;
- Fire Zone CB-FA-2B, Control Building Elev. 322', 480 V ES CC-1B & 1S Switchgear Room;
- Fire Zone CB-FA-2C, Control Building Elev. 322', Backup Technical Support Center;
- Fire Zone CB-FA-2D, Control Building Elev. 322', East Inverter Room;
- Fire Zone CB-FA-3A, Control Building Elev. 338', 4160 V Switchgear 1E Room;
- Fire Zone CB-FA-3B, Control Building Elev. 338', 4160 V Switchgear 1D Room;
- Fire Zone IB-FZ-3, Intermediate building Elev. 295', Motor Driven Emergency Feedwater Pump Area
- Inspectors reviewed IRs 512255 and 515667 which evaluated repeated station black out diesel generator room fire panel alarms (PLF-4-6);
- Inspectors reviewed IR 513208 which evaluated two deluge nozzles found clogged during flow testing of the safety related control building charcoal filter AH-F-3B; and
- On September 19-28, an abandoned unit auxiliary transformer located within the protected area was disassembled and removed. Disassembly involved hot-work in the vicinity of combustibles. The inspectors discussed the work activity with station personnel and reviewed the hot-work permit, transformer design, transformer disassembly work plan, fire protection compensatory measures, and emergency plan considerations in the event of an associated fire.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07 - 2 samples)

a. Inspection Scope

Based on plant specific risk importance, the inspectors selected the station blackout diesel generator cooling water heat exchanger (HX) and the 'A' decay heat removal system HX (DH-C-1A and DC-C-2A) as samples for inspection. The inspectors evaluated the heat removal capability and verified that any potential heat exchanger deficiencies which could mask degraded performance were identified. The inspectors reviewed ECR TM 05-00684 000, "T1R16 DH-C-1A and DC-C-2A Cooler Testing," performed under A/R A2125469. The inspectors reviewed the operations data and verified that the performance monitoring was conducted using methods outlined in EPRI NP-7552, "Performance Monitoring Guidelines," that pre-established criteria were appropriate, and that the heat exchanger performance met the pre-established criteria, including heat exchanger inlet and outlet temperatures and secondary side fluid flow. The inspectors also reviewed GPU Letter 6710-96-2097, Generic Letter 89-13 Revised Response dated June 6, 1996, to ensure the licensee was implementing commitments made in response to Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." Also, the inspectors reviewed methods for monitoring and controlling biotic and macro-fouling to verify that they were implemented effectively. The inspectors reviewed a sample of Issue Reports (IRs) related to the selected heat exchangers to ensure that problems related to these components were appropriately identified, characterized, and corrected. Additional documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

On September 26, 2006, the inspectors observed licensed operator requalification training at the control room simulator for the 'D' 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 TMI Operational Simulator Scenario Number 7, "Loss of Main Feedwater, Failed Open Power Operated Relieve Valve, Emergency Feedwater Failures, and Loss of 25 Degree Subcooling Margin," Rev. 11. 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 the fidelity of the simulator to the actual plant. The inspectors evaluated training instructor effectiveness in recognizing and correcting individual and operating crew errors. 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. 4.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12 - 2 samples)

a. Inspection Scope

The inspectors evaluated Maintenance Rule (MR) implementation for the following: 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. Additionally, extent of condition follow-up, operability, and functional failure determinations were reviewed to verify they were appropriate. 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," Rev. 2, and AmerGen procedure ER-AA-310, "Implementation of the Maintenance Rule," Rev. 5. The inspectors verified that appropriate corrective actions were initiated and documented in IRs, and that engineers properly categorized failures as maintenance rule functional failures and maintenance preventable functional failures when applicable.

- IR 504314 described a Halide Test failure of the 'A' control building emergency ventilation filter (AH-F-3A) during performance of an annual surveillance test.
- IR 523013 described mechanical binding of the manual actuator for makeup valve MU-V-26 during performance of a quarterly surveillance test per procedure 1303-5.1B, "B RB Emergency Cooling and Isolation System Logic Channel / Component Test," Rev. 3.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 5 samples)a. Inspection Scope

The inspectors reviewed the scheduling, control, and restoration during the following maintenance activities 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. 12.

- On August 2, the independent grid operator controller issued a maximum emergency generation warning due to elevated ambient temperatures. This condition elevated the on-line maintenance risk profile to yellow (Risk Document 1207, Rev. 2).
- On August 22, the 'A' emergency safeguards actuation system train was removed from service for surveillance testing per ST1303-5.1A, "ESAS RB Cooling and Isolation Test," Rev. 2 (Risk Document 534, Rev. 4).
- On September 6, reactor river water cooling pump RR-P-1A was removed from service for scheduled seal re-packing activity. This condition elevated the on-line maintenance risk profile to yellow (Risk Document 527, Rev. 7).
- On September 22, fire service pump FS-P-1 was removed from service for scheduled maintenance activities, while the backup altitude tank was out of service to repair a small leak. This condition elevated the on-line maintenance risk profile to yellow (Risk Document 516, Rev. 6).
- On September 26, the 'A' train for the decay heat, decay closed, and decay river water systems was removed from service for scheduled maintenance activities. This condition elevated the on-line maintenance risk profile to orange (Risk Document 1133, Rev. 1).

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 4 samples)a. Inspection Scope

The inspectors reviewed operability evaluations for the following degraded equipment issues. The inspectors verified that degraded conditions in question were properly characterized, operability of the affected systems was properly evaluated in relation to Technical Specification (TS) requirements, that 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,

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“Operability Determinations,” Rev. 1, to determine acceptability of the operability evaluations.

- On June 11, 2006, operators observed a 10 percent lower discharge pressure from fire service pump FS-P-1, during monthly surveillance testing. Engineers determined that this condition did not affect pump operability (IR 498862).
- On July 12, 2006, operators observed an unexplained drop in the ‘B’ core flood tank (CF-T-1B) level and pressure. Engineers determined this condition was associated with seat leakage from sample valve CF-V-20B, and that the ‘B’ core flood tank remained operable (IR 509864 and IR 534917).
- On July 14 and the week of July 31, operators observed elevated average temperatures in the reactor building containment, due to increased ambient temperatures. The elevated containment temperatures exceeded the 125 degrees Fahrenheit alarm set point and on August 1, peaked at 129 degrees. The inspectors verified that a proper adverse condition monitoring plan was developed, and that temperatures did not exceed the specified limit of 130 degrees (IR 509540 and 509458).
- In early August, operators observed elevated reactor coolant system (RCS) leakage after chemists completed drawing a sample from the ‘B’ core flood tank. Troubleshooting to identify the source of the leakage and an operability evaluation were performed as described in IR 518820. Engineers determined the leakage was associated with CF-V-20B and this containment isolation valve remained operable (IR 509864 and IR 534917).

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications (IP 71111.17B - 9 samples)

a. Inspection Scope

The inspectors reviewed nine risk-significant permanent plant modifications selected from the design changes completed within the past two years. The review was to verify that the design bases, licensing bases, and performance capability of risk significant structures, systems, and components (SSCs) had not been degraded through the modification process.

The selected plant modifications were distributed among the initiating event, mitigating system, and barrier integrity cornerstones. For the selected permanent plant modifications, the inspectors reviewed the design inputs, assumptions, and design calculations. The inspectors compared selected attributes, such as safety classification, energy requirements, instrument setpoints, and results from supporting electrical and mechanical calculations and analyses, to the design and licensing bases to determine

the design adequacy. The inspectors reviewed affected procedures, drawings, design basis documents, and the UFSAR to verify that the affected documents were appropriately revised and updated. The inspectors reviewed the post-modification testing, functional testing, and instrument calibration records to determine whether the SSCs were ready for operation. Field change notices, issued during installation work activities, were also reviewed to identify whether problems associated with the installation were adequately resolved. For the selected permanent plant changes, the 10 CFR 50.59 screens or evaluations were reviewed as described in section 1R02 of this report.

For the accessible components associated with the selected plant changes, the inspectors performed field walkdowns to assess whether there were any abnormal or unexpected installation conditions. A listing of the modifications and documents reviewed is provided in the Attachment.

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 the following post-maintenance test (PMT) activities 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.

- On June 28, 2006, maintenance technicians and engineers performed testing of the 'A' train control building emergency ventilation train in accordance with procedure U-36, "Ventilation Filter DOP & Halide Testing," Rev. 9, following planned preventive inspections of the filter and charcoal bed sampling.
- On July 12, technicians calibrated borated water storage tank (BWST) level transmitter DH-LT-808 in accordance with work order R2059330 after finding the transmitter indication low, outside of the calibration band (IRs 508103, 517937).
- On July 12, technicians calibrated BWST level alarm differential pressure instrument DH-DPIS-914 in accordance with work order R2059330 after finding the transmitter indication low, outside of the calibration band (IRs 508485, 523284, 525514).
- MU-V26 (reactor coolant pump seal return line containment isolation valve) pressure integrity verification and valve freedom of motion test following installation of temporary modification TM 06-00667 and removal of TM 06-00666 in accordance with work order C2013428.

- On August 30, instrumentation and control technicians and plant operators performed testing in accordance with procedure 1303-4.13, "RB Emergency Cooling And Isolation System Analog Test," Rev. 37, following planned replacement and inspection of safety relay 62X3/RC1A.
- On September 26, operators performed testing in accordance with procedure OP-TM-533-201, "IST Of DR-P-1A and valves," Rev. 7.
- On September 26, operators performed testing in accordance with procedure OP-TM-543-201, "IST of DC-P-1A," Rev. 2.

b. Findings

Introduction. The inspectors identified a Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for untimely action to correct degraded performance of BWST level alarm differential pressure instrument DH-DPIS-914.

Description. On July 11-12, 2006, technicians performed a biennial BWST level instrumentation calibration in accordance with work order R2059330. Transmitter DH-LT-808 and the associated computer point (A0287) for BWST level indication were found low, outside of the instrument operability criteria. Technicians promptly recalibrated both instruments. The inspectors questioned whether DH-LT-808 had a trend of excessive instrument drift and whether further corrective action was necessary. Engineers reviewed the calibration history for the past 4 years, concluded the transmitter had excessive drift, and initiated corrective action to replace the transmitter (IR 517937).

The inspectors noted that BWST level alarm differential pressure instrument DH-DPIS-914 was also found low, outside of the instrument operability criteria (IR 508485). Technicians promptly recalibrated the instrument and the associated IR was closed with no further action required. The inspectors reviewed calibration records and noted this instrument was found out of calibration on six of the previous eight calibration surveillances. In five instances the instrument was found outside of the instrument operability criteria. The inspectors determined that the BWST low level alarm was inoperable for extended periods of time over this 12 year period.

The BWST low level alarm is not required by TS. However, TMI UFSAR section 6.1 states "When the BWST reaches a low level, an alarm will be annunciated in the Control Room. At this time the operator will take action to .... open the reactor building (RB) sump isolation valves to transfer the Decay Heat (DH) pump suction (from the BWST) to the RB sump." This manual action must be performed while the BWST level is within a specific level band to support long term decay heat removal following a loss of coolant accident (LOCA). OP-TM-MAP-E0204, "BWST Level Low Alarm," Rev. 1 directs operators to perform the manual emergency core cooling system (ECCS) suction swap-over from the BWST to the RB sump upon receipt of this alarm. The TMI Probabilistic Risk Assessment identifies this as a critical manual operator action to prevent core damage.

In response to inspectors' questions, engineers identified that IR 321290 had been initiated in 2005 to identify a replacement for DH-DPIS-914, due to its degraded performance. To date, no replacement instrument was identified and no other corrective action (i.e., reduced surveillance interval) to improve instrument performance was implemented. The inspectors further questioned whether TMI had programmatic requirements to trend instrument performance. In researching this issue the licensee identified that station personnel had not implemented procedure ER-AA-520, "Instrument Performance Trending," Rev. 3, which had been in effect at TMI since 2002.

The inspectors reviewed records and interviewed operations training personnel. Operators are trained to rely on BWST level indication, rather than the BWST low level alarm, to alert them when to perform the manual swap-over from BWST to RB sump. However, the elevated intensity of the control room environment during operator response to a LOCA increases the potential for human error. The inspectors also noted, as described above, that one train of BWST level instrumentation (DH-LT-808 and computer point A0287) was degraded and was found outside of its operability range. The inspectors concluded that: 1) the unavailability of the BWST low level alarm reduced the probability that operators would successfully perform the risk critical manual suction swap-over action; and 2) corrective action to resolve the degraded BWST low level alarm function was untimely. AmerGen initiated IR 525514 to replace DH-DPIS-914.

Analysis. Untimely correction of excessive DH-DPIS-914 instrument drift permitted the BWST low level alarm function to be unreliable for extended periods of time and was a performance deficiency. This issue was more than minor because it affected the human performance attribute of the Mitigating Systems cornerstone. Specifically, the unreliable BWST low level alarm reduced the likelihood that operators would successfully perform the risk critical manual decay heat removal suction swap-over function. This in turn reduced the reliability of the low pressure recirculation, low pressure injection, and building spray functions following a LOCA. Additionally, engineers had not implemented the station-wide instrument performance trending program for over 4 years. If left uncorrected this issue could become a more significant concern, because instrument drift could remain uncorrected and degrade the reliability of additional systems.

The 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 loss of safety function. This finding has a cross-cutting aspect in the area of problem identification & resolution, because the licensee did not implement appropriate corrective action to address the degraded DH-DPIS-914 performance trend in a timely manner.

#### Enforcement.

10 CFR 50, Appendix B, Criterion XVI, "Corrective Action" requires, in part, that conditions adverse to quality such as equipment deficiencies and malfunctions shall be promptly identified and corrected. Contrary to the above, degraded performance of the BWST low level alarm, since 1994, had not been corrected. On six occasions,

Enclosure



DH-DPIS-914 failed its calibration. Five of these failures, the latest being on July 11, 2006, found the BWST low level alarm instrument to be inoperable. To date no replacement instrument was identified and no other corrective action (i.e., reduced surveillance interval) to restore instrument reliability was implemented. Because this violation was of very low safety significance and was entered into the TMI corrective action program (IRs 523284 and 525514), this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy: **NCV 05000289/2006005-01, Untimely Corrective Actions for Unreliable BWST Level Alarm Instrument.**

1R22 Surveillance Testing (71111.22 - 6 samples)

a. Inspection Scope

The inspectors observed and/or reviewed the following operational surveillance tests, to verify 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.

- On July 13, 2006, procedure 1303-4.16, "Emergency Power System," Rev. 109 performed on the 'B' emergency diesel generator (EDG). The inspectors verified proper completion of this monthly surveillance test upon discovery, later the same day, that the 'A' EDG was inoperable due to low coolant level.
- On July 31, procedure 1300-3KA, "IST of RR Pump 'A' and Valves," Rev. 0
- On August 19, procedure 3303-M1, "Fire Pump Periodic Operation," Rev. 36
- On August 22, procedure 1303-5.1A, "A RB Emergency Cooling and Isolation System Logic Channel/Component Test," Rev. 2.
- On September 5, procedure OP-TM-424-201, "IST of EF-P-2A," Rev. 2.
- On September 13, procedure 1300-3KB, "IST of RR Pump 'B' and Valves," Rev. 0.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 - 1 sample)

a. Inspection Scope

The inspectors reviewed the temporary modification (TM) associated with Engineering Change Request (ECR) 06-00667, "MU-V26 Operator Cover Plate TCP," Rev. 0. The review included the associated implementing documents, interviews with the respective

system engineer and work planners, and a walkdown of the in-plant system to verify plant design basis and system and component operability were maintained. Procedures CC-AA-112, "Temporary Configuration Changes," Rev. 10, and CC-TM-112-1001, "Temporary Configuration Change Implementation," Rev. 3, specified requirements for development and installation of TMs. Additional documents reviewed during the inspection are listed in the Attachment.

- Temporary modification TM 06-00667 was implemented on August 24, 2006, to restore MU-V26 pressure boundary integrity and operability following removal of the manual valve operator, which had failed with the valve in the open position.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness [EP]**

1EP2 Alert and Notification System (ANS) Testing (71114.02 - 1 Sample)

a. Inspection Scope

An onsite review was conducted to assess the maintenance and testing of the licensee's ANS. The inspectors interviewed corporate and site EP staff responsible for implementation of the ANS testing and maintenance. Issue Reports (IRs) pertaining to the ANS were reviewed for causes, trends, and corrective actions. The inspectors reviewed IR 505191, written for the failure of 21 of 96 sirens on June 29 during the annual full activation test, the licensee's subsequent prompt investigation report, and planned corrective actions for this event. The inspectors further discussed with the licensee their plans to add both sirens and repeaters to the siren system. The inspectors reviewed the licensee's original ANS design report to ensure compliance with commitments for system maintenance and testing. The inspection was conducted in accordance with Inspection Procedure 71114, Attachment 02. Planning standard, 10 CFR 50.47(b)(5) and the related requirements of 10 CFR 50, Appendix E were used as reference criteria. Additional documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization (ERO) Augmentation Testing (71114.03 - 1 Sample)

a. Inspection Scope

A review of Three Mile Island's ERO augmentation staffing requirements and the process for notifying the ERO was conducted. This was performed to ensure the readiness of key staff for responding to an event and to ensure timely facility activation. Records from call-in drills and one recent mustering drill were reviewed. The inspectors reviewed procedures and CRs associated with the ERO notification system and drills. The inspectors interviewed personnel responsible for testing the ERO augmentation process. The inspectors compared qualification requirements to the training records for a sample of ERO members. The inspectors also verified that the EP department staff were receiving required training as specified in the emergency plan. The inspection was conducted in accordance with Inspection Procedure 71114, Attachment 03. Planning standard, 10 CFR 50.47(b)(2) and related requirements of 10 CFR 50, Appendix E were used as reference criteria. Additional documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

Prior to this inspection, the NRC had received and acknowledged changes made to the Three Mile Island Emergency Plan (the Plan) and implementing procedures. These changes were made in accordance with 10 CFR 50.54(q). The licensee determined these changes did not result in a decrease in effectiveness to the Plan and concluded that the Plan continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR 50. The inspectors reviewed changes made to the Plan, such as, the changes to site access made at the site's south bridge and changes to the memorandum of understanding between AmerGen and Norfolk Southern Railroad concerning the passage of trains in front of the site's north bridge access point. During this inspection the inspectors conducted a sampling review of the changes that could potentially result in a decrease in effectiveness. This review does not constitute an approval of the changes and, as such, the changes are subject to future inspection. The associated 10 CFR 50.54(q) reviews for the changes were sampled by the inspectors. Also, the NRC reviewed the licensee's EAL scheme for logic and consistency, and the licensee's plans for revising the EALs in accordance with NEI 99-01, Revision 4. The inspection was conducted in accordance with Inspection Procedure 71114, Attachment 4. The requirements in 10 CFR 50.54(q) were used as reference criteria. Additional documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies (71114.05 - 1 Sample)

a. Inspection Scope

The inspectors reviewed self-assessments and audit reports to assess the licensee's ability to evaluate their performance and programs. The inspectors reviewed CRs initiated by AmerGen at Three Mile Island from drills, self-assessments, and audits, and attended a TMI Emergency Preparedness Advisory Council meeting. The review was conducted to evaluate the significance of the issues, to determine if repeat problems were occurring, and to assess the effectiveness of corrective actions. This inspection was conducted according to Inspection Procedure 71114, Attachment 05. Planning standard, 10 CFR 50.47(b)(14) and the related requirements of 10 CFR 50 Appendix E were used as reference criteria. Additional documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY**

**Cornerstone: Public Radiation Safety**

2PS3 Radiological Environmental Monitoring Program (71122.03 - 10 samples)

a. Inspection Scope

The inspectors reviewed implementation of AmerGen's Radiological Environmental Monitoring Program (REMP) and AmerGen's assessment results to verify that the REMP was implemented as required by the TS and the Offsite Dose Calculation Manual (ODCM). The review was against criteria specified in TSs, station procedures, the REMP program requirements outlined in the ODCM, and NRC Branch Technical Position, "An Acceptable Radiological Environmental Monitoring Program," Rev. 1.

Inspection Planning and In-Office Inspection

The inspectors reviewed the 2005 Annual Environmental Monitoring Reports and licensee assessment results to verify that the REMP was implemented as required by TS and the ODCM. The inspectors reviewed the report for changes to the ODCM with respect to environmental monitoring; commitments in terms of sampling locations and stations, monitoring and measurement frequencies; land use census; inter-laboratory

comparison program; and analysis of data. The inspectors also reviewed the UFSAR results for information regarding the environmental monitoring program and meteorological monitoring instrumentation.

The inspectors reviewed licensee self-assessments, audits, licensee event reports, and inter-laboratory comparison program results. (See Section 40A2)

### Onsite Inspection

The inspectors walked down and observed the collection of two particulate and iodine samples (A3-1, G2-1) from environmental monitoring stations, observed the collection of milk from two locations stations (G2-1, E2-2), and observed the collection of one down-river surface water (J1-2) and two drinking water (G15-2, G15-3) samples to verify that the environmental sampling was representative of the release pathways as specified in the ODCM and that sampling techniques were in accordance with approved collection procedures. The inspectors also inspected five thermoluminescent dosimeter (TLD) monitoring stations (G2-4, H3-1, G15-1, C1-1, B1-1) to determine whether they were located as described in the ODCM and to determine the equipment material condition.

The inspectors observed ongoing calibration activities at the meteorological tower. The inspectors selectively reviewed calibration testing records for the meteorological towers to verify that meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the UFSAR, NRC Safety Guide 23, and licensee procedures. The inspectors compared meteorological instrument readouts in the control room and at the tower for operability and evaluated readout data to identify if there were line loss differences from the control room and meteorological towers. The inspectors reviewed and discussed conditions at the meteorological tower to identify potential interferences with measurements (e.g., trees).

The inspectors reviewed each event documented in the Annual Environmental Monitoring Report, as applicable, which involved a missed sample, inoperable sampler, lost TLD, or anomalous measurement for its cause and corrective actions.

The inspectors conducted a review of AmerGen's assessment of positive sample results (i.e., licensed radioactive material detected above the lower limits of detection (LLDs)). The inspectors reviewed the associated radioactive effluent release data that was the likely source of the released material and associated dose results.

The inspectors reviewed any significant changes made by AmerGen to the ODCM as the result of changes to the land use census or sampler station modifications since the last inspection. The inspectors reviewed technical justifications for any changed sampling locations. The inspectors evaluated the reviews required to ensure that the changes did not affect its ability to monitor the impacts of radioactive effluent releases on the environment.

The inspectors reviewed the calibration and maintenance records for selected air samplers (locations A3-1, G2-1) and composite water samplers (locations J1-2, G15-2, G15-3).

The inspectors reviewed the results of AmerGen's vendor laboratory to analyze the REMP samples and reviewed the results of the vendor's quality control program, including the inter-laboratory comparison program, to verify the adequacy of the vendor's program.

The inspectors reviewed audits and technical evaluations performed on the vendor's program. The inspectors reviewed the results of the inter-laboratory comparison program to verify the adequacy of environmental sample analyses performed and the quality control evaluation of the inter-laboratory comparison program and the corrective actions for any deficiencies. Where applicable, the inspectors reviewed determination of any bias to the data and the overall effect on the REMP. The inspectors reviewed QA audit results of the program.

The inspectors also evaluated monitoring and evaluation of tritium in ground water, re-use of contaminated ground water from industrial wells, and conduct of applicable dose evaluations.

#### Unrestricted release of material from the Radiologically Controlled Area (RCA)

The inspectors reviewed AmerGen's practices for monitoring potentially contaminated material leaving the RCA, and inspected the methods used for control, survey, and release from these areas. The inspectors previously observed the performance of personnel surveying and releasing material for unrestricted use to verify that the work was performed in accordance with plant procedures.

The inspectors verified that the radiation monitoring instrumentation was appropriate for the radiation types present and was calibrated with appropriate radiation sources. The inspectors reviewed AmerGen's criteria for the survey and release of potentially contaminated material and verified that there was guidance on how to respond to an alarm which indicated the presence of licensed radioactive material.

The inspectors reviewed AmerGen's equipment to ensure the radiation detection sensitivities were consistent with the guidance for surface contamination and for volumetrically contaminated material. The inspectors discussed AmerGen's capabilities to detect radionuclides that decay via electron capture. The inspectors reviewed procedures and records to verify that the radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters (i.e., counting times and background radiation levels). The inspectors verified that AmerGen had not established a release limit by altering the instruments typical sensitivity through methods such as raising the energy discriminator level or locating the instrument in a high radiation background area.

### Identification and Resolution of Problems

The inspectors reviewed AmerGen Event Reports, Special Reports, audits, and self-assessments related to the radioactive materials release survey practices to determine if identified problems are entered into the corrective action program for resolution commensurate with their importance to safety and risk. (See Section 4OA2)

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

### 4OA1 Performance Indicator (PI) Verification (71151- 3 Samples)

a. Inspection Scope

The inspectors reviewed data for the EP PIs which are: (1) Drill and Exercise Performance (DEP); (2) Emergency Response Organization (ERO Drill Participation; and (3) Alert and Notification System (ANS) Reliability. The inspectors reviewed supporting documentation from emergency preparedness drills and tests for the period April 2005 to June 2006, to verify NRC PIs had been accurately reported to the NRC as required by NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Rev. 4. The review of these PIs was conducted in accordance with Inspection Procedure 71151. The acceptance criteria also included 10 CFR 50.9.

b. Findings

No findings of significance were identified.

### 4OA2 Identification and Resolution of Problems (71152 - 2 annual samples)

#### .1 Review of Items Entered into the Corrective Action Program 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.

The inspectors also reviewed a sample of IRs associated with 10 CFR 50.59 issues and plant modification issues to ensure that AmerGen was appropriately identifying, characterizing, and correcting problems associated with these areas and that the

planned or completed corrective actions were appropriate. Additional documents reviewed during this inspection are listed in the attachment.

Section 1R19 describes a finding for untimely action to correct degraded performance of BWST level alarm differential pressure instrument DH-DPIS-914. Incomplete assessment of the excessive DH-DPIS-914 instrument drift and untimely correction permitted the BWST low level alarm function to be unreliable for extended periods of time.

## .2 Radiological Environmental Monitoring Program

### a. Inspection Scope

The inspectors reviewed audits and self-assessments to determine if identified problems were entered into the corrective action program for resolution. The inspectors also reviewed Action Requests to evaluate AmerGen's threshold for identifying, evaluating, and resolving problems relating to occupational radiation safety. The review included a check of possible repetitive issues such as radiation worker or radiation protection technician errors. The following documents were reviewed:

- Annual Report on the Meteorological Monitoring Program at the Three Mile Island Generating Station, 2005;
- Monthly Report on The Meteorological Monitoring Program at the Three Mile Island Nuclear Station, June 2006;
- ODCM, REMP Effluent and Environmental Monitoring Report Audit No. NOSA-TMI-05-08, December 7, 2005;
- Chemistry, Radwaste, Effluent and Environmental Monitoring program Audit Report NOSA TMI-06-04, April 2006;
- Nuclear Oversight Quarterly Reports, January 25, 2006, April 25, 2006, July 25, 2006;
- Action Requests (ARs/IRs) - 351297, 353049, 355814, 395920, 429460, 362215, 365578, 366218, 369960, 372399, 377077, 355696, 495884, 517006, 527425, 526008, 514155, 526130, 526402 ; and
- Teledyne-Brown Engineering Environmental Service Annual 2005 Quality Assurance Report.

The inspectors also selectively reviewed the licensee's corrective action documents (AR 528426) associated with the identification of potential low-level discharge of tritium to the river via ground-water discharge from the island. The inspectors reviewed and discussed the bounding dose calculations associated with this potential release. The licensee's calculations did not identify any significant downstream dose impacts. Projected doses were a small fraction of regulatory limits. This review was against the criteria contained in 10 CFR 20, Technical Specifications, and the station procedures.

### b. Findings

No findings of significance were identified.

Enclosure



.3 Annual Sample: Review of NRC GL 89-13 Commitments and Associated Corrective Actions

a. Inspection Scope

The inspectors selected one sample for review. The inspectors reviewed IR 371356, which documented the licensee's assessment and corrective actions implemented in response to NCV 2005005-01. The NCV previously documented that the licensee did not fulfill a periodic heat exchanger inspection commitment made in their response to NRC Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety-Related Equipment." The inspectors reviewed IR 371356, to ensure that the full extent of the issue was identified, appropriate evaluations were performed, and that appropriate corrective actions were specified and prioritized. The inspectors verified that actions were taken to add acceptance criteria for periodic inspections as appropriate. Actions were taken to ensure the periodic inspection work activities that were in place to meet regulatory requirements were not deleted. Additional documents reviewed during the inspection are listed in the Attachment.

b. Findings

No findings of significance were identified. However, the inspectors questioned whether the periodic inspection of the backup emergency river water discharge line met AmerGen's commitment in response to Generic Letter 89-13 to perform "periodic internal visual inspections" of the line. The inspection procedure specified "Go outside the fence to visually inspect discharge point of 48" emergency dump line (Pt. 004). Verify full 48" pipe is exposed and area east of security grill for a distance of 48" is clear of debris that would obstruct flow. Submit WR# against component TMI-\*-\* if necessary for cleaning. Record depth (~ inches) of silt buildup inside security grill." No formal written basis established how this surveillance or a proposed visual internal inspection of a fraction of the line from the discharge grate at the line termination satisfied the commitment to perform "periodic internal visual inspections." Additionally, the inspectors noted the procedure did not document acceptance criteria and the annual inspection had not been performed in the last three years. AmerGen's extent of condition review was deficient in that it did not identify these issues.

The inspectors discussed these issues with the lead GL 89-13 program engineer and concluded that the intent of Generic Letter 89-13 specifications for reasonable assurance of intended safety function were being met. Since the backup emergency river water discharge line serves only a backup function, there has been no noticeable system degradation, and corrective actions to address the inspectors' concerns have been initiated as captured in IRs 355344 and IR 542822, this issue was considered minor.

.4 Annual Sample: Reactor Coolant System Flow Transmitter Drift

a. Inspection Scope

Based on a plant specific risk assessment and resident inspector input, the inspectors selected IR 095371 as a PI&R sample for a detailed follow-up. During routine surveillance tests, in January 2002, seven out of eight reactor coolant flow transmitters were found out of tolerance and required re-calibration. This IR documented AmerGen's evaluation and corrective actions for repetitive instrument drift of reactor coolant flow transmitters.

The inspectors assessed AmerGen's problem identification threshold, cause analyses, extent-of-condition reviews, operability determinations, and the prioritization and timeliness of AmerGen's corrective actions to determine whether AmerGen was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. Additional documents reviewed during this inspection are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified. The inspectors determined that, although the original instrument drift issue had not been corrected, AmerGen's interim compensatory actions and completed corrective actions were reasonable.

AmerGen's extent-of-condition review, performed in 2002 as part of the IR 095371 apparent cause evaluation, identified 16 occurrences of instrument drift in six different systems, over a two year period, for similar model transmitters. The inspectors noted that AmerGen had not tracked or trended similar transmitters found out of calibration since 2002 to the present, except for the reactor coolant flow transmitters. In addition, TMI procedure ER-AA-520, "Instrument Performance Trending," required such trending, but had not been fully implemented. The inspectors concluded that AmerGen's initial extent-of-condition evaluation for the transmitter drift issue was narrowly focused and lacked sufficient engineering rigor to fully evaluate other possible causes of the drift. This performance deficiency was determined to be a minor issue because the inspectors did not identify any additional instrument channels with similar repetitive drift issues. AmerGen entered this issue into their corrective action program as IR 00523284.

The inspectors identified a minor violation of 10 CFR 50 Appendix B, Design Control, because AmerGen used non-conservative values for reactor power and flow as design inputs for calculations that evaluated the as-found operability of reactor coolant flow transmitters. These errors had been incorporated into TMI's surveillance test procedures as operability acceptance criteria for the as-found condition. Using corrected conservative values, AmerGen subsequently determined that the as-found trip setpoints of the reactor coolant flow instrument channels had not exceeded the TS limiting safety system setting for the power-to-flow reactor trip. This performance deficiency was determined to be a minor issue because the Technical Specification limit

was never exceeded, and the as-left values were always returned to within tolerance before the instruments were returned to service. AmerGen entered this issue into their corrective action program as IR 526717.

4OA3 Event Followup (71153 - 1 sample)

a. Inspection Scope

On September 1-4, 2006, the effects of Hurricane Ernesto were predicted to cause unusually heavy rains and elevated river level near TMI. The national weather service predicted 3-5 inches of rain over a 24 hour period. Licensee meteorologists monitored the storm and briefed station personnel regarding the expected Susquehanna river level crest and winds. Licensee staff reviewed procedures 1202-32,"Flood," Rev. 61 and 1202-33 "Tornado / High Winds," Rev. 27 for applicable actions. The inspectors walked down plant areas most likely to be effected by the heavy rains, interviewed station personnel, and monitored human performance to determine whether personnel performance caused unnecessary plant risk or challenges to reactor safety.

b. Findings

No findings of significance were identified.

4OA5 Other

1. Review of Institute of Nuclear Power Operations Maintenance and Technical Training Accreditation

The Institute of Nuclear Power Operations (INPO) performed an accreditation assessment of six TMI maintenance and technical training programs during the period February 13-17, 2006. The final INPO assessment report was issued and the six training programs were reaccredited on June 21, 2006. The inspectors reviewed the training assessment report. Problems identified in the report were consistent with NRC inspection assessments findings and no new safety issues were identified.

2. (Closed) Unresolved Item 05000289/2005002-04: Adequacy of Walkthrough Exam Administered to Control Room Supervisors

This issue addressed the level of difficulty for the job performance measure (JPM) sets administered to Senior Reactor Operators (SROs)/ Control Room Supervisors (CRSs). These JPMs appeared to be inadequate in that the exam items did not require the senior operators to demonstrate an understanding of and ability to perform the tasks. For example, the JPMs being used for testing Emergency Action Level (EAL) classifications for exam weeks 1, 2, 3, 4, and 5 were considered by the inspectors to be overly-simplistic and involved only one plant challenge, the equivalent of a direct look-up question. AmerGen initiated IRs 309418 and 260860 to review and address JPM content. The inspectors reviewed the assigned corrective actions that revised the Licensed Operator Requalification Program Procedure (TQ-AA-106), JPM Development

Job Aid procedure (TQ-AA-106-0303), and Exam Development Job Aid procedure (TQ-AA-106-0304) and determined that more rigid standards had been established for the development of JPMs to be administered to licensed operators as part of their Annual Operating Exams. The inspectors also reviewed the JPMs used to examine EAL classifications that AmerGen administered to their operators during the 2006 annual operating exam and determined that these JPMs were adequate exam items. In addition, the establishment of uniform testing standards for licensed operator requalification exams is under evaluation at this time by both the industry and the NRC. After further evaluation and without more specific guidance in this area, this issue was determined to be minor. This closes unresolved item (URI) **05000289/2005002-04**.

#### 4OA6 Meetings, Including Exit

##### Exit Meeting Summary

On October 11, 2006, the resident inspectors presented the inspection results to Mr. Tom Dougherty 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 and none was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

**SUPPLEMENTAL INFORMATION****KEY POINTS OF CONTACT**Licensee Personnel

C. Baker      Manager, Chemistry  
 J. Bashista   System Engineer  
 P. Bennett    Manager, Design Engineering  
 B. Carsky     Director, Operations  
 G. Chick      Plant Manager (departing)  
 D. Darr       Assessor, NOS  
 T. Dougherty  Plant Manager (incoming)  
 E. Eilola     Director, Site Engineering  
 R. Green      Program Engineer  
 J. Heischman  Director, Maintenance  
 S. Homoki,    System Engineer  
 J. Karkoska   Manager, AmerGen Mid-Atlantic Emergency Preparedness  
 A. Miller     Regulatory Assurance  
 J. Murray     Manager, Operations Training  
 T. Nahay      Director, Work Management  
 D. Neff       Manager, Emergency Preparedness  
 L. Rajkowski  Manager Engineering Programs  
 C. Smith      Manager, Regulatory Assurance  
 L. Weir       Manager, Nuclear Oversight Services  
 C. Wend      Manager, Radiation Protection  
 R. West       Vice President, TMI Unit 1  
 T. Wickel     Senior Manager, Design Engineering

Others:

M. Murphy, Pennsylvania Department of Environmental Protection, Bureau of Radiation Protection

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**Opened and Closed

05000289/2006005-01      NCV    Untimely Corrective Actions for Unreliable BWST Level Alarm Instrument (Section 1R19)

Closed

05000289/2005002-04      URI    Adequacy of Walkthrough Exam Administered to Control Room Supervisors (Section 4OA5)

## LIST OF DOCUMENTS REVIEWED

### **Section 1R02: Evaluations of Changes, Tests, or Experiments**

#### 50.59 Safety Evaluations:

TI-115403-005 Revised OTSG High Level Limit Following STP 90-039, Revision 0  
SE-000823-022 AH-E-1B Condensate Flow Alarm Switches Has Boron Build-Up,  
Revision 0  
PC-18967 Add Procedures to Cross-Tie to 480V Buses in Emergency, Revision 0  
SE 00561-003 Reactor Coolant System Zinc Injection Skid Installation, Revision 0  
SE 000733-008 Add preemptive actions to prevent MHIF (multiple high impedance fault)  
from causing a loss of 1B ES MCC in the event of a fire in CB-FA-1

#### 50.59 Screenings (no safety evaluation required):

04-00414 MU-V-16A-D Replacement  
04-00613 Increase OTSG High Level Limit  
06-00372 Remove Internals of DR-S-1A (Instrument Aspects only)  
05-00210 Ball Check Valve Modification for EG-Y-4, Revision 0  
04-00611 Ball Check Valve Modification for EG-Y-1B, Revision 1  
04-00017 EG-Y-1A Exhaust Check Valve Modification  
04-00093 CC-AA-103 Attachment G, Generic Screening Criteria for Equivalence Changes  
05-00438 Underground Fire Service Leak, Revision 0  
05-00382 Reactor Building Door Ventilation Barrier Improvement, Revision 1  
04-00325 Modification of MS-PT-204 Piping System Supports, Revision 1  
04-00416 NS-V-12 Reorient Check Valve, Revision 1

### **Section 1R04: Equipment Alignment**

#### Drawings:

E-206-022, "4160 Volt Engineered Safeguards Switchgear," Rev. 21  
302-082, Emergency Feedwater," Rev. 23  
302-351, "EDG Services," Rev. 18  
302-640, "Decay Heat Removal," Rev. 79

#### Procedures:

1107-2A, "Emergency Electrical - 4KV and 480 Volt," Rev. 14  
1107-3, "Diesel Generator," Rev. 112  
LS-AA-119, "Overtime Controls," Rev. 3  
OP-TM-424-271, "Standby Lineup and Flow Path Verification Check of EFW System," Rev. 2

#### Other Documents:

NRC Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours," dated June 15, 1982.  
TMI Unit 1 Technical Specification 6.8.1.j  
Overtime Guideline Deviation Authorization dated June 16, 2006  
IR 508420, "Overtime Deviations"

**Section 1R05: Fire Protection**

Procedures:

EP-AA-1009, Table TMI 3-1, "Fire/Explosion Emergency Action Level Matrix," Rev. 7  
EP-AA-1009, Table TMI 3-1, "Fire/Explosion Emergency Action Level Matrix," Rev. 7q  
EP-AA-1009, Table TMI 3-2, "EAL Technical Basis, Recognition Category Hazards and Other Conditions - HU6," Rev. 7

Other Documents:

Work Order A2149215-00-01, Drain & Remove/Dismantle Spare Aux Transformer"  
GEI-28008D, "Power Transformers - Removing and Rewelding Covers"  
A-Line EDS Safety & Health Plan for Demolition & Transportation Activities

**Section 1R07: Heat Sink Performance**

Drawings:

Flow Diagram, 302-357, "Station Blackout Diesel," Rev. 4  
Flow Diagram, 302-358, "Station Blackout Diesel," Rev. 3  
Flow Diagram, 302-359, "Station Blackout Diesel," Rev. 4

Procedures:

M-164, "Station Blackout (SBO) Diesel Generator Major Inspection," Rev. 12  
M-164, "Station Blackout (SBO) Diesel Generator Major Inspection," Rev. 4, completed November 4, 1994

Other Documents:

Recurring task work order R1835824, completed June 2003  
ECR TM 05-00684 000 performed under A/R A2125469, "T1R16 DH-C-1A and DC-C-2A Cooler Testing," dated 11/10/05  
Letter 6710-96-2097, "Generic Letter 89-13 Revised Response," dated 6/6/96

**Section 1R17: Permanent Plant Modifications**

Modifications:

DCP 04-00613	Increase OTSG High Level Limit, Revision 0
ECR 04-00414	MU-V-16A-D Replacement, Revision 2
ECP 04-00987	MU-P-3B Qualified Life Extension, Revision 0
ECR 04-00601	Removal of AH-FS-241A,B,C, Revision 1
ECR 04-00093	EGS Environmental Qualification 5 kV Cable Splices, Revision 0
ECR 05-00671	Cross-Tie of Vital AC & DC Buses, Revision 0
ECR 04-00325	Modification of MS-PT-204 Piping System Supports, Revision 1
ECR 05-00438	Underground Fire Service Leak, Revision 0
ECR 05-00382	Reactor Building Door Ventilation Barrier Improvement, Revision 1

Procedures:

CC-AA-10	Configuration Control Process Description, Revision 4
CC-AA-102	Design Input and Configuration Change Impact Screening, Revision 10
CC-AA-103	Configuration Change Control, Revision 9
CC-AA-104	Document Change Requests, Revision 8
CC-AA-203	Environmental Qualification Program, Revision 5
CC-MA-203-1001	Environmental Qualification Engineering, Revision 2
CC-AA-309	Control of Design Analysis, Revision 4
LS-AA-104	50.59 Review Process, Revision 5
LS-AA-104-1000	50.59 Resource Manual, Revision 3
LS-AA-104-1002	50.59 Applicability Review Form, Revision 2
LS-AA-104-1003	50.59 Screening Form, Revision 1
LS-AA-104-1004	50.59 Evaluation Form, Revision 2
MAP J-1-5	Alarm Response Procedure, OTSG "A" Level High, Revision 13

Calculations & Analyses:

C-1101-644-5522-001	OTSG Operate & Startup Level Instrument Error Analysis, Revision 0
C-9000-700-5710-001	Guidelines for Performing Arrhenius Calculations, Revision 0

Drawings:

51-1176821-00	Calculated Operate Range Limits for TMI-1, Revision 0
302-202	River Water P&ID, Revision 69
302-645	Decay Heat Closed Cooling Water P&ID, Revision 37
302-661	Makeup & Purification P&ID, Revision 56
E-206-011	Main One Line & Relay Diagram, Revision 49
E-206-032	One Line and Relay Diagram - Engineering Safeguards, Screen House, Reactor Building H&V, 480V Switchgear, Revision 15

Issue Reports (\* denotes an IR generated as a result of this inspection):

00514187*	00226509	00495444	00233051
00512974*	00436905	00167542	00430764
00514270*	00447522	00340360	00436901
00466167	00441069	00393269	00233098
00474358	00338349		00495452

Self-Assessments:

AR 00453889	Self-Assessment of the Modifications and 50.59 Review Process at TMI (05-28-06)
AR 368202	Engineering Design Control Audit Report. NOS Audit NOSA-TMI-05-05 at TMI Station, 09-19-2005 thru 09-30-2005

Work Orders:

C2008575	R2008205
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Miscellaneous:

Component Record List for DH-V-1
Component Record List for MU-V-16A



EQ-T1-121, EQ Binder for GE Motor 5K37JG403, Revision 7  
EQ-T1-121-09, Optional Qualified Life Extension for MU-P-3B, Revision 1

**Section 1R19: Post-Maintenance Testing**

Drawing:

302-640, "Decay Heat Removal Flow Diagram," Rev. 79

Procedures:

1302-5.19, "Borated Water Storage Tank Level Indicator," Rev. 24  
1303-5.1A, "'A' RB Emergency Cooling and Isolation System Logic Channel/Component Test," Rev. 2  
1303-5.1B, "'B' RB Emergency Cooling and Isolation System Logic Channel/Component Test," Rev. 2  
ER-AA-520, "Instrument Performance Trending," Rev. 3  
OP-TM-EOP-001, "Reactor Trip," Rev. 6  
OP-TM-EOP-002, "Loss of 25 Degree F Subcooled Margin," Rev. 4  
OP-TM-EOP-006, "LOCA Cooldown," Rev. 5  
OP-TM-EOP-010, "Emergency Procedure Rules, Guides and Graphs," Rev. 5  
OP-TM-MAP-E0204, "BWST Level Lo," Rev. 1

Work Orders:

C2013427	C2013428-02	R2059330	R2025009	R2025006	R1801615
1800106	156179	143819	134105	109813	A2147960

Issue Reports:

508103	508485	517937	525514	523284
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Other Documents:

Calculation C-1101-212-5310-050, "TMI-1 BWST Vortex Determination," Rev. 2  
Calculation C-1101-212-E510-057, TMI BWST Level Loop Accuracy - DH-LT-0808, DH-LT-0809, DH-DPS-0914," Rev. 0  
Operator Training Simulator Exercise Guide TQ-TM-106-E02-S001, "Large Break LOCA with Complications," Rev. 0  
Operator Training Module 11.2.01.317, "Plant Computer System," Rev. 12  
Operator Training Module TQ-TM-104-EOP006-C001," Rev. 1  
TMI Licensed Operator Training Cycle 05-5 Schedule  
Technical Specifications 3.3 and 4.1

**Section 1R23: Temporary Plant Modifications**

Drawings:

E-29028, "Copes-Vulcan High Output Manual Actuator," Rev. 0  
D-375972, "Copes-Vulcan Diaphragm Operator Assembly," Rev. 2

Procedure:

302-660, "Makeup & Purification Flow Diagram," Rev. 41

Other Documents:

Work order #C2013428

ECR 06-00666, "MU-V26, Diaphragm Air Leak/ Difficult to Block Handwheel," Rev. 0  
TS 3.1.6

**Section 1EP2: Alert and Notification System (ANS) Testing**

EP-MA-121-1002, AmerGen East Alert Notification System (ANS) Program  
EP-MA-121-1004, AmerGen East ANS Corrective Maintenance  
EP-MA-121-1005, AmerGen East ANS Preventive Maintenance Program  
EP-MA-121-1006, AmerGen East ANS Siren Monitoring, Troubleshooting, and Testing  
EP-AA-120-1001, 50.54(q) Program Evaluation and Effectiveness Review, No. 04-21,  
Evaluation of the TMI ANS Upgrade Project  
AR 00429795 Report, ANS Quiet Test Siren Failures  
AR 00505191 Report, 21 of 96 Sirens Fail to Rotate During Annual TMI Siren Test  
Department of Homeland Security Technical Review of the AmerGen East Updated ANS  
Design Report for the Three Mile Island

**Section 1EP3: Emergency Response Organization (ERO) Augmentation Testing**

EP-AA-112-100-F-07, Mid-Atlantic ERO Notification or Augmentation  
TQ-AA-113, ERO Training and Qualification  
ERO Augmentation Drill Memos, Dated: June 24, 2006; March 29, 2006; and, February 2, 2006  
2006 Monthly ERO Qualification Training Schedules  
AR 00491845 Common Cause Analysis - ERO Notification Failures  
AR 00486598 Prompt Investigation Report - TMI ERO Pager System Redundancy Not As  
Expected  
AR 00491217 Prompt Investigation Report - Automated Callout System Activation Failure

**Section 1EP4: Emergency Action Level (EAL) Revision Review**

10 CFR 50.54(q) Reviews:

EP-AA-1009, Radiological Emergency Plan Annex for TMI, Rev. 3  
EP-AA-1009, Radiological Emergency Plan Annex for TMI, Rev. 4  
EP-AA-1009, Radiological Emergency Plan Annex for TMI, Rev. 5  
EP-AA-1009, Radiological Emergency Plan Annex for TMI, Rev. 6  
EP-AA-1009, Radiological Emergency Plan Annex for TMI, Rev. 7  
Amendment 253 to License DPR-50, PASS Elimination

**Section 1EP5: Correction of Emergency Preparedness Weaknesses and Deficiencies**

EP-AA-125, Emergency Preparedness Self Evaluation Process  
AmerGen Emergency Preparedness Excellence Plan, Rev. 12  
TMI EP Program Assessment Report # 488880, Readiness Assessment for the 2006 NRC  
Routine Biennial Program Inspection  
Focus Area Self-Assessment Report #363167, TMI NRC Inspection White Finding - Untimely  
ERO Annual Retraining  
IR 491845, ERO Notification Failure, Common Cause Analysis  
IR 505191, Siren Software Configuration Issue, Prompt Investigation Report  
TMI Emergency Preparedness Advisory Council Agendas, Various

**Section 4OA1: Performance Indicator (PI) Verification**

EP-AA-125-1004, Emergency Response Facilities & Equipment Performance Indicators  
Guidance

EP-AA-125-1003, ERO Readiness - Performance Indicator Guidance

Drill and Exercise Performance PI Data, April 2005 - June 2006

ERO Drill Participation PI Data, April 2005 - June 2006

Alert and Notification System Reliability PI Data, April 2005 - June 2006

**Section 4OA2: Identification and Resolution of Problems**Procedures:

1302-5.4A, "RPS Channel A RC Flux-Flow Comparator," Rev. 4

ER-AA-520, "Instrument Performance Trending," Rev. 0

LS-AA-126-1001, "TMI 89-13 Program and Ultimate Heat Sink Focused Area Self-Assessment Report," Rev. 3, dated 6/7/06

RT LIB A1700930 Eval-01, "RPS Chan A Flux RC Flow Comparator Task Frequency Change"

RT LIB A1700931 Eval-01, "RPS Chan B Flux RC Flow Comparator Task Frequency Change"

RT LIB A1700932 Eval-02, "RPS Chan C Flux RC Flow Comparator Task Frequency Change"

RT LIB A1700933 Eval-02, "RPS Chan D Flux RC Flow Comparator Task Frequency Change"

Issue Reports (\* denotes an IR generated as a result of this inspection):

095371	436901	436902	436905	436907	436909
508103	515650	523284*	526717*	542822	371356
431684	449641	476471			

Work Orders and Completed Surveillances:

A2037731	A2037733	A2037737	A2037733	A2037740	A2037741
A2037742					

Calculations and Engineering Analyses:

32-1151224, revision 2, "RPS Instrument String Accuracies"

32-1151224, revision 3, "RPS Instrument String Accuracies"

C-1101-641-5522-008, "RC Pressure/Flow Reactor Trip Loop Error Analysis," Rev. 1

C-1101-641-E270-013, "Surveillance Deficiency Report Calibration Error Analysis," Rev. 0

C-1101-641-E270-014, "Surveillance Deficiency Report Calibration Error Analysis," Rev. 0

C-1101-641-E270-016, "RCS Total Flow Buffer Amplifier Scaled Gain," Rev. 0

Letter from Framatome to GPU, FTI-99-1214, dated April 6, 1999

Other Documents:

TMI Cycle 16 Core Operating Limits Report, Enclosure 2, "DNBR-Related Bases," Rev. 3

Technical Specification 2.3, "Limiting Safety System Settings"

MTAN CAP T1999-0135

System 641 surveillance history for RC14 flow transmitters, 05\_1220r14

Rosemount 1153 Series D Nuclear Pressure Transmitter Product Manual

NRC Regulatory Guide 1.105, "Setpoints for Safety Related Instrumentation," Rev. 3

NRC Regulatory Issue Summary 2006-17, "Requirements of 10 CFR 50.36, "Technical Specifications," Regarding Limiting Safety System Settings during Periodic Testing and Calibration of Instrument Channels"  
 Letter 6710-96-2097, "Generic Letter 89-13 Revised Response," dated 6/6/96  
 TR 119, Topical Report 119 Generic Letter 89-13 Program Description, Rev. 4  
 M-144, "Heat Exchanger Inspections and Cleanings, for NS-C-1A NSCCW HX," Rev. 24 performed on 2/6/04  
 M-144, "Heat Exchanger Inspections and Cleanings, for NS-C-1D NSCCW HX," Rev. 22 performed on 1/28/02  
 M-144, "Heat Exchanger Inspections and Cleanings, for NS-C-1D NSCCW HX," Rev. 25 performed on 2/1/06  
 M-144, "Heat Exchanger Inspections and Cleanings, for NS-C-1A NSCCW HX," Rev. 20 performed on 9/12/00  
 JO 00183446, WO 3220-51042, Nuc Svc Close Cool Wtr A Cooler, performed on 9/15/00  
 T1-CCD-128216-001, Configuration Change Documentation RB [Reactor Building] Emergency Water Enhancements, Rev. 0, 5/27/97  
 LAR 95034.10, Alternative to SWSOPI at TMI-1, 7/31/95 {justifying 24" of silt}  
 OPS-S193, General TMI-1 Inspection of Remote Areas by Operations Support Staff, performed 4/4/01  
 OPS-S193, General TMI-1 Inspection of Remote Areas by Operations Support Staff, performed 11/13/02 {ARs written by Balian}  
 R1831795, A1731010, Heat Exchanger Inspection & Clean, for TM 1 541 M HX NS-C-1A, 2/12/04  
 R1833364, WO for OPS-S193, performed 4/4/01  
 R2022817, WO for OPS-S193, performed 11/13/02  
 R2084257, WO for DSN 004: Inspect River Water Emergency Overflow, 5/9/06  
 R2020560, WO General Inspection of Remote Areas by TPOS, deactivated, 7/31/03  
 A2039263, Discharge Point 2 Requires Cleaning, 8/29/02  
 A2039264, Discharge Point 3 Requires Cleaning, 8/29/02  
 A2138899, DSN 004: Inspect River Water Emergency Overflow, 5/9/06AR 00294475

**LIST OF ACRONYMS**

ADAMS	Agencywide Documents and Management System
AmerGen	AmerGen Energy Company, LLC
ALARA	As Low As is Reasonably Achievable
AmerGen	AmerGen Energy Company, LLC
ANS	Alert and Notification System
BWST	Borated Water Storage Tank
CFR	Code of Federal Regulations
CM	Corrective Maintenance
DCCS	Decay Closed Cooling System
DNBR	Departure from Nucleate Boiling Region
DRP	Division of Reactor Projects
EAL	Emergency Action Level
ECCS	Emergency Core Cooling System

ECR	Engineering Change Request
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
EQ	Environmental Qualification
ERO	Emergency Response Organization
GL	Generic Letter
HP	Health Physics
HX	Heat Exchanger
I&C	Instrumentation and Control
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
JO	Job Order
LOCA	Loss of Coolant Accident
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NSCCW	Nuclear Service Closed Cooling Water
OTSG	Once Through Steam Generator
PARS	Publicly Available Records
PASS	Post Accident Sampling System
PI	Performance Indicator
PI&R	Problem Identification and Resolution
PMT	Post-Maintenance Test
RB	Reactor Building
RCA	Radiologically Controlled Area
RCS	Reactor Coolant System
REMP	Radiological Environmental Monitoring program
RETS	Radiological Effluent Technical Specifications
RPS	Reactor Protection System
RSPS	Risk Significant Planning Standard
SDP	Significance Determination Process
SE	Safety Evaluation
SSC	Structures, Systems, and Components
SWS	Service Water System
TMI	Three Mile Island, Unit 1
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
WO	Work Order