



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

May 29, 2008

Mr. Charles G. Pardee
Chief Nuclear Officer (CNO) and Senior Vice President
Exelon Generation Company, LLC
Chief Nuclear Officer (CNO)
AmerGen Energy Company, LLC
200 Exelon Way
Kennett Square, PA 19348

**SUBJECT: THREE MILE ISLAND STATION, UNIT 1 - NRC PROBLEM IDENTIFICATION
AND RESOLUTION INSPECTION REPORT 05000289/2008006**

Dear Mr. Pardee:

On April 18, 2008, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Three Mile Island (TMI) Station, Unit 1. The enclosed report documents the inspection results, which were discussed on April 18, 2008, with Mr. W. Noll and other members of your staff.

This inspection was an examination of activities conducted under your license as they relate to the identification and resolution of problems and compliance with the Commission's rules and regulations and the conditions of your license. Within these areas, the inspection involved examination of selected procedures and representative records, observations of activities, and interviews with personnel.

The inspectors concluded that AmerGen was generally effective in identifying, evaluating and resolving problems. TMI personnel identified problems and entered them into the corrective action program at a low threshold. AmerGen prioritized and evaluated issues commensurate with the safety significance of the problems and corrective actions were generally implemented in a timely manner.

There were four findings identified by the NRC during this inspection associated with problem identification and evaluation. The four findings were determined to involve violations of NRC requirements. Additionally, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. However, because each violation was of very low safety significance (Green) and because they were entered into your corrective action program (CAP), the NRC is treating these findings as non-cited violations (NCVs), in accordance with Section VI.A of the NRC's Enforcement Policy. If you deny any of these NCVs, you should provide a response with the basis for your denial, within 30 days of the date of this inspection

report, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C., 20555-0001, with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C., 20555-0001; and the NRC Resident Inspector at the Three Mile Island Station.

In accordance with Title 10 of the Code of Federal Regulations (CFR), Part 2.390 of the NRC's "Rules of Practice," a copy of this letter, 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 the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web Site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Mel Gray, Chief
Technical Support & Assessment Branch
Division of Reactor Projects

Docket No. 50-289
License No. DPR-50

Enclosures: Inspection Report 05000289/2008006
w/Attachment: Supplemental Information

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E. Epstein, TMI-Alert (TMIA)
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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 05000289

License No.: DPR-50

Report No.: 05000289/2008006

Licensee: AmerGen Energy Company, LLC (AmerGen)

Facility: Three Mile Island Station, Unit 1

Location: P. O. Box 480
Middletown, PA 17057

Dates: March 31, 2008 through April 18, 2008

Team Leader: Fred L. Bower, Senior Resident Inspector, Peach Bottom, DRP

Inspectors: Javier Brand, Resident Inspector, DRP
Doug Tiff, Reactor Inspector, DRS
Garrett Newman, Project Engineer, DRP

Approved by: Mel Gray, Chief
Technical Support & Assessment Branch
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000289/2008-006; 3/31/2008 - 04/18/2008; AmerGen Energy Company, LLC; Three Mile Island, Unit 1; Biennial Baseline Inspection of the Identification and Resolution of Problems (PI&R); Four violations were identified with respect to the implementation of the CAP.

This NRC team inspection was performed by two resident inspectors and two regional inspectors. Four findings of very low safety significance (Green) were identified by the NRC during this inspection. Each of the findings was classified as a non-cited violation (NCV). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Identification and Resolution of Problems

The inspectors concluded that AmerGen was generally effective in identifying, evaluating and resolving problems. AmerGen personnel identified problems and entered them into the CAP at a low threshold. However, one issue that was not entered into the CAP in a timely manner resulted in a NRC-identified NCV. The inspectors verified that AmerGen had taken actions to address previous NRC findings. In general, AmerGen appropriately screened issues for operability and reportability and prioritized issues commensurate with the safety significance of the problems. Notwithstanding, actions to correct one issue were not appropriately classified as corrective actions and resulted in a NRC identified NCV. Causal analyses appropriately considered extent of condition, generic issues, and previous occurrences. CAs addressed the identified causes and were typically, but not always, implemented in a timely manner. Untimely CAs for one issue resulted in a NRC-identified finding.

AmerGen's audits and self-assessments were thorough and probing. However, untimely CAs for one issue identified by a licensee self-assessment resulted in a NRC-identified NCV. The inspectors concluded that AmerGen adequately identified, reviewed, and applied relevant industry operating experience. Based on interviews, observations of plant activities, and reviews of the CAP and the Employees Concerns Program (ECP), the inspectors determined that site personnel were willing to raise safety issues and to document them in the CAP.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a NCV of Technical Specification (TS) 6.8.1, which requires that written procedures be implemented as recommended in Appendix A of Regulatory Guide (RG) 1.33, including abnormal operating procedures (AOPs) for loss of service water. Specifically, the AOP for loss of river water was inadequately implemented when equipment required was not staged to support the AOP implementation.

The finding is more than minor because it is associated with the procedure quality attribute of the Mitigating Systems Cornerstone, and the associated cornerstone objective of ensuring the reliability of systems (and personnel) that respond to initiating events to prevent undesirable consequences. Specifically, this finding reduced the reliability of the operators to complete the AOP. This finding was of very low safety significance (Green) because the finding is not a design or qualification deficiency, does not represent a loss of safety function, and does not screen as potentially risk significant due to external hazards. Although the operators would be delayed without the staged hoses, the inspectors concluded that the alternative cooling safety function could be provided to the Nuclear Services Closed Cooling Water (NSCCW) system within the time limit specified by AmerGen's calculations.

The finding has a cross-cutting aspect related to the area of PI&R, corrective action program component, in that, AmerGen identified that the hoses were missing in January 2008, and did not implement CAs to replace the hoses required by the AOP until identified by the inspectors. [P1.(d)] (Section 4OA2.a.3.a)

- Green. The inspectors identified a NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Specifically, AmerGen did not ensure that fuel consumption calculations included the additional fuel needed for allowable emergency diesel generator (EDG) frequency variations of up to 61 Hertz (Hz). The increased fuel consumption was not accurately translated into the TS used to verify operability of the EDGs.

This finding is considered to be more than minor because it is associated with the design control attribute of the Mitigating Systems Cornerstone and the associated cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences. This finding was of very low safety significance (Green) because the finding is not a design or qualification deficiency, does not represent a loss of safety function, and does not screen as potentially risk significant due to external hazards.

The issue has a cross-cutting aspect related to the area of PI&R, corrective action program component, in that, AmerGen did not thoroughly evaluate the extent of condition for a previous NRC NCV (reference IR 581933) regarding inadequate design control of EDG loading calculations. Specifically, the cause of the problem, not adequately considering the effect on EDG loading due to operating at the maximum frequency allowed by station procedures, was not resolved for other EDG parameters, such as EDG fuel oil consumption. [P1.(c)] (Section 4OA2.a.3.b)

- Green. The inspectors identified a NCV of TS 4.2.2 for the failure to implement applicable American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code requirements for comprehensive in-service testing (IST) of the 'A' and 'B' decay heat removal (DH) pumps. Specifically, AmerGen used differential pressure gauges that did not meet the data collection requirements for instrument accuracy.

This finding is more than minor because it is similar to IMC 0612, Appendix E, example 2C, in that, the issue was repetitive (2005 and 2007 comprehensive tests). Additionally, this finding is associated with the Equipment Performance Attribute of the Mitigating Systems Cornerstone and the associated cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. This finding was of very low safety significance because it involved a qualification deficiency that was confirmed not to result in a loss of operability.

This finding has a cross-cutting aspect in the area of PI&R, corrective actions program component, because AmerGen personnel identified the issue in 2005, but did not take appropriate CAs in a timely manner prior to testing the pumps in 2005 and 2007. [P.1(d)] (Section 4OA2.a.3.c)

- Green. The inspectors identified a NCV of License Condition 2.c(4) and 10 CFR 50, Appendix R, Section III.J, which require that emergency lighting units (ELUs) with at least an eight-hour battery power supply be provided in areas needed for operation of safe shutdown (SSD) equipment and in access and egress routes thereto. Specifically, Fire Hazards Analysis Report (FHAR) Attachment 3-7 specifies a post-fire safe shutdown (SSD) action for operators to manually operate valve IC-V-4 within four hours for a fire in fire zone AB-FZ-9, and ELUs were not provided at valve IC-V-4 and portions of the adjacent access and egress routes.

The finding is more than minor because it was associated with the Mitigating Systems Cornerstone attribute of protection against external factors (i.e. fire) and affects the cornerstone objective of ensuring reliability and capability of systems that respond to initiating events. Specifically, the finding adversely affected to some degree the ability to carry out local operator actions required to achieve and maintain a SSD condition following a severe fire. This finding was of very low significance because it involved a low degradation of SSD capability. The conclusion of low degradation was based on the fact that the procedure step in question has a four hour completion time per FHAR Attachment 3-7.

The finding has a cross-cutting aspect in the area of PI&R, Self and Independent Assessments Component, because AmerGen did not take the appropriate corrective actions to address this issue commensurate with its safety significance. Specifically, as part of an extent of condition review for missing ELUs identified by a fire safe shutdown self assessment conducted in 2003, AmerGen identified that emergency lighting was needed at valve, IC-V-4, to meet the requirements of 10 CFR 50, Appendix R, but has not evaluated and corrected the issue in a timely manner. [P.3(c)] (Section 4OA2.c.3)

B. Licensee-Identified Violations.

A violation of very low safety significance, which was identified by the licensee, has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's CAP. This violations and corrective actions are listed in Section 4OA7 of this report.

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution (PI&R) (Biennial - 71152B)

a. Assessment of the Corrective Action Program (CAP)

1. Inspection Scope

The inspectors reviewed the procedures that describe AmerGen's CAP at TMI Station, Unit 1. AmerGen identified problems for evaluation and resolution by initiating issue reports (IRs) that were entered into the issue reporting (Passport) system. The IRs were subsequently screened for operability, categorized by significance (1 to 5), assigned a level of evaluation (A to D), and routed for resolution and/or trending. Issues requiring work were entered into the work request (PIMS) system as action requests (ARs) where they could be developed into work orders (WOs).

The inspectors evaluated the process for assigning and tracking issues to ensure that issues were screened for operability and reportability, prioritized for evaluation and resolution in a timely manner commensurate with their safety significance, and tracked to identify adverse trends and repetitive issues. In addition, the inspectors interviewed plant staff and management to determine their understanding of and involvement with the CAP.

The inspectors reviewed IRs selected across the seven cornerstones of safety in the NRC's Reactor Oversight Process (ROP) to determine if site personnel properly identified, characterized, and entered problems into the CAP for evaluation and resolution. The inspectors selected items from functional areas that included emergency preparedness, engineering, maintenance, operations, physical security, radiation safety, and oversight programs to ensure that AmerGen appropriately addressed problems identified in these functional areas. The inspectors selected a risk-informed sample of IRs that had been issued since the last NRC PI&R inspection conducted in March 2006. The inspectors considered risk insights from the station's risk analyses to focus the sample selection and plant tours on risk-significant systems and components. Inspectors' samples focused on these systems, but were not limited to them. The corrective action review was expanded to five years for evaluation of issues associated with the reactor building emergency cooling fans (AH-E-1A, 1B & 1C).

The inspectors selected items from other processes at TMI to verify that they were appropriately considered for entry into the CAP. Specifically, the inspectors reviewed a sample of action requests (ARs) in the work management (PIMS) system, operator workaround conditions, operability determinations and work orders (WOs).

The inspectors reviewed IRs to assess whether AmerGen personnel adequately evaluated and prioritized identified problems. The inspectors observed daily IR screening meetings conducted by the Station Oversight Committee (SOC) in which

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AmerGen personnel reviewed new IRs for prioritization and assignment. The issues and IRs reviewed encompassed the full range of evaluations, including root cause analyses, apparent cause evaluations (ACEs), and common cause analyses (RCAs). IRs that were assigned lower levels of significance which did not include formal cause evaluations were also reviewed by the inspectors to ensure they were appropriately classified. The inspectors' review included the appropriateness of the assigned significance, the scope and depth of the causal analysis, and the timeliness of resolution. The inspectors assessed whether the evaluations identified likely causes for the issues and developed appropriate CAs to address the identified causes. Further, the inspectors reviewed equipment operability determinations, reportability assessments, and extent-of-condition reviews for selected problems to verify these processes adequately addressed equipment operability, reporting of issues to the NRC, and the extent of problems. The inspectors observed a cross-disciplinary group of TMI personnel screen new issues at SOC meetings. The inspectors also observed Management Review Committee (MRC) meetings during which AmerGen managers reviewed RCAs, as well as selected ACEs and corrective action assignments.

The inspectors reviewed IRs for adverse trends and repetitive problems to determine whether CAs were effective in addressing the broader issues. The selected sample of evaluation products reviewed also included common cause analyses (CCAs). The inspectors reviewed AmerGen's timeliness in implementing CAs and effectiveness in precluding recurrence for significant conditions adverse to quality. The inspectors further reviewed IRs associated with selected NCVs and findings to determine whether AmerGen personnel properly evaluated and resolved the issues. The IRs and other documents reviewed, as well as key personnel contacted, are listed in the Attachment.

2. Assessment

Identification of Issues

Based on the samples selected, the team determined that AmerGen personnel identified problems and entered them into the CAP at a low threshold. In most cases, problems were identified appropriately in IRs. The inspectors determined that AmerGen trended equipment and programmatic issues. The team concluded that personnel were identifying trends at low levels, and did not identify trends or repetitive issues that AmerGen had not self-identified.

However, AmerGen missed a few opportunities to identify and enter identified issues into the CAP. One example of an issue that was identified but not entered into the CAP in a timely manner resulted in a NRC-identified finding of very low safety significance (Green) concerning missing hoses that were required to be pre-staged by procedure but were not pre-staged.

Specifically, AmerGen personnel did not did initiate an IR for three hoses that were found missing from a box (AOP Box 1) used to pre-stage equipment for implementing procedure OP-TM-AOP-005, "River Water System Failures." The inspectors found that plant personnel missed an opportunity to place this issue in the CAP when the hoses were found missing during an inventory check on January 24, 2008. This NRC-identified finding is discussed in detail in Section 4OA2.a.3.a below.

The inspectors also identified the following two additional issues with an AOP and a fire door that were identified issues, but had not been entered into the CAP:

- AmerGen personnel did not did initiate an IR for a procedure enhancement that had been identified. Specifically, the inspectors found spare fuses stored in AOP Box 1 and listed on the checklist used to verify the inventory of the boxes. However, these fuses were not included on the list of staged equipment in the procedure OP-TM-AOP-005. A procedure change request (IR 758269) for this minor issue was entered into the CAP to ensure agreement between the inventory list in OP-TM-AOP-005 and the equipment stored in AOP Box 1.
- The inspectors identified that Fire Door D108 did not close without assistance as required by plant procedures. Based on interviews and observations of maintenance, operations, and engineering personnel, the inspectors determined that personnel were aware of this equipment deficiency but the issue had not been entered into the CAP. Subsequently, the inspectors verified that the issue was placed in the CAP (IR 757910). This issue was minor because the door was not identified in an improper (open) position.

Prioritization and Evaluation of Issues

The inspectors determined that, in general, AmerGen appropriately prioritized and evaluated issues commensurate with the safety significance of the problem. IRs were screened for operability and reportability, categorized by significance, and assigned to a department for evaluation and resolution. The various IR screening and management review groups considered human performance issues, radiological safety concerns, repetitiveness, and adverse trends during the conduct of reviews.

Items were generally categorized for evaluation and resolution commensurate with the significance of the issues. Guidance for categorization was sufficiently definitive for consistent implementation. In general, issues were appropriately screened and prioritized commensurate with their safety significance. Operability and reportability screenings were appropriately performed. Causal analyses appropriately considered extent of condition, generic issues, and previous occurrences.

During the inspection, the inspectors noted that AmerGen's RCAs and ACEs were generally thorough. AmerGen developed additional comprehensive corrective and preventive actions to address the identified causes. However, the inspectors identified instances where these additional actions were inconsistent or untimely. Specifically, examples existed where CAs and action items (ACITs) generated from the evaluation of issues had not been completed as originally scheduled and had been extended multiple

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times. Under the Exelon CAP, CAs are actions developed to restore conditions adverse to quality (CAQ) to an acceptable condition or capability.

ACITs are action items that are developed to improve performance or correct problems that do not represent a CAQ. It is noted that AmerGen had previously identified (IR 724251) this adverse trend of extensions of ACITs. Below are listed some examples of these extensions identified by the inspectors. These instances were determined to be minor because the issues being addressed by the ACITs did not result in conditions adverse to quality:

- IR 167266 (**3C**) – Multiple CAs were developed to review engineering design calculations and address calculation weaknesses that had been observed during a NRC safety system design inspection in 2003. These CAs were downgraded to ACITs and were extended at least seven times from 2004 to the present. The ACITs remained open at the time of this inspection.
- IR 482279 (**2A**) – After engineering led impact reviews did not identify errors in a plant modification that was designed to prevent the effects of hot shorts, an ACIT was developed to brief engineering supervisors on the expectations to enter the performance of poor modification impact reviews into the fundamentals management system. The inspectors observed the ACIT had been extended 23 times in 1.5 years and remained open at the time of this inspection.
- IR 533819 (**3B**) – An ACIT was generated to brief engineers on the requirements to include maintenance planners in the review process for developing advance work authorization (AWAs). This ACIT remained open at the time of this inspection and had been extended approximately 20 times since the original due date in January 2007.

The team also identified one example where an action was inappropriately categorized as an ACIT instead of a CA. The delayed resolution of a design control related issue resulted in an NRC-identified finding of very low safety significance (Green) concerning noncompliance to 10 CFR 50, Appendix B, “Design Control.”

- IR 581933 (**3D**) – This IR documented a 2007 NRC Component Design Basis Inspection that identified that AmerGen EDG loading calculations used a nominal frequency of 60 hertz (Hz) versus the maximum frequency (61 Hz) allowed by station procedures. The IR also noted that EDG fuel oil consumption would be adversely affected by operation at 61 Hz and the fuel oil consumption could exceed the amount dedicated in the storage tanks to meet the design basis and the associated TS required volume. AmerGen actions to correct this design control error were untimely. This NRC-identified finding is discussed in detail in section 4OA2.a.3.b below.

Effectiveness of CAs

The inspectors concluded that CAs for identified deficiencies were typically timely and adequately implemented. The inspectors also concluded that AmerGen conducted in-

depth effectiveness reviews for significant issues to determine if the CAs were effective in resolving the issue. The inspectors did identify a few minor instances where CAs were not fully effective in addressing underlying deficiencies. For significant conditions adverse to quality, the inspectors noted that AmerGen's actions were comprehensive and thorough, and generally successful at preventing recurrence.

However, AmerGen inappropriately closed or cancelled some CA assignments without taking the recommended actions or generating another corrective action type assignment. One following example was related to the closure of a CA to a lower level ACIT assignment was not corrected in a timely manner. This untimely CA resulted in a NRC-identified finding of very low safety significance (Green) concerning noncompliance with TS required sections for in-service testing (IST) of the pump. The inspectors identified the following additional issues related to corrective action assignments that were not tracked to completion:

- IR 303042 **(4D)** – CAs were developed to correct inadequate (did not meet ASME OM Code requirements) accuracy of the differential pressure gauges that were used for IST of the DH (RHR/LPSI) pumps were closed to action tracking items (ACITs). These lower priority ACITs did not correct the condition before the next two comprehensive tests of the DH Removal pumps and remained open at the time of the inspection. This NRC-identified finding is discussed in detail in section 4OA2.a.3.c below.
- IR 643757 **(4D)** – A quick human performance investigation (QHPI) was performed in response to a June 2007 tagging error. The QHPI identified 1 CA and 6 ACIT's. The QHPI stated that the CA and 3 of the 6 ACIT's had been completed. The team noted that the remaining 3 ACIT's did not have specific tracking assignments initiated to track and drive completion of the ACITs. The team also noted that IR 643757 was in an "Approved" status with a past due date of August 7, 2007. During this inspection, AmerGen determined that the 3 ACITs without tracking assignments had not been completed. An IR (763233) was written to address this problem. The inspectors concluded this issue was minor.
- The team also noted that a backlog of work requests (ARs) existed in the work management system and the backlog included open CAs. The team observed some instances where these ARs were not being closed when an evaluation in the associated IR determined that the work was not required. Some ARs were also remaining open when the work had been completed under a different CAP or work management process. The team found that some of these ARs have remained open longer than four years. The team concluded that these ARs were not being adequately tracked; therefore, the CAs may not be implemented as intended. AmerGen initiated IR 758958 to address this issue. Through this review, the team found that there was a backlog of PIMS WOs and ARs that remained open and have not been placed into the records management system after the work was completed. IR 749136 was initiated to address this concern. The following instances were identified by the team. The team concluded that issues were minor because corrective actions had been completed.

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- IR 266174 **(4D)** – This IR initiated AR A2099777 to address the lack of emergency lighting units (ELUs) for two fire safe shutdown valves in the auxiliary building. Subsequently, Assignment 266174-02 determined that the installation of an ELU was not required, but AR A2099777 was not closed.
- IR 266170 **(4D)** – This IR initiated AR A2099778 to address the lack of ELUs for two fire safe shutdown valves in the auxiliary building. Subsequently, Assignment 266170-02 determined that the installation of an ELU was not required, but AR A2099778 was not closed.
- IR 303049 **(4D)** – This IR initiated AR A2019156 to address the need for more accurate gauges to perform comprehensive in-service testing of the chemical addition pumps, CA-P-1A/B. The work was completed but the AR was left open.
- IR 231026 **(3D)** – AR A2091736 was opened to have a new relief valve installed on the control room chillers. Work was done per an engineering change request (ECR) and the related technical manual was updated, but the AR was left open.
- IR 749136 **(3B)** - During the review of incomplete PIMS ARs, the team found information related to the loss PIMS WOs had been identified as a finding by AmerGen QA personnel during an audit. Specifically, the finding identified that the loss of these safety-related corrective maintenance WOs was a loss of quality records. This licensee identified finding is described in report section 4OA7 below.
- IR 286662 **(3B)** – AR A2105304 associated with maintenance on AH-E-1A remained open although all work had been completed for a year. As a result, AmerGen initiated IR 753965 (4D) to expand the scope of the ACE being performed for IR 749136.

3. Findings

(a) Failure to Follow Abnormal Operating Procedures

Introduction: The inspectors identified a Green NCV of TS 6.8.1, which requires that written procedures be implemented as recommended in Appendix A of RG 1.33, including AOPs for loss of service water. Specifically, the AOP for loss of river water was inadequately implemented when equipment required to be staged to support the AOP implementation was not maintained in the specified box.

Description: The inspectors reviewed IR 590427 which identified that equipment was missing from AOP Box 1 on February 12, 2007. The AOP for the loss of service water, OP-TM-AOP-005, "River Water System Failures," Attachment 3, step 2.1, provides a list of equipment that to support procedure implementation. The AOP requires the support equipment to be staged in a specific location (AOP Box 1).

In response to IR 590427, AmerGen replaced the missing equipment, enhanced the AOP box inventory checklist, and considered adding tamper seals to the AOP boxes. AmerGen personnel subsequently inventoried the AOP boxes on January 24, 2008, using the revised checklist; however, the decision was made to not install tamper seals on the AOP boxes.

To review AmerGen's CAs, on April 2, 2008, the inspectors walked down the AOP boxes to ensure that the boxes contained the support equipment required to complete OP-TM-AOP-005. The inspectors identified that AOP Box 1 contained only one of the four fire hoses required by the AOP. The inspectors reviewed the WO from the last AOP box inventory that was performed on January 24, 2008, and determined that the three fire hoses were documented as missing in the WO completion notes; however, an IR was not written to investigate and have them replaced. The replacement of the three missing hoses was not corrected until the inspectors identified the condition on April 2, 2008. The licensee added the three missing hoses to the AOP box and wrote IR 758924 to investigate the problem.

Analysis: The performance deficiency involves the inadequate implementation of AOP OP-TM-AOP-005, "River Water System Failures," in that, all the AOP-required support equipment was not stored in AOP Box 1. The AOP is entered in the event there is a loss of all river water pumps or low level in the pump bay. The AOP is used to provide long term cooling to the core by lining up an alternate source to cool the NSCCW system. The NSCCW system is a risk significant support system that cools the make up (MU) system. The MU system is used for high head injection at TMI. Specifically, Attachment 3 of OP-TM-AOP-005 uses the four hoses to supply water from the fire system to cool the NSCCW system. Without the staged hoses, operators would be required to: locate replacement hoses elsewhere on-site; or, complete an alternative (contingency) section of the AOP. The inspectors determined this issue is more than minor because it is associated with the procedure quality attribute of the Mitigating Systems Cornerstone and the associated cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. Specifically, this finding reduced the reliability of the operators to complete the AOP. The inspectors assessed this finding in accordance with NRC IMC 0609, Appendix A, Attachment 1, Phase 1 "SDP for Reactor Inspection Findings for At-Power Situations," and determined that it was of very low safety significance (Green) because the finding is not a design or qualification deficiency, does not represent a loss of safety function, and does not screen as potentially risk significant due to external hazards. Although the operators would be delayed without the staged hoses, the team concluded that alternative cooling could be provided to the NSCCW system within the time specified by AmerGen's calculations.

The finding has a cross-cutting aspect related to the area of PI&R, corrective action program component, in that, AmerGen identified that the hoses were missing in January 2008, and did not implement CAs to replace the hoses required by the AOP until identified by the inspectors. [P1.(d)].

Enforcement: TS 6.8.1 requires that written procedures shall be implemented as recommended in Appendix A of RG 1.33, Revision 2, February 1978. RG 1.33 specifies

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the development of procedures for addressing emergencies and other significant events, including the loss of service water. The loss of service water response AOP, OP-TM-AOP-005, "River Water System Failures," Attachment 3, step 2.1, requires the staging of four fire hoses in AOP Box 1. OP-TM-AOP-005, Attachment 3, uses the four hoses to supply water from the fire system to cool the NSCCW system. Contrary to the above, procedure OP-TM-AOP-005 was inadequately implemented from about January 24, 2008, to April 2, 2008, when three of the four fire hoses required by OP-TM-AOP-005, Attachment 3, step 2.1, were identified by inspectors to not be staged in AOP Box 1. This violation is documented in AmerGen's CAP (IR 758324) and, therefore, is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: **NCV 05000289/2008006-01, "Failure to Stage Equipment Required by Abnormal Operating Procedures."**

(b) Failure to Include Increased EDG Fuel Oil Consumption Into Design Basis Calculations

Introduction: The inspectors identified a finding of very low safety significance (Green) involving a NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Specifically, AmerGen did not ensure that fuel consumption calculations included the additional fuel needed for allowable EDG frequency variations of up to 61 Hz. The increased fuel consumption was not accurately translated into the design basis calculations and used to verify operability of the EDGs.

Description: On April 2, 2007, the NRC issued NCV 2007-006-02, because AmerGen's calculations of record did not adequately verify or check the adequacy of EDG loading within procedurally allowed frequency limits. Specifically, EDG loading calculation, C-101-741-E510-005, Revision 4, did not account for allowable variations in EDG frequency. Operating procedure OP-TM-861-902 and surveillance procedure 1303-4.16, allowed EDG frequency up to 61 Hz. AmerGen entered this issue in their CAP under IR 581933. This is a performance deficiency because important design information that was not accurately translated into TS 3.7.1.e, as required by 10 CFR Part 50, Appendix B, Criterion III, "Design Control."

The inspectors reviewed the actions taken in response to IR 581933 and noted that AmerGen identified that the higher EDG loads experienced during operation at 61 Hz could affect EDG fuel oil consumption. AmerGen personnel performed an operability evaluation that incorporated an informal calculation of the additional fuel needed for the higher EDG loads experienced during operation at 61 Hz. The EDG loading calculation was also revised to ensure that the EDG rating bounded the loads that would be experienced during operation at 61 Hz under design basis conditions.

The inspectors observed that TS 3.7.1.e requires at least 25,000 gallons of fuel oil be available in the EDG fuel oil storage tank (DF-T-1), and requires the station operators to place the plant in a hot shutdown within 12 hours if this condition is not met. This requirement supports the design basis in the Updated Final Safety Analysis Report (UFSAR), Section 8.2.3, which states, "sufficient fuel is stored to allow one EDG to supply post accident power requirements for seven days."

AmerGen's operability evaluation determined that an additional 474 gallons (total 25,474

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gallons) were needed for operation of the EDG at 61 Hz. However, the inspectors identified that a revised fuel consumption calculation had not been performed, nor had administrative controls been put in place to prevent lowering EDG fuel oil tank level below the fuel volume required to support EDG operability during the postulated design basis accident.

In reviewing the EDG loading calculation, the inspectors identified additional deficiencies that included:

- The EDG fuel oil consumption calculation of record did not consider the amount of unusable fuel oil volume that was caused by the suction pipe configuration inside the EDG fuel oil tank and the flow vortex effect. Amergen subsequently calculated that the unusable volume was approximately 428 gallons.
- The EDG fuel oil tank level instrument uncertainty (± 2 inches) was not adequately considered when establishing alarm set points.

In response to the inspectors' observations, AmerGen personnel initiated IR 764180 and recalculated the EDG fuel oil consumption in a technical evaluation. The evaluation conservatively determined that 26,820 gallons will be needed in the EDG fuel oil storage tank to account for operation of the EDG at 61 Hz, instrument uncertainty and unusable tank volume. AmerGen implemented administrative controls to maintain the needed volume in the EDG fuel oil storage tank in accordance with the design basis.

Analysis: This issue is a performance deficiency because the calculation of record for EDG fuel consumption had not been revised to account for EDG operation at the maximum permissible frequency and administrative controls had not been put in place to prevent lowering the EDG fuel oil storage tank level below the fuel volume required to support EDG operation under design basis conditions. It was reasonable for this to have been performed because AmerGen personnel identified this impact in evaluating a similar NCV in 2007. This design control issue was considered to be a more than minor finding because it is associated with the design control attribute of the Mitigating Systems Cornerstone and the associated cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors assessed this finding in accordance with NRC IMC 0609, Appendix A, Attachment 1, Phase 1 "SDP for Reactor Inspection Findings for At-Power Situations," and determined that it was of very low safety significance (Green) since the finding is not a design or qualification deficiency, does not represent a loss of safety function, and does not screen as potentially risk significant due to external hazards. In a review of previous EDG low level alarms, the inspectors determined that adequate fuel oil had been maintained in accordance with the design basis.

The issue has a cross-cutting aspect related to the area of PI&R, corrective action program component, in that, AmerGen did not thoroughly evaluate the extent of condition for a previous NRC NCV (Reference IR 581933) regarding inadequate design control of EDG loading calculations. Specifically, the cause of the problem, not adequately considering the effect on EDG loading due to operating at the maximum frequency

allowed by station procedures, was not evaluated for other EDG parameters, such as EDG fuel oil consumption. [P1.(c)].

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires that measures shall provide for verifying or checking the adequacy of design. Contrary to this requirement, at the time of the inspection, AmerGen's calculations of record did not adequately verify or check the adequacy of EDG fuel oil consumption within the procedurally allowable frequency limits. Specifically, EDG fuel oil consumption calculation of record, C-1101-862-5360-002, Revision 3, did not account for the higher EDG load resulting from allowable variations in EDG frequency. Operating procedure, OP-TM-861-902, and surveillance procedure, 1303-4.16, allowed EDG frequency up to 61 Hz. Because this violation was of very low safety significance and was entered into AmerGen's CAP (IR 764180), this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy: **NCV 05000289/2008006-02, "Failure to Include Increased Emergency Diesel Generator Fuel Oil Consumption Into Design Basis Calculations."**

(c) Failure to Meet ASME OM Code Data Collection Requirement for Comprehensive IST

Introduction: The inspectors identified a Green NCV of TS 4.2.2 for the failure to implement applicable ASME OM Code requirements for comprehensive IST of the 'A' and 'B' DH removal pumps. Specifically, AmerGen used differential pressure gauges that did not meet the data collection requirements for instrument accuracy.

Discussion: The inspectors reviewed IR 303042, DH-PI-1493A/B, entitled, "Do Not Meet ASME Testing Requirement." The team also reviewed the surveillance test records of comprehensive IST conducted on November 6 and 7, 2005, and October 31 and November 5, 2007, in accordance with procedures, OP-TM-212-213 & -214, "DH-P-1A & B Refueling IST." The review was conducted to determine if the tests met TS, 10 CFR 50.55a(f) and ASME Code requirements. AmerGen's fourth ten-year interval for IST commenced on September 22, 2004, and it specifies that ASME OM Code, 1998 Edition through the 2000 Addenda applicable to TMI. This Code edition requires biennial comprehensive testing with more accurate gauges and a smaller acceptance criteria than the previous Code of record for TMI. Comprehensive testing demonstrates a pump's capability to operate at design flow, while regular quarterly testing is performed at a lower than design flow rate.

AmerGen generated AR 303042 on February 18, 2005, to identify that the differential pressure gauges (DH-DPI-1493A & B) used by procedure for comprehensive IST of the DH pumps did not meet the ASME OM Code requirement for instrument accuracy. Specifically, the applicable Code requires pressure gauge accuracy of one-half percent of full range. The installed gauges were accurate to the gauge manufacturer's tolerance of three-fourths percent of full range. AmerGen considered options for correcting the problem that included: (1) evaluating the acceptability of using installed alternate suction and discharge pressure gauges; and (2) temporarily or permanently replacing the gauges with more accurate gauges. However, AmerGen did not take CAs prior to the 2005 and 2007 comprehensive tests to meet the Code instrument accuracy requirements.

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The inspectors discussed with AmerGen personnel the use of non-conforming differential pressure gauges to conduct the comprehensive IST procedures. As a result, AmerGen personnel generated IR 757932 to document that comprehensive testing of the 'A' and 'B' DH pumps had not been performed in accordance with applicable ASME OM Code requirements. Although the gauges were not qualified to meet the ASME Code, AmerGen determined that the pumps were operable. The most recent (2007) test results were acceptable after adding the instrument inaccuracy (three-fourths percent of full range) to recorded pressure data. For the historical (2005) test records, AmerGen postulated that the calibration records for differential pressure gauges, DH-DPI-1493A & B, could be used to demonstrate that the gauges were calibrated more accurately than designed. The team noted that DH-DPI-1493B was not calibrated more accurately than the manufacturer's specified tolerance prior to the 2005 comprehensive test. The team concluded that attempts to calibrate the gauges more accurately than designed by the manufacturer may be impractical due to their readability. However, AmerGen demonstrated that the pump had been operable because flow margin remained to compensate for the non-conforming pressure gauge.

Analysis: AmerGen's use of differential pressure gauges for comprehensive 2005 and 2007 IST that did not meet ASME OM Code requirements for instrument accuracy was a performance deficiency. The use of inaccurate pressure instruments had the potential to invalidate the last two comprehensive tests of the 'A' and 'B' DH removal pumps. This finding is more than minor because it is similar to IMC 0612, Appendix E, example 2C, in that, the issue was repetitive (2005 and 2007 comprehensive tests). Additionally, this finding is associated with the equipment performance attribute of the Mitigating Systems Cornerstone and the associated cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors assessed this finding in accordance with NRC IMC 0609, Appendix A, Attachment 1, Phase 1 SDP for Reactor Inspection Findings for At-Power Situations, and determined that it was of very low safety significance (Green) because the finding involved a qualification deficiency that was confirmed not to result in a loss of operability.

This finding has a cross-cutting aspect in the area of PI&R, corrective action program component, because AmerGen personnel did not take appropriate corrective actions in a timely manner after identifying the problem. [P.1(d)]

Enforcement: TS Surveillance Requirement 4.2.2 requires, in part, that IST of ASME Code Class 1, Class 2, and Class 3 pumps and valves shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code. Specifically, The ASME Operations and Maintenance (OM) Code, 1998 Edition through the 2000 Addenda is applicable to TMI. ASME OM Code Section ISTB-3510 requires that, for comprehensive tests, pressure gauge accuracy shall be within one half percent of full-range. Contrary to the above, during the 2005 and 2007 IST, AmerGen used differential pressure gauges, DH-DPI-1493A and B, for comprehensive testing of the 'A' and 'B' DH removal pumps. DH-P-1A and B were designed to be accurate to three-fourths percent of full range. Because this issue is of very low safety significance, and it was entered into the CAP (IR 757932), this violation is being treated as a NCV, consistent with Section VI.A.1

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of the NRC Enforcement Policy: **NCV 05000289/2008006-03, "Failure to Meet ASME OM Code Data Collection Requirement for Comprehensive IST."**

b. Assessment of the Use of OE

1. Inspection Scope

The inspectors selected a sample of industry OE issues to confirm that AmerGen evaluated the OE information for applicability to TMI and took appropriate actions when warranted. The inspectors reviewed OE documents to determine that AmerGen appropriately considered the underlying problems associated with the issues for resolution via their CAP. The inspectors also observed plant activities to determine if industry OE was considered during the performance of routine and infrequently performed activities. A list of the documents reviewed is included in the Attachment to this report.

2. Assessment

The inspectors determined that AmerGen appropriately considered industry OE information for applicability, and used the information for corrective and preventive actions to identify and prevent similar issues. The inspectors assessed that, in general, OE was appropriately applied and lessons learned were communicated and incorporated into plant operations. However, the inspectors identified some instances where actions developed through the review of OE had repetitive deferrals and had not been implemented or evaluated for revision or re-disposition:

- IR 352410 **(4D)** – An OE review performed in 2005 generated CAs to respond to industry information which indicated that the response time for a loss of reactor coolant pump (RCP) seal cooling may be significantly less (5 minutes versus 30 minutes assumed in the FHAR). The CAs, including plans to replace the pump seals with an improved design, have been extended or closed to new CAs multiple times and have not been implemented. In the interim, AmerGen determined that, if RCP cooling cannot be restored within five minutes, the plant will be cooled down on natural circulation and RCP seal leakage will remain within the capability of one makeup pump.
- IR 250605 **(4D)** - An OE review performed in 2004 generated a work request (Action Request (AR) A2096821) to have nondestructive examination (NDE) performed on emergency feedwater (EFW) piping downstream of orifices and venturis that can cause cavitation. The proposed NDE of this EFW piping had been deferred 17 times and had not been scheduled at the beginning of this inspection.
- IR 255716 **(4D)** – A review of site-specific and industry OE in 2004 led to the recommendation to repair degraded tubing clamps on the 1A EDG's by replacing missing or dried rubber sleeves on the clamps. The work order to replace the degraded tubing clamps had been deferred and had not been completed at the time of this inspection.

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These issues were minor because the OE issues did not affect the safety function of the equipment.

3. Findings

No findings of significance were identified in the area of OE.

c. Assessment of Self-Assessments and Audits

1. Inspection Scope

The inspectors reviewed a sample of QA audits, including the most recent audit of the CAP, departmental self-assessments, and assessments conducted by independent organizations. These reviews were performed to determine if problems identified through these assessments were entered into the CAP, when appropriate, and whether CAs were initiated to address identified deficiencies. The effectiveness of the audits and assessments was evaluated by comparing audit and assessment results against self-revealing and NRC-identified observations made during the inspection. A list of documents reviewed is included in the Attachment to this report.

2. Assessment

The inspectors concluded that self-assessments, QA audits, and other assessments were generally critical, probing, thorough and effective in identifying issues. The inspectors observed that these audits and self assessments were completed in a methodical manner by personnel knowledgeable in the subject. The audits and self-assessments were completed to a sufficient depth to identify issues that were entered into the CAP for evaluation. In general, CAs associated with the identified issues were implemented commensurate with their safety significance. One notable exception resulted in one inspector-identified finding of very low safety significance (Green) concerning timeliness of CAs taken in response to a self-assessment finding. Specifically, the team found that although the extent of condition review from a 2003 self-assessment identified that emergency lighting was needed to support a post-fire safe shutdown manual action, AmerGen had not taken timely corrective action to provide emergency lighting required by 10 CFR 50, Appendix R. (see Section 4OA2.c.3)

3. Findings

Lack of Emergency Lighting for Post-Fire Manual Operation of IC-V-4

Introduction: The inspectors identified a Green NCV of TMI Unit 1 License Condition 2.c(4) and 10 CFR 50, Appendix R, Section III.J that require emergency lighting units (ELUs) with at least an eight-hour battery power supply be provided in all areas needed for operation of SSD equipment and in access and egress routes thereto. Specifically, FHAR Attachment 3-7 specifies a post-fire SSD action for operators to manually operate valve IC-V-4 within four hours for a fire in fire zone AB-FZ-9 and ELUs were not provided at valve IC-V-4 and portions of the adjacent access and egress routes.

Description: The team selected several open work requests (PIMS ARs A2099779, A2099777, A2099778) for detailed review. The ARs dealt with the need to install Appendix R required emergency lighting at locations where post-fire safe shutdown operator actions would be performed. For the review of AR A2099779, the team walked down the area around valve IC-V-4 with AmerGen personnel and observed there was no emergency lighting on the valve, the immediate surrounding area or the adjacent access and egress paths. The team noted that an IR (164472) from 2003 identified that an ELU was needed for the operation of valve IC-V-4 and that no ECR existed to install the ELU. IR 164472 led to the initiation of IR 266170 and a work request, AR A2099779, for the development of an engineering change. The CAs in IR 164472 and IR 266167 were closed to PIMS AR A2099779, and the AR remained open.

The team noted that 10 CFR 50, Appendix R, Section III.J, requires ELUs with at least an eight-hour battery power supply be provided in all areas needed for operation of SSD equipment and in access and egress routes thereto. The team's review determined that FHAR Attachment 3-7 specifies a fire SSD action for operators to manually operate valve IC-V-4 within four hours for a fire in Fire Zone AB-FZ-9. The team found that the post-fire SSD action to manually operate valve IC-V-4, was included in procedure OP-TM-AOP-001, Fire, Attachment 10, AB-FZ-9 – Auxiliary Building 305' General Area.

The team also noted IR 164472 (initiated in 2003 with a 1988 event date) that identified the need for lighting at valve IC-V-4 was generated as part of a self assessment of the FHAR. The team noted that the self assessment was being performed to resolve previously identified FHAR deficiencies (IRs 120979 & 118686). The team also noted that the absence of required ELUs was a repeat of a similar condition as described in IRs 128648 and 118674. The team found that the need for an ELU at IC-V-4 was identified again in IRs 391126 and 441069. The CAs in these IRs were closed to a PIMS work request (AR A2133184). The installation of ELUs by this AR had been deferred over 6 times and was in a routed status at the time of the inspection. The associated maintenance WO was on hold.

Analysis: The inspectors identified a performance deficiency because AmerGen did not provide ELUs, with at least an 8-hour battery power supply, to operate SSD equipment (manual operation of valve, IC-V-4, as directed by OP-TM-AOP-001, Fire, Attachment 10, AB-FZ-9 - Aux Bldg 305' General Area). This manual operator action is specified in FHAR Attachment 3-7. This emergency lighting is required by 10 CFR 50, Appendix R,

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Section III.J. Although AmerGen identified this issue in 2003, it has not been corrected. It is considered more than minor significance because it is associated with the protection against external factors (i.e., fire) attribute of the Mitigating Systems Cornerstone and the associated cornerstone objective of ensuring reliability and capability of systems that respond to initiating events. Specifically, the finding adversely affected to some degree the ability to carry out local operator actions required to achieve and maintain a SSD condition following a design basis fire.

The team reviewed this finding using the IMC 0609, Appendix F, Phase 1 SDP worksheet. The team determined that the issue was of very low significance (Green) because the SDP Phase 1 analyses indicated the finding was a low degradation of SSD capability and, therefore, was of very low significance. The conclusion of minor degradation was based on the fact that the procedure step in question was not a time

critical step because it has a four hour completion time per FHAR Attachment 3-7. Consideration was also given to the fact that a management expectation exists for auxiliary operators (AOs) to carry flashlights and the AOs would have access to portable lanterns to provide compensatory lighting.

The performance deficiency has a cross-cutting aspect in the area of PI&R, Self- and Independent Assessments Component, because AmerGen did not take the appropriate CAs to address this issue commensurate with its safety significance. Specifically, as part of an extent of condition review for missing ELUs identified by a fire safe shutdown self assessment conducted in 2003, AmerGen identified that emergency lighting was needed at valve, IC-V-4, to meet the requirements of 10 CFR 50, Appendix R, but has not evaluated and corrected the issue. [P.3(c)]

Enforcement: TMI Unit 1 License Condition 2.c(4) requires that the licensee implement and maintain in effect all provisions of the approved Fire Protection Program. These documents incorporate the requirements of 10 CFR 50, Appendix R, Section III.J, which requires ELUs with at least an eight-hour battery power supply be provided in all areas needed for operation of SSD equipment and in access and egress routes thereto. Contrary to the above, AmerGen did not provide ELUs in the auxiliary building where SSD equipment (IC-V-4) would be operated and in portions of the access and egress routes thereto. AmerGen identified this issue since 2003 when it was identified by an extent of condition review from a self-assessment. Because this finding is of very low safety significance and has been entered into the CAP (IR 761235), this violation is being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy: **NCV 05000289/2008006-04, "Emergency Lighting Not Installed as Required by Appendix R, Section III.J."**

d. Assessment of Safety Conscious Work Environment

1. Inspection Scope

During interviews with staff personnel, the inspectors assessed whether there were issues that may represent challenges to the free-flow of information or factors at the site that could produce a reluctance to raise safety concerns. In support of this, the inspectors assessed whether staff were willing to enter issues into the CAP or raise safety concerns to their management and/or the NRC. The inspectors also interviewed the station ECP coordinator to determine the number and types of issues being raised and entered into the program. The inspectors reviewed a sample of the ECP files to assess the program's effectiveness in addressing potential safety issues. Additionally, the inspectors reviewed the results of nuclear safety culture surveys conducted in 2006 and 2008.

2. Assessment

All persons interviewed demonstrated an adequate knowledge of the CAP and ECP. Based on these limited interviews, the inspectors did not identify a reluctance to raise safety issues or significant challenges to the free flow of information.

Based on interviews, observations of plant activities, and reviews of the CAP and the ECP, the inspectors determined that site personnel were willing to identify and raise safety issues. The inspectors identified that some instances existed where maintenance and security personnel did not personally initiate CRs; however, these individuals did raise their issues to their supervisors for entry into the CAP. The inspectors did not identify any significant issues that were not entered into the CAP as a result of this practice.

The inspectors determined that the 2008 Nuclear Safety Culture Survey provided insights into the safety culture of the site workforce. A team of AmerGen and Exelon personnel assessed the survey results and developed a set of recommendations that included the performance of further data analysis and the development of appropriate actions.

3. Findings

No findings of significance were identified related to the safety conscious work environment at TMI.

4OA6 Meetings, Including Exit

On April 18, 2008, the inspectors presented the inspection results to Mr. W. Noll, Site Vice President, and to other members of the TMI staff. The inspectors verified that no proprietary information is documented in the report.

4OA7 Licensee-Identified Violations

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

- 10 CFR 50, Appendix B, Criterion XVII, QA Records, requires that sufficient records of the results of inspections, tests, and the monitoring of work performance shall be maintained to furnish evidence of activities affecting quality. Contrary to this, in March 2008, AmerGen QA personnel identified that safety-related work orders completed in 2004 could not be located and had not been archived. This was identified in AmerGen's CAP as IR 749136. This finding is of very low safety significance because it represented a permanent loss of quality records but did not effect the safety function of equipment.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

W. Noll, Site Vice President
T. Dougherty, Plant Manager
D. Atherholt, Manager, Regulatory Assurance
P. Bennett, Engineering
W. Bishop Work Management
S. Brantley, Operations Service Manager
H. Crawford, Reactor Engineering Manager
R. Ezzo, Manager Electrical I&C Design
T. Flemming, System Engineer-Emergency Diesels
A. Miller, Regulatory Assurance
D. Mohre, Manager, Security
D. Neff, Manager, Emergency Preparedness
S. Nowak, Supervisor, I&C Maintenance
T. Orth, Engineering ERT Manager
S. Queen, Director, Site Engineering
L. Weir, Manager, Nuclear Oversight Services
T. Wickel, Sr. Manager, Design Engineering
S. Wilkerson, Maintenance Manager

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSEDOpened and Closed

0500289/2008006-01	NCV	Failure to Stage Equipment Required by Abnormal Operating Procedures (Section 4OA2.a.3.a)
05000289/2008006-02	NCV	Failure to Include Increased EDG Fuel Oil Consumption Into Design Basis Calculations (Section 4OA2.a.3.b)
05000289/2008006-03	NCV	Failure to Meet ASME OM Code Data Collection Requirement for Comprehensive IST (Section 4OA2.a.3.c)
0500289/2008006-04	NCV	Failure to Require Emergency Lighting Units (ELUs) (Section 4OA2.c.3)

LIST OF DOCUMENTS REVIEWED

Section 40A2: Identification and Resolution of Problems

Audits and Self-Assessments

NOSA-TMI-07-07, Operations Audit Report, October 1, 2007 to October 12, 2007
 NOSPA-TM-07-1Q, Nuclear Oversight Quarterly Report, January – March 2007
 NOSPA-TM-07-2Q, Nuclear Oversight Quarterly Report, April – June 2007
 NOSPA-TM-07-3Q, Nuclear Oversight Quarterly Report, July – September 2007
 NOSPA-TM-07-4Q, Nuclear Oversight Quarterly Report, October – December 2007
 NOSA-TMI-07-01, Corrective Action Program Audit Report, April 2, 2007 to April 13, 2007
 NOSA-TMI-06-13, Corrective Action Program Audit Report, February 27 to March 3, 2006
 NOSPA-TM-06-1Q, NOS Assessment of EP FASA – NRC Inspection (95001) White Finding –
 Untimely ERO Annual Retraining Focused Area Self-Assessment (AT#363167),
 February 17, 2006 – February 22, 2006
 NOSPA-TM-06-2Q, Condition Reporting and Resolution, June 6, 2006 – June 27, 2006
 NOSPA-TM-07-1Q, Pre-IP71111.11 Inspection FASA, April 3, 2007
 NOSPA-TM-07-1Q, Station Ownership Committee Meeting, March 13, 2007
 NOSPA-TM-07-2Q, Station Ownership Committee Meeting, June 13, 2007
 NOSPA-TM-07-2Q, Station Ownership Committee Meeting, May 3, 2007
 NOSPA-TM-07-2Q, Reg Assurance, Engineering, Security, Radiological Protection, Work
 Management and Operations, April 18, 2007 – April 20, 2007
 NOSPA-TM-07-3Q, Check-In Self-Assessment of Occupational Rad Safety in ALARA Planning
 and Controls IAW NRC IP 71121.02 and Access Control to HRA and VHRA IAW NRC IP
 71121.01 (AT# 560141-04), August 9, 2007 – August 24, 2007
 NOSPA-TM-07-3Q, Check-In Self-Assessment of Rad Material Processing and Transportation,
 IP 71122.02, August 9, 2007 – August 15, 2007
 NOSPA-TM-08-1Q, Emergency Preparedness Advisory Committee, January 15, 2008
 NOSPA-TM-07-4Q, 2008, “Return to Work” Safety & Human Performance Awareness Brief,
 January 4, 2008
 IR 563037-04, FASA, Preparation for NRC Problem Identification and Resolution (PI&R)
 Inspection, January 31, 2008
 IR 561139-02, FASA, Protective Equipment Barriers, August 13, 2007
 IR 561100-04, FASA, Operator Procedure Upgrade Quality, March 12, 2007
 IR 294292, FASA, Problem Identification and Resolution (PI&R) Pre-inspection FASA, January
 24, 2006
 IR 526102-04, Review Tracking Assignments of Class “B” Issue Reports, December 18, 2006
 NOS Letter 5521-2008-001, TMI Readiness for NRC Problem Identification and Resolution
 Inspection, February 20, 2008

Issue Reports (IR)

IR 164725, Voltage & Frequency Required for Emergency Diesel Generators
 IR 231026, AH-C-4B Chiller Failed to Start (Jet Pump Relief Set Too Low)

IR 368810, NOS Finding: LTA Management of PIMS AR Evaluations
IR 425795, AH-E-1A Will Not Start in Fast Speed
IR 483037, Adverse Trend of Maintenance Documentation of Work IRS
IR 483041, Adverse Trend of Maintenance Workmanship Related IRS
IR 518021, ERO DEP Failure
IR 533819, NOS ID: Weld Documentation Deficiencies due to ECR Changes
IR 541987, Welding Program Deficiencies Elevation Letter
IR 567370, AH-E-1A Tripped
IR 572391, New Pagers Are Not Loud Enough
IR 581933, EDGs Main Fuel Oil Tank Low Level Issues
IR 585653, EP Pager Did Not Activate for Call-In Test 1/30/07
IR 585866, One ERO Duty Member Pager did not Activate During Drill
IR 592916, Two ERO Duty Members Pagers did not Activate During Drill
IR 592921, Negative Trend in ERO Duty Members not Calling During Drills
IR 593207, Unexpected Pages Received during Activation Corporate Scenario 1225
IR 594375, Adverse Trend in RP Fundamental Rad Hazard Communications
IR 594623, BS-P-1A No Flow Indicated during 1303-5.2A, Sect 8.1.15.5
IR 600466, Summer – AH-E-1A Contactor inspection & Auxiliary Switch Replacement
IR 600538, Summer – AH-E-1B Contactor Inspection & Auxiliary Switch Replacement
IR 602849, Three of Usual Four Group Pages Received During Weekly Test
IR 603804, AH-E-1C Contactor Inspection & Auxiliary Switch Replacement
IR 610914, Two of Four Group Pages Received During Announced After Hours Test
IR 612498, NOS ID: Finding Issued for Ineffective CA on PIMS AR Evals
IR 619894, NRC Stated Exercise Weakness in UE Declaration Not Critiqued
IR 627768, 2007 WANO AFI – CM.2-1 (Air Intrusion into Safety Systems)
IR 622791, TMI ERO Call-In Drill – Two Duty Individuals did not Respond
IR 625273, NOS ID: Finding Issued for Ineffective EP CAs
IR 630866, BS-P-2 Pump Make Loud Noise
IR 638229, Findings from DEP Failure
IR 645600, Reactor Building Cooling Fan AH-E-1A Found to Have Slightly Low Current Draw
IR 650139, Danger Tagged Equipment Removed from System
IR 662018, EDGs Main Fuel Oil Tank Low Level Issues
IR 669080, EDGs Main Fuel Oil Tank Low Level Issues
IR 704374, AH-E-1B Suction Pressures Not Measurable
IR 707594, RP Dept Clock Reset Goal Exceeded for 2007
IR 720187, EDGs Main Fuel Oil Tank Low Level Issues
IR 721104, EDGs Main Fuel Oil Tank Low Level Issues
IR 721161, EDGs Main Fuel Oil Tank Low Level Issues
IR 724251, TMI Has a High CR ACIT Extension Rate
IR 725170, NS-P-1C Motor Makes Scraping Noise
IR 726579, DH-V-7A Local Indication Incorrect
IR 726582, DH-V-7B Local Indication Incorrect
IR 739152, EQR2: AH-E-1A Tripped From Fast Speed
IR 738802, Action Item Not Addressed in a Timely Manner
IR 739879, NOS ID: PIMS AR Evaluation Program is Not Being Properly Managed
IR 740161, AH-E-1A Fast Speed Thermal Overload Wiring
IR 704832, AH-E-1B Fan Tripped
IR 745716, AH-E-1A Tripped From Fast Speed

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IR 756084, EG-Y-1A Generator Bearing Repairs Rescheduled
IR 274845, Potential UFSAR Errors
IR 343330, Tech Spec Table 4.1-4 Errors
IR 473171, NRC PI&R Team - No Single Procedure for Loss Of Vital Bus
IR 475219, EG-Y-1A Mech Inspections Not In Accordance With 1001J.1
IR 475655, NOS ID: PCR: EDG Maintenance Procedure 1301-8.2 LTA
IR 478685, CCA Due To Continued Configuration Control Events AT TMI
IR 493098, Excessive Clad Temp Formula Out Of Date for L2911 L2912
IR 503925, PCR: SR-S-3A: Auto Shift To High Speed During Hand Operation
IR 521354, Assessment of TMI-1 EOP
IR 530134, NOS ID: White Out/ Red Ink / & Write Overs On Aid Docs
IR 531085, PCR: Procedure 1079 Class N2 NDE Req'ments Wrong
IR 538883, NOS ID: Potential Unauthorized Operator Aids
IR 539473, NOS ID: Potential Unauthorized Operator Aid
IR 540475, NOS ID: Potential Unauthorized Operator Aids
IR 540749, NOS ID: Potential Unauthorized Operator Aids
IR 541435, RCS Superheat RPPC Calc Does Not Match EOP-010
IR 550093, PCR: EOP Deficiencies Identified By Owner's Group Assessment
IR 552081, CDBI FASA: Documentation Deficiency For EFW Suction Response
IR 552478, Digital Turbine Control Sys Diagnostic Alarm
IR 572389, Improvement Opportunity - Corrective Action Extension Rate
IR 573812, A Train ESF Vent. Was In Service with RM-A-14 Secured
IR 580506, NOS ID'D: ACE Does Not Document Required Details
IR 586443, NOS ID: ACIT In-Progress Notes Contradict Completion Notes
IR 586452, NOS ID: ACIT Closed W/O Identifying Follow-Up Action
IR 590427, Emergency Procedure Support Material Missing From AOP Box#1
IR 596169, NOS ID: CA Assignment Closed Without Actions Complete
IR 597371, NOS ID: Unclear Information on Protected Equipment & Risk
IR 613562, PCR - Accurate Means Req'd Determining Fuel Level In FO-T-3
IR 614854, NOS ID: Ineffective Corrective Action and ACIT Close Out
IR 615757, NOS ID: Inadequate Extent Of Cause Evaluations
IR 616319, NOS ID: Deficiencies in CCA / QHPI Effectiveness Reviews
IR 625273, NOS ID: Finding Issued For Ineffective EP CAs
IR 627728, 2007 WANO AFI OF.1-2 (Control Room Equipment Deficiencies)
IR 627734, 2007 WANO AFI OF.3-1 Cont. From OF.4-3, 2005 AOP Guidance
IR 627782, 2007 WANO AFI - OR.2-2 (Mgmt Allows Some Issues To Linger)
IR 634006, Evaluate PRA Impact Due To MU-V-76A Difficult Operation
IR 639265, NOS FINDING For Untimely Station Response To Nos Findings
IR 643757, Clearance Application Error
IR 645674, CB Fire Barrier Penetration Capability Questionable
IR 660350, NOS Finding: Failure To Prepare Operability Evaluation
IR 685107, EF-V-30A Manual Operation Question
IR 685375, NOS ID: Simulator Model Deficiency
IR 687984, NOS ID: Improperly Controlled Documents In Field
IR 688795, PCR: Unexpected Draining Of Reactor Coolant
IR 689042, RC-V-44 Inadequate PZR Venting
IR 690089, NOS ID: Shortfalls In Knowledge Of Protected Equipment
IR 690229, NOS ID: Protected Equipment Posting Deficiency

IR 695435, Entry Into OP-TM-AOP-001 Fire
IR 697044, NOS ID: QV Weld Insp Not Perf./ Now Inaccessible AWA
IR 700788, MS-V-13A/B Handwheel Did Not Match Current Mode
IR 708903, NOS ID: Shortfalls In ID & Posting Of Protected Equipment
IR 712687, NOS ID: Prompts More Timely IR Initiation
IR 719947, NOS ID: Trend In Protected Equipment Issues
IR 720405, NOS ID: Inappropriate Protected Equipment Posting
IR 724130, Run To Failure Classification Of Manual Valves
IR 724251, TMI Has a High CR ACIT Extension Rate
IR 728095, NOS ID: Protected Equip Log And Turnover Checklist Deficiency
IR 729772, PI&R FASA: Ops Log Entry Minor Issues
IR 729776, PI&R FASA: Shift Operability/Reportability Reviews
IR 729780, PI&R FASA: Timeliness In Completing Past Op Evals
IR 730208, Operations Department WGE 719421 Overdue
IR 732588, PCR Heat Balance Was Not Included With 1301-1 Paperwork.
IR 738898, NOS ID: Potential Readiness Vulnerabilities For NRC PI&R
IR 741784, NOS ID: Potential Unauthorized Operator Aid In Whpf
IR 742930, SPDS Post Trip Alarm For Power Different Than OS-24
IR 469374, Consolidation of Procedure Issues
IR 704546, Nuclear Safety Culture Check-In Assessment (2008)
IR 520911, Nuclear Safety Culture Check-In Assessment (2006)
IR 708789, Gap in Issue Report Automated Feedback Process
IR 707954, NOS ID: Improvement Opportunity for Safety Conscious Work environment
(SCWE) Cascade Meeting
IR 737678, TMI Lost SCWE Survey
IR 523672, Security ACE Withdrawn from MRC Without Proper Notification
IR 461498, Resolution to an RCA SCWE Interview Response Not Documented
IR 745739*, CAP-006 CRs Ready for Auto Closure Requires Action
IR 749135, NOS ID'D Loss of Quality Records
IR 749136, Completed Work Orders Are Not Processed/Tracked in a Timely Manner
IR 753965*, PIR: PIMS AR A2105304/C2009450 in the ACTCMP Status
IR 757932*, PIR: DH-P-1A Refueling IST Not Performed to Code Requirement
IR 758269*, PIR: PCR Needed for OP-TM-AOP-005 Attachment 5
IR 758292*, PI&R Question on HR Exit Policy (Fleet Applicability)
IR 758958*, PIR: Backlog of Assignments in PIMS
IR 758324*, PIR: AOP Box 1 Discrepancies (Aux Bldg Hx Vault)
IR 758326*, PIR: AOP Box 4 Discrepancies (295 ft. Intermediate Bldg) PCR
IR 758336*, PIR: AOP Box 5 Labels Need Improvement (EG-Y-1B Room)
IR 757910*, PIR: Door D108 Does Not Close Without Assistance
IR 759387*, PIR: No IR Generated to Correct AOP Box Inventory Deficiency
IR 758237*, PIR PCR: Revision to SY-TM-1005 Step 4.7.10 Required
IR 758930*, PIR: Caution Sign Safety Enhancement at FS-P-3 Batteries
IR 761235*, PIR: Installation of Emergency Lighting at IC-V-4 Untimely
IR 762162*, PIR: DF-LS-172 Data Sheet Discrepancies
IR 762184*, PIR: PCR 1302-6 Performance Frequency Discrepancy
IR 762944*, PIR: PCR on OP-TM-212-942 Needed
IR 763233*, PIR: Assignments from QHPI Had No Actions Cut When Done
IR 764353*, PIR: IR Generation by Maintenance Personnel

IR 764180*, PIR: Potentially Non-Conservative Technical Specification 3.7.1.E

*NRC Identified During Inspection

Action Requests

AR A2105304 AH-E-1A, Overloaded and Tripped Immediately

AR A2161882, RB Spray A Flow Indicator

AR A2117569, Radiation Monitoring System-RM

Drawings

DWG 302-650, Reactor Coolant System, Revision 55

DWG 302-690, Liquid Waste Disposal, Revision 23

DWG 302-694, Waste Gas System Flow Diagram, Revision 43

DWG 80Z-14-006, Sol. Oper. Valve Energize to Open Size: 1" B.W. Sch. 160, Revision D

Miscellaneous

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Emphasis on Welding related IV's, Revision 0

JA-Analysis-210-1303, Training Needs/Cost Analysis Worksheet Job Aid, Welding
Documentation, Revision 0

Non-Cited Violations

NCV 2006007-03: Inservice Test Failure Not Identified and Evaluated for Containment Isolation
Check Valve (IR 444055)

- NCV 2006007-03: Inservice Test Failure Not Identified and Evaluated for Containment Isolation Check Valve (IR 444058)
- NCV 2006007-05: Deficient Test Procedure Causes Air Introduction to Emergency Core Cooling Systems (IR 474439)
- NCV 2006007-05: Deficient Test Procedure Causes Air Introduction to Emergency Core Cooling Systems (IR 475218)
- NCV 2006007-03: Inservice Test Failure Not Identified and Evaluated for Containment Isolation Check Valve (IR 481851)

Operating Experience

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Procedures

- 1103-11, RCS Water Level Control, Revision 64
- 1303-5.2A, "A" Emergency Loading Sequence and HPI Logic Channel/Component Test, Revision 4
- CC-AA-309-101, Engineering Technical Evaluations, Revision 9
- EI-AA-101, Employee Concerns Program, Revision 7
- EI-AA-101-1001, Employee Concerns Program Process, Revision 6
- EI-AA-101-1002, Employee Concerns Program Trending Tool, Revision 4
- EI-AA-100-1103, Employee Issues Advisory Committee Notification, Revision 0
- EP-AA-112-200-F-14, Radiation Protection Manager Checklist, Revision G
- EP-AA-112-300-F-01, OSC Director Checklist, Revision F
- EP-AA-122-F-01, Drill & Exercise Evaluation Criteria, Revision D
- EP-AA-122-1001, Drill & Exercise Scheduling, Development and Conduct, Revision 9
- EP-AA-122-1002, Drill & Exercise Evaluation, Revision 6
- EP-AA-122-1002-F-01, Drill & Exercise Demonstration Criteria, Revision D
- EP-AA-122-1002-F-02, Drill & Exercise Objective Evaluation Data Tables, Revision B
- EP-AA-125-1003, ERO Readiness – Performance Indicators Guidance, Revision 6
- EP-AA-1000, Standardized Radiological Emergency Plan, Revision 19
- EP-AA-1009, Radiological Emergency Plan Annex for TMI Station, Revision 10
- HR-AA-4000, Employees Entering Exelon Nuclear, Changing Positions Within Exelon Nuclear, or Exiting Exelon Nuclear
- LS-AA-115, Operating Experience Procedure, Revision 11
- LS-AA-120, Issue Identification and Screening Process, Revision 7
- LS-AA-125, CAP Procedure, Revision 11
- LS-AA-125-1001, Root Cause Analysis Manual, Revision 6
- LS-AA-125-1002, Common Cause Analysis Manual, Revision 5
- LS-AA-125-1003, Apparent Cause Evaluation Manual, Revision 7
- LS-AA-125-1004, Effectiveness Review Manual, Revision 2
- LS-AA-125-1005, Coding and Analysis Manual, Revision 5
- LS-AA-126, Self-Assessment Program, Revision 6
- LS-AA-126-1001, Focused Area Self-Assessments, Revision 5
- LS-AA-126-1005, Check-In Self-Assessments, Revision 4
- LS-AA-127, Passport Action Tracking Management Procedure, Revision 7

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Initiation and Processing, Revision 5
MA-MA-716-010-1010, Post-Job Review, Documentation Review, Action
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Revision 2
OP-TM-211-203, IST of MU-V-14A/B and DH-V-7A/B, Revision 0
SY-AA-103-518, Outprocessing of Personnel (Employee and Contractor)
WC-AA-106, Work Screening and Processing, Revision 7
WPS 1-1-GTSM-PWHT, ASME Welding Procedure Specification Record, Revision 1

Work Orders (WO)

WO C2009450, Reactor Building Emergency Cooling Fan Motor
WO C2100019, AOP Box Inventory
WO R2083902, OP-TM-220-243 – IST RC-V-40A/B, 41A/B, 28, 44 (Refuel)

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LIST OF ACRONYMS

ACE	Apparent Cause Evaluation
ACITs	Action Items
ACM	Adverse Condition Monitoring
ADAMS	Agency-wide Documents Access and Management System
AOs	Auxiliary Operators
AOP	Abnormal Operating Procedure
AR	Action Request
ASME	American Society of Mechanical Engineers
CA	Corrective Action
CAP	Corrective Action Program
CAQ	Condition Adverse to Quality
CCAs	Common Cause Analyses
CFR	Code of Federal Regulations
DH	Decay Heat
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
ECP	Employee Concerns Program
ECR	Engineering Change Request
EDG	Emergency Diesel Generator
EFW	Emergency Feedwater
ELUs	Emergency Lighting Units
FHAR	Fire Hazards Analysis Report
Hz	Hertz
IMC	NRC Inspection Manual Chapter
IR	Issue Report
IST	In-service Testing
MRC	Management Review Committee
MU	Make Up
NCV	Non-Cited Violation
NDE	Nondestructive Examination
NRC	Nuclear Regulatory Commission
NSCCW	Nuclear Services Closed Cooling Water
OE	Operating Experience
OM	Operation and Maintenance
PARS	Publicly Available Records System
PI&R	Problem Identification and Resolution
QA	Quality Assurance
QHPI	Quick Human Performance Investigation
RCA	Root Cause Analysis
RG	Regulatory Guide
RHR	Residual Heat Removal
ROP	Reactor Oversight Program
SCWE	Safety Conscious Work Environment
SDP	Significance Determination Process
SOC	Station Oversight Committee
SORC	Site Operations Review Committee

SSC	System, Structure, or Component
SSD	Safe Shutdown
TMI	Three Mile Island
TRM	Technical Requirements Manual
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
WO	Work Order