

August 25, 2000

Mr. Mark E. Warner  
Vice President, TMI Unit 1  
AmerGen Energy Company, LLC  
Three Mile Island Nuclear Station  
PO Box 480  
Middletown, Pennsylvania 17057-0480

SUBJECT: NRC'S INTEGRATED THREE MILE ISLAND REPORT 05000289/2000-005

Dear Mr. Warner:

On August 12, 2000, the NRC completed an integrated inspection at your Three Mile Island Unit 1 reactor facility. The enclosed report presents the results of that inspection which the resident inspector discussed with you and other members of your staff on August 16, 2000.

This inspection was an examination of 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. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with personnel. There were no findings identified during this inspection.

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We appreciate your cooperation. Please contact me at (610) 337-5146 if you have any questions regarding this letter.

Sincerely,

**/RA/**

John F. Rogge, Chief  
Projects Branch 7  
Division of Reactor Projects

Docket No.: 05000289  
License No.: DPR-50

Enclosure: NRC Inspection Report No. 05000289/2000-005

Mr. M. Warner

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cc w/encl:

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TMI-Alert (TMIA)

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**U.S. NUCLEAR REGULATORY COMMISSION**

REGION 1

Docket No.: 05000289  
License No.: DPR-50

Report No.: 2000-005

Licensee: AmerGen Energy Company, LLC (AmerGen)

Facility: Three Mile Island Station, Unit 1

Location: PO Box 480  
Middletown, PA 17057

Dates: July 2, 2000, through August 12, 2000

Inspectors: Craig W. Smith, Acting Senior Resident Inspector  
Ram S. Bhatia, Acting Resident Inspector  
Ronald L. Nimitz, Senior Health Physicist, DRS

Approved by: John F. Rogge, Chief  
Projects Branch 7  
Division of Reactor Projects

## SUMMARY OF FINDINGS

Three Mile Island, Unit 1  
NRC Inspection Report 0500289/2000-005

The report covers a six-week period of resident inspection and an announced inspection by a regional health physics inspector. The significance of issues is indicated by their color (Green, White, Yellow, Red) and was determined by the Significance Determination Process (SDP) in Inspection Manual Chapter 0609 (see Attachment 1).

- No findings were identified.

## Report Details

### Summary of Plant Status

AmerGen Energy Company, LLC (AmerGen) operated Three Mile Island, Unit 1 (TMI) at 100 percent power throughout the inspection period with the exception of a brief reduction to 90 percent power on August 5, 2000, to conduct required main turbine valve testing.

## **1 REACTOR SAFETY**

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

### 1R01 Adverse Weather

#### a. Inspection Scope

The inspector reviewed selected design features of the facility as they relate to the protection of vital plant systems from the adverse weather conditions of high winds and high ambient temperatures. The inspector reviewed Emergency Procedure 1202-33, "Tornado/High Wind," to verify it adequately addressed operator actions to protect vital plant equipment in the event of high wind conditions. The inspector reviewed contingency operator actions and equipment availability to manage high ambient temperatures in the control building switch gear rooms and emergency diesel generator building.

#### b. Issues and Findings

There were no findings identified.

### 1R04 Equipment Alignment

#### a. Inspection Scope

The inspector conducted a partial system walkdown of the 120 Volt AC Vital Power Distribution System. The inspector reviewed the design basis of the system as described in the Updated Final Safety Analysis Report (UFSAR). The inspector conducted a walkdown of the system to verify breakers and inverters were aligned in accordance with the applicable system operating procedures and design drawings. The inspector sampled the licensee's corrective action program records to verify that the licensee was identifying and evaluating equipment alignment problems at an appropriate threshold.

#### b. Issues and Findings

There were no findings identified.

## 1R05 Fire Protection

### a. Inspection Scope

The inspectors conducted fire protection inspections for the following plant areas:

- Auxiliary Building general areas
- Decay Heat Removal system pump vaults
- Fuel Handling Building general areas
- Intake Structure

The inspectors conducted walkdowns and reviewed the licensee's fire protection program documentation for the inspected areas. The plant walkdowns included observations of combustible material control, fire detection and suppression system availability, and any compensatory measures put in place by the licensee.

### b. Issues and Findings

There were no findings identified.

## 1R12 Maintenance Rule Implementation

### .1 Motor Operated Valve Testing Program

#### a. Inspection Scope

The inspector reviewed the licensee's motor operated valve (MOV) testing program as it related to the testing of selected valves in the high pressure injection system during a scheduled system outage conducted during the week of July 10, 2000. The inspector witnessed field testing of the valves and verified the test results were acceptable when compared against the supporting calculations.

#### b. Issues and Findings

There were no findings identified.

### .2 Radiation Monitoring System

#### a. Inspection Scope

The inspector reviewed the past performance history of the radiation monitoring system to assess the licensee's compliance with the NRC Maintenance Rule for this system. The inspector reviewed the goals established for monitoring system performance and sampled the licensee's corrective action program to verify that the licensee was identifying radiation monitoring system equipment problems at an appropriate threshold. The inspector reviewed past system failures to verify they were being properly characterized as functional failures.

#### b. Issues and Findings

There were no findings identified.

.3 Secondary River Water and Screen Wash System

a. Inspection Scope

The inspector reviewed the past performance history of the Secondary River (SR) Water and Screen Wash (SW) systems to assess the licensee's compliance with the NRC Maintenance Rule for this system. The SR/SW system has been in Maintenance Rule category a(1), requiring improvement, since April 1999 due to system unavailability exceeding the performance goals. The inspector reviewed the licensee's corrective actions, both taken and planned, to improve system performance and sampled the corrective action program to verify the licensee was identifying equipment problems with the SR/SW system at an appropriate threshold.

b. Issues and Findings

There were no findings identified.

1R13 Maintenance Risk Assessment

.1 Planned Maintenance Activities

a. Inspection Scope

The inspector reviewed the licensee's planning and risk assessment for a scheduled system outage on the B train of high pressure safety injection (HPI) conducted the week of July 10, 2000. The inspector verified contingency actions required by the risk assessment document were in place and observed selected maintenance activities.

b. Issues and Findings

There were no findings identified.

.2 Emergent Work Activities

a. Inspection Scope

The inspectors reviewed emergent work activities in response to the failure of both reactor compartment cooling fans (AH-E-2A/B) on July 20, 2000, and to replace a faulty component on a circuit card in the secondary power supply to the Group 5 control rods on August 1, 2000. The inspectors reviewed the licensee's actions to verify necessary steps were taken to plan and control the emergent work activities. The inspectors verified the emergent equipment failures were entered into the licensee's corrective action program for resolution.

b. Issues and Findings

There were no findings identified.



## 1R15 Operability Evaluations

### a. Inspection Scope

The inspector reviewed two operability evaluations during the inspection period:

- On July 24, 2000, while conducting routine surveillance testing on the A emergency diesel generator, the licensee identified a significant oil leak on the lubricating oil filter housing. The diesel was subsequently taken out of service and the leak was repaired later that same day. The inspector reviewed the operability determination for this condition performed by the Shift Manager as documented in the licensee's corrective action process (CAP 2000-0595).
- On July 25, 2000, while conducting a planned inspection of the D nuclear service water system heat exchanger, the licensee identified clam shells in the heat exchanger end bell that were bigger than the tube diameter of the heat exchanger. The dead clams resulted from a clam kill conducted by the licensee on July 6, 2000. The inspector reviewed the operability determination for this condition, as it related to the other river water heat exchangers, performed by the Shift Manager as documented in the licensee's corrective action process (CAP 2000-0595).

### b. Issues and Findings

There were no findings identified.

## 1R16 Operator Workarounds

### a. Inspection Scope

The inspector conducted the semi-annual review of the cumulative effect of operator workarounds on plant system reliability, initiating event frequency, and operator burden.

### b. Issues and Findings

There were no findings identified.

## 1R17 Permanent Plant Modifications

a. Inspection Scope

The inspector reviewed documentation prepared by the licensee in support of a modification to the control building ventilation system. The inspector reviewed modification documentation (MD-J007, "CB [Control Building] Habitability Damper Mod [Modification]") and its associated safety evaluation (SE 120067-001, Rev. 1). The inspector reviewed the design adequacy of the modification as well as selected portions of the modification implementation.

b. Issues and Findings

There were no findings identified.

## 1R19 Post-Maintenance Testing

a. Inspection Scope

The inspector reviewed post-maintenance tests performed by the licensee in conjunction with the following work activities:

- comprehensive motor operated valve preventive maintenance on the actuator for MU-V-14B, the isolation valve from the borated water storage tank to the B high pressure injection header, conducted on July 12, 2000;
- corrective maintenance on engineered safeguards actuation system relay 62X-2B/RC3B conducted on July 19, 2000; and,
- scheduled preventive maintenance on EF-P-2A, the A motor driven emergency feedwater pump, conducted on August 1, 2000.

The inspectors witnessed testing activities and reviewed test data to verify the components were returned to service capable of performing their intended safety functions.

b. Issues and Findings

There were no findings identified.

## 1R22 Surveillance Testing

a. Inspection Scope

The inspector reviewed the following surveillance testing activities:

- calibration of the degraded grid voltage relays for the 4160 volt engineered safeguards electrical bus conducted on July 13, 2000; and,

- monthly surveillance testing of the B emergency diesel generator conducted on July 31, 2000.

The inspectors witnessed the surveillance testing activities and reviewed the test data to verify the test performance met the Technical Specification and licensee procedural requirements. The inspector sampled the licensee's corrective action program documentation for problems identified during past performance of these surveillance tests to verify the licensee was identifying and resolving problems at an appropriate threshold.

b. Issues and Findings

There were no findings identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspector reviewed the installed temporary modifications which included one electrical, eight mechanical, and three computer software modifications. None of the installed temporary modifications was found to be risk significant. The inspector reviewed in detail the implementation of temporary modification (TM 2000-040) to the control circuit of the A reactor compartment cooling fan, AH-E-2A.

b. Issues and Findings

There were no findings identified.

## 2 RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control To Radiologically Significant Areas

a. Inspection Scope

The inspector reviewed the following documents and conducted the following activities to determine the effectiveness of access controls to radiologically significant areas:

- The inspector conducted a key inventory of Locked High Radiation and Very High Radiation Area keys to ensure keys were maintained in accordance with administrative controls (Locked High Radiation Areas/Red Tag Keys).
- Fifteen Locked High Radiation Area access points were physically inspected to determine if access controls were sufficient to preclude unauthorized entry and that the access points were locked or guarded, as appropriate.
- Locked High Radiation Area Access Log Sheet (July 29, 2000)

- Radiological Control High Radiation Area Access Key Logbook
- Access controls to licensee defined Exclusion Areas and Very High Radiation Areas were reviewed.
- The inspector made independent radiation measurements of radiation levels within accessible radiologically controlled areas (RCAs) at the station to: 1) verify areas expected to exhibit radiation levels in excess of 100 mR/hr, were posted and controlled as High Radiation Areas or locked as appropriate and, 2) confirm survey data.
- Radiological Controls Program Assessment No. 95935-PA-023, Radiological Controls Assessment (71121.01), dated March 30, 2000
- TMI Technical Specification Change (Alternate High Radiation Area Control), dated June 11, 1998
- Transuranic Scaling Factors based on 10 CFR Part 61
- Procedure 6610-ADM-4110.04, Rev. 8, Radiation Work Permit
- Procedure 6610-ADM-4110.06, Rev. 7, Control of Locked High Radiation Areas
- 1999/2000 Maximum Individual Exposure Results

The inspector reviewed high radiation area access controls and occupation exposure controls for three work activities controlled as Locked/High Radiation Area radiation work permits (RWPs 176228, 186658, 176244). RWP No. 186658 covered personnel entry into the reactor containment with the reactor at power on July 29, 2000. The inspector verified conformance with applicable High Radiation Area access controls including RWP requirements. The inspector also reviewed measurement and calculation of neutron equivalent dose rates and accrued equivalent dose. The inspector also reviewed occupation exposure controls associated with Reactor Coolant Pump C rotating element change-out (RWP 153290).

b. Issues and Findings

There were no findings identified.

## 2OS2 ALARA Planning and Controls

### a. Inspection Scope

The inspector selectively reviewed the adequacy and the effectiveness of the licensee's program to reduce occupational radiation exposure to as low as is reasonably achievable (ALARA). The following matters were reviewed:

- Source Term Reduction Program, dated February 28, 2000
- TMI Station ALARA Council Charter
- TMI Station ALARA Council Minutes for May 12 and May 18, 2000, meetings
- TMI Station Collective Exposure History
- Radiological Health and Safety Report, 13R Refueling Outage
- AmerGen Radiation Protection Directive AD-RP-1, Revision 0, Radiation Protection Directive
- Assessment No. 95934-PA-00-001, Annual ALARA Assessment, dated April 26, 2000
- Procedure 6610-ADM-4010.02, Rev. 5, ALARA Review Program
- Procedure 6610-IMP-3282.01, Rev. 7, Installation of Temporary Shielding
- Three/Two Year Average Dose
- 1999 Annual and Outage Accumulated Exposure
- Pre- and Post-Job ALARA Reviews- Reactor Coolant Pump C
- Estimated and Final Aggregate Exposure Results for 1999 Refueling Outage Major Work Activities

### b. Issues and Findings

There were no findings identified.

## 2OS3 Radiation Monitoring Instrumentation

### a. Inspection Scope

The inspector selectively reviewed elements of the radiation monitoring instrumentation program. The inspector reviewed the calibration and use of the gamma and neutron radiation dose rate instruments used by radiological controls personnel during job

coverage surveys for personnel entering reactor containment at power on July 29, 2000. The following associated documentation was reviewed.

- Assessment No. 95934-OB-00-006, Radiological Instrumentation (71121.03), dated May 23, 2000
- Procedure 6610-INS-4200.01, Rev. 32, TMI Radiological Controls Instrument Operations Manual
- Procedure 1091, Rev. 1, Conduct of Calibration, Maintenance and Repair of Radiological Instrumentation
- UFSAR Instrument Listing (Table 11.5-1)
- Portable Instrument Source Check and Inventory, dated July 17, 2000
- Procedure IC-202, Rev. 0, Calibration of the Bicron RSO-50E
- Procedure 6610-PMI-4224.36, Rev.1, Calibration of Analog Smart Portable ASP-1/NRD
- Procedure IC-181, Rev. 0, Calibration of AMS-3
- National Institute of Standards Technology (NIST) Traceability Data Sheets
- ANSI N323A, 1997, "American National Standard Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments"

b. Issues and Findings

There were no findings identified.

#### **4 OTHER ACTIVITIES**

##### 4OA1 Performance Indicator Verification

##### .1 Occupational Exposure Control Effectiveness

##### a. Inspection Scope

The inspector examined the adequacy and effectiveness of the licensee's implementation of the Occupational Exposure Control Effectiveness Performance Indicator (PI). The inspector reviewed the following matters.

- The inspector reviewed corrective action program records for occurrences involving high radiation areas, very high radiation areas, and unplanned personnel exposures for the past four quarters against the applicable criteria

specified in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 0, to verify that all conditions that met the NEI criteria were recognized and identified as Performance Indicators.

- The inspector discussed instances where personnel exited the radiological controls area with a dose in excess of 100 mrem (based on secondary dosimetry) in the past four quarters.
- The inspector reviewed the process for collecting data and reporting Occupational Exposure Control Effectiveness performance indicators to ensure that the licensee had a clear understanding of the indicator definitions, data reporting elements, calculation methods, and definitions of terms to verify that the licensee's process was capable of producing accurate performance indicators in accordance with the guidance contained in NEI 99-02.
- Procedure 1099, Rev. 0, "NRC Regulatory Oversight Process-Performance Indicators-Collection, Verifications, and Submittal".

b. Issues and Findings

No significant findings were identified.

.2 Safety System Unavailability

a. Inspection Scope

The inspector verified the licensee's performance indicator data for calculating safety system unavailability for the HPI and decay heat removal (DHR) systems. The inspector reviewed control room log book entries, the licensee's maintenance rule data base, and the licensee's corrective action program data base for the previous twelve quarters in conducting this verification. The inspector noted some minor deficiencies in the January 2000 "best effort" historical data submittal for both of these PIs. The licensee entered these minor deficiencies into its corrective action process (CAP 2000-0641) for resolution.

4OA6 Management Meetings

.1 Exit Meeting Summary

On August 16, 2000, the resident inspector presented the inspection results to Mr. Warner and other members of licensee management.

The Occupational Radiation Safety inspector presented his inspection results to licensee representatives at the conclusion of the inspection on August 4, 2000.

The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.





**PARTIAL LIST OF PERSONS CONTACTED**

Licensee

M. Warner, Vice President, TMI  
R. Fraile, Plant Manager  
D. Atherholt, Director - Operations  
O. Limpas, Director - Site Engineering  
G. Skillman, Director Plant Engineering  
J. Telfer, Director Radiation Health & Safety  
D. Ethridge, Director Maintenance  
E. Fuhrer, Manager Regulatory Licensing  
R. McDonald, Group Radiological Controls Supervisor  
J. Schmidt, Manager Radiological Engineering  
B. Parfitt, Senior Engineer  
A. Miller, Regulatory Licensing

**ITEMS OPENED, CLOSED, AND DISCUSSED**

None

**LIST OF ACRONYMS USED**

AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As is Reasonably Achievable
AmerGen	AmerGen Energy Company, LLC
CAP	Corrective Action Process
CFR	Code of Federal Regulations
DHR	Decay Heat Removal
DRS	Division of Reactor Safety
HPI	High Pressure Safety Injection
MD	Modification Documentation
MOV	Motor Operated Valve
NEI	Nuclear Energy Institute
NIST	National Institute of Standards Technology
NRC	Nuclear Regulatory Commission
PDR	Public Document Room
PARS	Publicly Available Records
PI	Performance Indicator
RCA	Radiologically Controlled Area
RWP	Radiation Work Permit
SDP	Significance Determination Process
SE	Safety Evaluation
SR	Secondary River
SW	Screen Wash
TM	Temporary Modification
TMI	Three Mile Island, Unit 1
UFSAR	Updated Final Safety Analysis Report

## ATTACHMENT 1

### NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

#### Reactor Safety

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

#### Radiation Safety

- Occupational
- Public

#### Safeguards

- Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.