

May 11, 2004

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

SUBJECT: THREE MILE ISLAND STATION, UNIT 1 - NRC INTEGRATED INSPECTION  
REPORT 05000289/2004002

Dear Mr. Crane:

On March 31, 2003, the Nuclear Regulatory Commission (NRC) completed an inspection at Three Mile Island, Unit 1 (TMI) facility. The enclosed report documents the inspection findings that were discussed April 13, 2004 with Mr. Bruce Williams and other members of your staff.

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

The report documents five findings of very low safety significance (Green). Four of these findings were determined to involve violations of NRC requirements. However, because of their very low safety significance and because the issues were entered into your corrective action program, the NRC is treating the issues as non-cited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis of your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector at Three Mile Island.

Since the terrorist attacks on September 11, 2001, the NRC has issued five Orders and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance controls over access authorization. In addition to applicable baseline inspections, the NRC issued Temporary Instruction 2515/148, "Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures," and its subsequent revision, to audit and inspect licensee implementation of the interim compensatory measures required by order. Phase 1 of TI 2515/148 was completed at all commercial power nuclear power plants during calendar year 2002 and the remaining inspection activities for TMI were completed during calendar year 2003. The NRC will continue to monitor overall safeguards and security controls at TMI.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document

Mr. Christopher Crane

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Room or from the Publicly Available Records (PARs) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

We appreciate your cooperation. Please contact me at 610-337-5234 if you have any questions regarding this letter.

Sincerely,

*/RA/*

Peter W. Eselgroth, Chief  
Reactor Projects Branch 7  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000289/2004002  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION 1

Docket No: 05000289

License No: DPR-50

Report No: 050000289/2004002

Licensee: AmerGen Energy Company, LLC (AmerGen)

Facility: Three Mile Island Station, Unit 1

Location: PO Box 480  
Middletown, PA 17057

Dates: January 1, 2004 - March 31, 2004

Inspectors: David M. Kern, Senior Resident Inspector  
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## SUMMARY OF FINDINGS

IR 05000289/2004002; 01/01/2004 - 03/31/2004; AmerGen Energy Company, LLC; Three Mile Island, Unit 1; Equipment Alignment and Licensed Operator Requalification.

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

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

#### Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation (NCV) of technical specification 6.8.1.a for inadequate implementation of scaffold control requirements and for not performing engineering evaluations as required by procedures MA-MA-796-024-1001 and LS-AA-104-1000. The procedural violations resulted in scaffold construction deviations that were not evaluated for adequacy by engineering to ensure that safety related equipment would not be adversely impacted by the scaffold during a seismic event. The finding is of very low safety significance since no equipment was rendered inoperable due to the scaffolding, and the scaffolding would not have caused a loss of any safety function during or following a seismic event. (Section 1R04)

#### Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance was identified. The finding was associated with operating crew performance on the simulator during facility-administered licensed operator requalification examinations. Of the eight crews evaluated, two did not pass their simulator examinations. The finding is of very low safety significance because the failures occurred during annual testing of the operators on the simulator, because there were no actual consequences to the failures, and because the crews were removed from watch-standing duties, refrained and re-evaluated before they were authorized to return to control room watches. (Section 1R11.1)
- Green. An NCV was identified for non-adherence to an established Exelon/AmerGen licensed operator requalification test (LORT) program procedure that provided guidance for satisfying the requirements of 10 CFR 55.59 in the development of the Senior and Reactor Operator 2004 annual requalification exams.

The finding is greater than minor because the Performance Deficiency (PD) affected the mitigating systems cornerstone objective to ensure mitigating system reliability and availability, and its related attribute on human performance (Human Error (Pre-Event and Post-Event)). The finding is of very low safety significance because the discrepancy did not have an adverse impact on the operator's ability to safely operate the plant this past year and there were no identified concerns regarding exam compromise. (Section 1R11.1)

- Green. An NCV was identified for non-adherence to an established Exelon/AmerGen licensed operator requalification program procedure for documenting remediation plans for Senior and Reactor Operators developed as a result of failures on 2003 biennial written and annual operating exams and as required by 10 CFR 55.59(c)(5).

The finding is greater than minor because the PD affected the mitigating systems cornerstone objective to ensure mitigating system reliability and availability, and its related attribute on human performance (Human Error (Pre-Event and Post-Event)). The finding is of very low safety significance because the discrepancy did not have an adverse impact on the operator's ability to safely operate the plant this past year. (Section 1R11.1)

- Green. An NCV was identified for simulator modeling discrepancies that should have been identified and corrected during required steady state performance testing as required by ANSI/ANS 3.5-1985 and 10 CFR 55.46.

This finding is more than minor because it affects the human performance (human error) attribute of the mitigating systems cornerstone. The finding is of very low safety significance because the discrepancy did not have an adverse impact on operator actions such that safety-related equipment was made inoperable during normal operations or in response to a plant transient.

B. Licensee-Identified Findings

None.

## REPORT DETAILS

### Summary of Plant Status

AmerGen Energy Company, LLC (AmerGen), operated Three Mile Island, Unit 1 (TMI) at or near 100 percent power throughout the inspection period.

#### 1. REACTOR SAFETY

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

#### 1R01 Adverse Weather Protection (71111.01)

##### a. Inspection Scope

The inspectors walked down risk significant plant areas for several days in January 2004 and assessed AmerGen's protection for cold weather conditions. The inspectors were sensitive to outside instrument line conditions and the potential for unheated ventilation. The walkdown included the emergency feedwater system, the condensate storage tanks and the turbine driven pump steam supply exhaust piping, the borated water and sodium hydroxide storage tanks, and the cooling water intake and screen pump house. The inspectors referenced the nuclear oversight "Winter Readiness" Report, NIOSPA-TM-034Q and reviewed all action requests for January 2004 to determine whether AmerGen was identifying and resolving cold weather equipment problems. The inspectors also reviewed implementation of AmerGen administrative procedure OP-AA-108-109, "Seasonal Readiness," Rev. 1, for cold weather conditions.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment (71111.04)

##### a. Inspection Scope

##### Partial System Walkdown.

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

- On January 28, 2004, walked down the 'A' nuclear service closed cooling water (NSCCW) train while the 'B' train was out of service for scheduled motor and heat exchanger maintenance.
- On February 20, walked down the 'A' decay heat removal (DH) train while the 'B' DH river water pump was out of service due to a motor overload condition.

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- On March 1, walked down the redundant fire protection pumps (FS-P-1 and FS-P-2) and associated piping, after a coupling leak was identified on fire protection pump (FS-P-3).
- On March 31, walked down the 'B' emergency 4160V train while the 'A' emergency diesel generator (EG-Y-1A) was out of service for planned annual maintenance.

The partial system walkdowns were conducted on the redundant and standby equipment to ensure that trains and equipment relied on to remain operable for accident mitigation was properly aligned and protected. The following documents were used for this inspection:

- Condition Reports (CRs) 180325, 197282, 198061, 204305, 180009, and 198672, which evaluated scaffold concerns identified by the inspectors during the period between September 14, 2003 and January 28, 2004
- MA-AA-796-024, "Scaffold Installation, Inspection, and Removal," Rev. 2
- MA-AA-716-025, "Scaffold, Installation, Modification, and Removal Request Process," Rev. 2
- TMI Condensate Storage Tank Seismic Qualification No. SQ-TI-CO-T-0001A, Rev. 1
- Drawing 302-640, "Decay Heat Removal," Rev. 79
- Drawing 302-645, "Decay Heat Closed Cycle Cooling Water," Rev. 36
- OP-TM-212-000, "Decay Heat Removal System," Rev. 2
- Drawing 302-353, "Diesel Generator Services - Lube Oil, Fuel Oil, Air Start," Rev. 11
- Drawing E-206-022, "One Line Diagram, 4160v Engineered Safeguards Switchgear," Rev. 21
- 1107-2A, "Emergency Electrical - 4Kv and 480 Volt," Rev. 9
- 1107-3, "Diesel Generator," Rev. 106
- LS-AA-104-1000, "Exelon 50.59 Resource Manual," Rev. 1

b. Findings

Seismic Scaffolding Near Safety-Related Equipment Not Built Or Evaluated In Accordance With Procedural Requirements

Introduction. The inspectors identified that station personnel routinely did not install temporary scaffolding in accordance with procedural requirements and to perform the required engineering evaluations when needed. This issue was determined to be of very low safety significance (Green) and an NCV of technical specification (TS) Section 6.8.1.a.

Description. On September 14, 2003, the inspectors identified several scaffolds erected in the non-safety related turbine building that were in direct contact with piping. Condition report (CR-180325) was initiated to address these deficiencies. On January 28, 2004, the inspectors identified six additional seismic scaffolding erected near safety

related equipment in the heat exchanger vault and at the condensate storage tanks (CSTs) which did not meet the two inch seismic clearance. In addition, the inspectors identified that the scaffolding did not have the required engineering evaluation and approval to be built in this manner. The inspectors also identified that four of the scaffolds were over 14 months old, and that no 10 CFR 50.59 engineering evaluations had been performed as required by procedure LS-AA-104-1000. This procedure states that temporary changes including scaffolding are subject to 10 CFR 50.59 when the temporary alterations are in effect for longer than 90 days.

The specific conditions identified by the inspectors involved several safety-related systems including: NSCCW, nuclear river water cooling (NR), DH, DH closed cooling water, and the CSTs. Specifically, four scaffolds had over twelve points in direct contact with the piping and/or heat exchangers. In two of the cases, the scaffolds were installed perpendicularly between two independent, safety-related systems (NR piping and DH heat exchanger). This condition created a potential for damage of several safety-related components in multiple safety-related systems during a postulated seismic event (SSE). Other examples involved a temporary scaffold platform installed on top of each of the CSTs. The platform extended perpendicularly from a permanent ladder anchored to the floor outside the tank and rested on top of the CST domes. The metal scaffold poles were separated from the metal dome by a thin piece of rubber material to protect the paint.

AmerGen scaffold procedure MA-AA-796-024, Section 2.1, states that “scaffolds shall not be supported by, in contact with, or connected in any way to nuclear safety-related pipes, valves, equipment.” Section 4.0 also states that a minimum clearance of two inches shall be maintained in all cases. This procedure allows a smaller seismic clearance provided that an engineering evaluation is performed.

In response to the inspectors' concerns, engineers evaluated the incorrectly installed scaffolding under CRs 180325, 197282, 198061, 204305, 180009, and 198672. Corrective actions included an extent of condition review, re-inspection of scaffolding erected in the affected areas, removal of several scaffolds, walkdowns which identified over 15 scaffolding structures that exceeded the 90 day criteria, training of applicable personnel, and review of procedures MA-AA-796-024 and LS-AA-104-1000.

Engineers concluded that although contact between the scaffold and the safety-related components existed and/or the two inch clearance criteria was not maintained, no damage to any of the safety-related components would have occurred during a postulated seismic event (SSE). The TMI evaluation also identified that the following causes contributed to the improper installation of the six scaffold structures:

- Supervisors had stopped performing some of the required scaffold inspections and relied upon the installer for proper installation.
- Installers were not always knowledgeable of the two-inch seismic clearance requirement.
- Engineers were not officially performing/documenting the required scaffold evaluations (in some cases, verbal acceptance was provided).

The inspectors reviewed the engineering evaluations and all applicable corrective actions to address the identified deficiencies. The inspectors also verified that corrective actions were in place or planned to ensure proper installation of future scaffold structures.

Analysis. The six separate scaffold structures near safety related components that were improperly installed and needed engineering evaluations performed per applicable procedures MA-AA-796-024 and LS-AA-104-1000 constituted a performance deficiency.

This issue affected the mitigating systems cornerstone and was more than minor because it was similar to Example 4.a of Appendix E to IMC 0612, in that station personnel routinely did not properly install scaffolding in safety-related areas, and did not perform required engineering evaluations when needed. Multiple examples of this deficiency were identified by the inspectors. In addition, improperly installed scaffolding near safety-related components could affect the function of the components during a design basis seismic event.

This finding was evaluated using NRC Manual Chapter 0609, "Significance Determination Process," Appendix A, Phase 1, and was determined to be of very low significance since the condition did not involve any actual damage to the safety-related components. In addition, engineering analysis demonstrated that the scaffold as installed would not have affected the capability of the safety-related systems to perform their design function.

Enforcement. Technical specification 6.8.1.a requires that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Rev. 2, February 1978. Regulatory Guide 1.33, Appendix A, recommends procedures for safe operation and shutdown of safety-related systems. Contrary to this requirement, maintenance technicians and engineers did not properly implement procedural requirements for the installation and evaluation of scaffolding structures in safety related applications. Because this violation was of very low safety significance and was entered into the TMI corrective action program (CRs 180325, 197282, 198061, 204305, 180009, and 198672), this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy: **NCV 05000289/2004002-01, Failure to Follow Scaffolding Installation Procedures.**

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors conducted fire protection inspections for several plant fire zones, selected based on the presence of equipment important to safety within their boundaries. The inspectors conducted plant walkdowns and verified the areas were as described in the TMI Fire Hazard Analysis Report (FHAR). The plant walkdowns were conducted throughout the inspection period and included assessment of transient

combustible material control, fire detection and suppression equipment operability, and compensatory measures established for degraded fire protection equipment. In addition, the inspectors verified that applicable clearances between fire doors and floor met the specified criteria per Technical Evaluation CC-AA-309-101, "Fire Door Acceptance Criteria," Rev. 0. The inspectors observed several fire doors to vital areas which were repeatedly found unlatched. In each case, compensatory measures were initiated in accordance with station procedures. Station personnel initiated CRs to address the inspector's concern that this was a repetitive problem. Fire zones inspected included:

- Intermediate building turbine driven emergency feedwater pump room (Zone IB-FZ-2)
- Intermediate building motor driven emergency feedwater pump room (Zone IB-FZ-3)
- 'A' emergency diesel generator room (Zone DG-FA-1)
- 'B' emergency diesel generator room (Zone DG-FA-2)
- Intake structure trash rake and screen area (Zone ISPH-FZ-3)
- Intake structure 1'R' switch gear area (Zone ISPH-FZ-1)
- Intake structure 1'T' switch gear area (Zone ISPH-FZ-2)
- Intake structure fire pumps room (Zone ISPH-FA-2)
- Heat exchanger vault (Zone AB-FZ-1)
- CR 198292, which evaluated a condition identified by the inspectors involving non-safety-related system piping and tubing in contact with fire protection piping in the turbine building

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors performed visual inspections of flood barriers, system boundaries, and high energy line break sources located in portions of the intermediate building (295 and 332 foot elevations) and auxiliary building ('A' decay heat vault) where internal flooding could adversely affect two systems needed for safe shut down of the plant. The two systems reviewed were emergency feedwater (EFW) and decay heat removal (DH). The inspectors also reviewed the flooding potential created by ongoing maintenance activities in the affected areas. Documents reviewed to support this inspection included:

- UFSAR Section 2.6.4, "Flood Studies"
- UFSAR Appendix 14A, "Design Review for Consideration of Effects of Piping System Breaks Outside Containment"
- Individual Plant Examination Section 10, "Internal Flood Analysis"
- Procedure 3301-SA1, "Dike Inspection System," Rev. 11
- TMI Work Week Plan 0414, Rev. 0

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

1. Biennial Licensed Operator Requalification (71111.11B)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Rev. 8; NRC Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program;" NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP);" and 10 CFR 55.46 Simulator Rule (sampling basis) as acceptance criteria. In addition to the onsite inspection activities, the inspectors conducted additional Region I office reviews of information provided by AmerGen such as CRs and test results prior to the final exit on April 5, 2004.

The inspectors reviewed documentation of operating history since the last requalification program inspection. The inspectors also discussed facility operating events with the resident staff. Documents reviewed included NRC inspection reports, performance indicators (PIs), licensee event reports (LERs), and CRs and assignment reports (ARs) that involved human performance issues for licensed operators to ensure that operational events were not indicative of possible training deficiencies (see document list attached).

The inspectors reviewed three sets of scenarios and job performance measures (JPMs) administered during this current exam cycle (i.e., weeks 2, 4, and 6) to ensure the quality of these exams met or exceeded the criteria established in the Examination Standards and 10 CFR 55.59. Note: The comprehensive biennial written exams administered in 2003 were reviewed by the NRC last year and that review was addressed previously in NRC Inspection Report 05000289/2003-003.

The week of the inspection, the inspectors observed the administration of operating examinations to one operating crew (i.e., Delta Shift). The operating examination consisted of two simulator scenarios for each crew and one set of five JPMs administered to each individual. The "D" crew did not pass both of their dynamic scenarios as a crew; in addition, five of the six crew members also did not pass their exams individually. Consequently, the crew was removed from shift duties, remediated for eight days and reexamine. Based on the poor performance of this crew, NRC management decided to observe the "D" crew's reexamination prior to returning to shift. In addition, in subsequent weeks following this inspection, the NRC observed three of the other five operating crews receive their annual dynamic simulator evaluations.

Conformance with Simulator Requirements Specified in 10 CFR 55.46:

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For the site specific simulator, the inspectors observed simulator performance during the conduct of the examinations, reviewed simulator performance tests (e.g., steady state performance tests, selected transient tests) and discrepancy reports to verify compliance with the requirements of 10 CFR 55.46. The following tests and data were reviewed:

- Priority scheme for all currently open and recently closed (i.e., in the past two-year period) simulator work requests (SWR). Please refer to the list of documents attached for specific SWRs that were reviewed.
- Normal operations, including core performance tests (3):
  - NOT23 Plant Cooldown Certification Test 2002/2003
  - NOT05 Zero Power Physics Testing Certification Test 2002/2003
  - NOT25 Heat Balance Calculation Certification Test 2002/2003
- Annual transient tests (3):
  - TTS56 Manual Reactor Trip Tests for 2000/2001, 2001/2002 and 2002/2003
  - TTS19 Loss of Forced Flow Certification Test 2000/2001 and 2002/2003
  - TTS42 Main Steam Leak Inside the Reactor Building Certification Test 2000/2001 and 2002/2003
- Steady state performance tests and real time tests (2):
  - SSP02 Simulator Accuracy Certification Test 2000/2001 and 2002/2003
  - SSP01 Simulator Stability Certification Test 2000/2001 and 2002/2003
  - RTT01 Real Time Certification Test 2002/2003
- Malfunction test (1):
  - TTS23 Loss of Shutdown Cooling Certification Test 1999/2000
- Surveillance test performed on the simulator (1):
  - NOT09 Main Steam Isolation Valves Surveillance Certification Test 1999/2000
- Original NRC Form 474 submittal for exceptions taken.

Conformance with operator license conditions was verified by reviewing the following records:

- Attendance records for four of the thirteen training cycles during the current two year training cycle.
- 10 medical records (6 senior reactor operators [SRO]; 4 reactor operators [RO]) and confirmed all records were complete, and restrictions noted by the doctor were reflected on the individual's license and that the exams were given within 24 months.
- Proficiency watch-standing and reactivation records. A sample of four licensed operator reactivation records were reviewed as well as a random sample of

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watch-standing documentation for time on shift to verify currency and conformance with the requirements of 10 CFR 55.

Remediation training records for all seven of the biennial written failures (4 SRO, 3 RO) and all seven annual operating exam failures for the 2003 exam cycle were reviewed.

Licensee's feedback system: The inspectors interviewed Instructors, training/operations management personnel, and licensed operators (i.e., Assistant Operations Manager, One Operations Supervisor, the Operations Training Manager, one training supervisor, three instructors, three evaluators, the simulator lead, and licensed operators (three ROs and two SROs) for feedback regarding the implementation of the licensed operator requalification program to ensure the requalification program was meeting their needs and responsive to their noted deficiencies/recommended changes.

On April 1, the inspectors conducted an in-office review of licensee requalification exam results. These results included the annual operating test only (i.e., the comprehensive written exam was administered last year). The inspection assessed whether pass rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The inspectors verified that:

- Crew failure rate on the dynamic simulator was **NOT** less than 20 percent. (Failure rate was 25 percent)
- Individual failure rate on the dynamic simulator test was less than or equal to 20 percent. (Failure rate was 18.5 percent)
- Individual failure rate on the walk-through test (JPMs) was less than or equal to 20 percent. (Failure rate was 0.0 percent)
- Individual failure rate on the comprehensive biennial written exam was less than or equal to 20 percent. (N/A - this exam was not administered this exam cycle)
- More than 75 percent of the individuals passed all portions of the exam (81.5 percent of the individuals passed all portions of the exam).

b. Findings

1. Crew Performance on the Dynamic Simulator Portion of the Facility-Administered Annual Operating Examinations

Introduction. The inspectors identified a (Green) finding of very low safety significance, based on two of eight crews not passing their facility-administered annual simulator examinations.

Description. During facility-administered annual operating testing of the licensed operators, licensee training staff evaluated crew performance on dynamic simulator scenarios using performance standards derived from NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." Facility results of crew performance showed that two of the eight crews evaluated (25.0 percent) did not pass their simulator exams. The licensee initiated CR 209825

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and planned to conduct a formal root cause evaluation. In addition, two of the five Operating Crew Control Room Supervisors (CRS) individually failed the dynamic simulator portion of their operating exams and a third operating crew CRS required retraining based on his weak performance on the dynamic simulator portion of his exam. The NRC observed four of five operating crew evaluations on the dynamic simulator and the remake test of the one crew that failed during the initial week of the requalification program inspection.

Analysis. A performance deficiency (PD) was identified in that two of eight licensed operator crews operated the plant with knowledge and ability performance weaknesses resulting in performance that did not pass an NRC required requalification test administered by the licensee. Traditional enforcement does not apply because the issue did not have any actual safety consequence or potential for affecting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or licensee procedures. The finding is greater than minor because the PD affected the mitigating systems cornerstone (and potentially initiating events and barrier integrity) objective to ensure mitigating system reliability and availability, and its related attribute on human performance (Human Error [Pre-Event and Post-Event]). Specifically, the finding reflected potential shortcomings responding to actual abnormal or emergency conditions. The risk associated with the number of crews not passing the annual operating tests is provided in the Simulator Operational Evaluation Matrix of NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The Matrix was entered using the number of crews that took the simulator test, eight, and two crews with performance that did not pass. Based on these numbers, the finding was characterized by the SDP as having very low safety significance (20 - 34 percent failure rate), or Green.

Enforcement. NRC regulations require that licensed operators pass an annual operating test; the regulations do not specify pass/fail rates. When a failure occurs, requirements are met by restricting the operator from licensed duties until the operator has been refrained and successfully retested, steps which licensee staff completed. Therefore, no violation of regulatory requirements occurred. Crew performance on the 2004 annual operating exams has been entered into the corrective action program (CAP) as CR 209825 and AmerGen is planning to perform a full root cause of the crew failures: **FIN 05000289/2004002-02, Inability of 25 Percent of the Crews to Pass the Dynamic Simulator Portion of the Facility-Administered Annual Operating Examinations.**

2. Sections of the Operating Exam less than 50 Percent Unique

Introduction. A Green NCV was identified for non-adherence with an established Exelon/AmerGen LORT program procedure that provided guidance for satisfying

the requirements of 10 CFR 55.59 in the development of the Senior and Reactor Operator 2004 annual requalification exams.

Description. The NRC identified that the exam schedule displayed multiple repeated utilization of the same scenarios and JPMs from week to week across all crews such that the examinees tested late in the exam cycle had the potential to have knowledge of the exam content prior to its administration. The inspectors noted that Exelon/AmerGen procedure, TQ-AA-106-0304, "Licensed Operator Requalification Training Exam Development Job Aid," Rev. 2, Section 4.5.1.1.H states, "To maintain the discrimination validity and integrity of the annual exam: Each section of the operating exam **shall** be at least 50 percent unique when compared to any other operating exam administered during the same cycle." Operating crews A, B, C, and E were tested later in the 2004 annual exam cycle and their exams did not meet the program requirement of being at least 50 percent unique when compared to any other operating exam for the dynamic simulator and JPM portions of the exams. For example, the dynamic simulator scenarios administered to operating crews A, B, C, and E had 0 percent uniqueness (i.e., the scenarios administered to these crews had all been administered to crews examined earlier in the same exam cycle prior to March 5, 2004). Similarly, the JPM exam sets administered to these operating crews did not meet program requirements regarding exam uniqueness (i.e., JPM set uniqueness A-17 percent, B-29 percent, C-29 percent, and E-29 percent). Although, there was a potential for the individual operators and/or crews to have advance knowledge of their exams, the results of the annual operating exams (i.e., 2 of 8 crews and 9 of 48 individual failures) seem to indicate that this did not occur. Furthermore, during operator interviews the operators indicated that they had been cautioned not to discuss the contents of their exams with other crews.

Analysis. The inspectors determined that a performance deficiency existed in that AmerGen did not ensure that each section of the operating exam was at least 50 percent unique when compared to any other operating exam administered during the same testing cycle. This was a lack of adherence to established requalification program procedures and to meet the requirements of 10 CFR 55.59(c)(4), "Evaluation." The finding is greater than minor because the PD affected the mitigating systems cornerstone (and potentially initiating events and barrier integrity) objective to ensure mitigating system reliability and availability, and its related attribute on human performance (Human Error [Pre-Event and Post-Event]). Specifically, the SDP requires the inspector to determine if more than 20 percent of the individual operating exams reviewed were unacceptable; since more than 20 percent of the individual exams reviewed were unacceptable, in that the exams did not meet the licensee's standards for exam development to maintain discrimination validity and integrity, the finding was considered greater than minor. The finding is of very low safety significance (Green) because the discrepancy did not have an adverse impact on the operator's ability to safely operate the plant this past year and there were no identified concerns regarding exam compromise.

Enclosure

**Enforcement.** 10 CFR 50.54 (i-1) requires, in part, that "... the licensee shall have in effect an operator requalification program which must as a minimum, meet 55.59(c)." 10 CFR 50.54 (c)(4) requires, in part, that "The requalification program must include-(i) Comprehensive requalification...annual operating tests which determine areas in which retraining is needed to upgrade licensed operator and senior operator knowledge." Exelon/AmerGen procedure, TQ-AA-106-0304, requires that "each section of the operating exam **shall** be at least 50 percent unique when compared to any other operating exam administered during the same cycle." Contrary to this requirement, AmerGen did not ensure that each section of the Winter 2004 operating exam was at least 50 percent unique when compared to other exams administered during the Winter 2004 exam cycle. This issue is of very low safety significance and has been entered into the CAP (CR 206967). This violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: **NCV 05000289/2004002-03, Lack of Assurance that Each Section of the Operating Exam is at Least 50 percent Unique.**

3. Lack of Documentation of Adequate Remediation Plans for SROs and ROs

**Introduction.** A Green NCV was identified for not following an established Exelon/AmerGen licensed operator requalification program procedure for documenting remediation plans for SROs and ROs developed as a result of failures on 2003 biennial written and annual operating exams and as required by 10 CFR 55.59(c)(5).

**Description.** The inspectors identified that the remediation plans prepared as a result of 2003 exam cycle failures were not in compliance with AmerGen's LORT program. Specifically, Exelon/AmerGen procedure TQ-AA-106, "Licensed Operator Requal Training Program," Rev. 3, states in section 4.5.8 states that "Any one of the following failures shall result in the convening of a Performance Review Committee (PRC) to determine qualification status, remediation, and reevaluation methods/actions. Section 4.8 provides guidance for PRCs." For example, items 4.5.8.5 and 6 failures on the comprehensive written or annual operating exams require convening the PRC. Procedure section 4.8.2 states, "The PRC is ...documented using TQ-AA-210-4102, PRC Data Sheet. TQ-AA-210-4102, "Performance Review Committee Data Sheet" has instructions that state "At a minimum, the committee's recommendation should include:

- Trainee strengths and weaknesses and any specific corrective actions.....to address the identified weaknesses.
- Any additional actions which expand the scope or frequency of evaluations.....
- A schedule for completion of remedial training and evaluations.
- Specific criteria to be met...and thresholds which, if not met,..... . "

Two of these licensed individuals (one SRO/Control Room Supervisor (CRS) and one RO) did not pass both the NRC required annual and biennial written exams. However, their remediation plans did not include a listing of strengths and weaknesses and any specific corrective actions, a schedule for completion of remedial training and evaluations, any additional actions which expand the scope or frequency of evaluations, nor any specific criteria to be met for continued participation in the program and thresholds which, if not met, will result in trainee removal from the program. Although these specific LORT program requirements were not met, the inspectors verified that the individuals were restricted (at the time of these exam failures) from license duties, received some refraining and were administered a re-exam prior to being returned to active/non-restricted watch-standing duties.

Analysis. The inspectors determined that a performance deficiency existed in that AmerGen did not document adequate remediation plans, which constituted non-adherence to established LORT program procedures and to the requirements of 10 CFR 55.59 (c)(5)(i), "Records." Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or AmerGen's procedures. The finding is greater than minor because the PD affected the mitigating systems cornerstone (and potentially initiating events and barrier integrity) objective to ensure mitigating system reliability and availability, and its related attribute on human performance (Human Error [Pre-Event and Post-Event]). This finding was evaluated using the Operator Requalification Human Performance SDP (MC 0609 Appendix I) because it is a requalification training issue related to maintaining operator licenses and records. The SDP, Appendix I, Block 27, requires the inspectors to determine if more than 20 percent of the records reviewed have deficiencies. Since all of the records reviewed had deficiencies, the issue was greater than minor and resulted in a finding of very low safety significance (Green). The finding is of very low safety significance (Green) because the discrepancy did not have an adverse impact on the operator's ability to safely operate the plant this past year.

Enforcement. 10 CFR 50.54 (i-1) requires, in part, that "... the licensee shall have in effect an operator requalification program which must as a minimum, meet 55.59(c)." 10 CFR 55.59 (c)(5)(i) requires, in part, that "The records must contain...the results of evaluations and documentation of tests and of any other additional training administered in areas in which an operator or senior operator has exhibited deficiencies." Training procedure TQ-AA-210-4102 states that "At a minimum, the committee's recommendation should include: trainee strengths and weaknesses and any specific corrective actions.....to address the identified weaknesses; any additional actions which expand the scope or frequency of evaluations.....; a schedule for completion of remedial training and evaluations; specific criteria to be met...and thresholds which, if not met,..... ." Contrary to this requirement, the Exelon/AmerGen procedure that was developed in order to adhere to the SAT-based element of evaluation and specifically records in

10 CFR 55.59(c)(5) was not adhered to by the licensee. Specifically, remediation plans did not include a listing of strengths and weaknesses, specific corrective actions, a schedule for completion of remedial training and evaluations, any additional actions which expand the scope or frequency of evaluations, nor any specific criteria to be met for continued participation in the program and thresholds which, if not met, will result in trainee removal from the program. The lack of documentation of adequate remediation plans is of very low safety significance and has been entered into the CAP (CR 206534). This violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: **NCV 05000289/2004002-04, Lack of Documentation of Adequate Remediation Plans for SROs and ROs**

4. Simulator did not Demonstrate Expected Plant Response to Steady State Conditions

Introduction. A Green NCV was identified for simulator modeling discrepancies that should have been identified and corrected during required steady state performance testing as required by ANSI/ANS 3.5-1985 and 10 CFR 55.46(c)(1).

Description. The inspectors identified that the yearly steady-state simulator performance testing conducted in accordance with the standards of ANSI/ANS 3.5-1985 was not being conducted in a manner such that out-of-tolerance parameters were identified and corrected. Specifically, inspectors identified that yearly steady-state test data was routinely being reviewed against 1993 plant data for all 3 power levels (i.e., 100 percent, 80 percent, 60 percent) rather than the latest available plant data. However, when the inspectors compared available 2003 plant data for steady state operations to 2003 simulator steady state test data at 100 percent, several parameters were identified by the inspectors as being out of tolerance by more than the 2 percent limit established in the ANSI standard guidance (A once through steam generator [OTSG] level - 9.84 percent, Feed Flow - 2.26 percent, Megawatt Electric [MWe] - 4.2 percent). At 60 percent power, the steady state test results indicated control rod Position Group 7 average was 10 percent deviant when compared to 1993 data. In addition, on April 2, 2004, as a follow-up item to this inspection issue, AmerGen provided a comparison of available steady state plant data at 64 percent from December 10, 2003, to current steady state simulator performance data and identified that feed water flow loop "A" was out of tolerance by more than 2 percent limit allowed by the ANSI standard guidance ("A" feed flow 3.3 percent).

Analysis. The inspectors determined that a performance deficiency existed in that AmerGen did not ensure that the TMI simulator met test acceptance criteria in replicating expected plant response to steady state conditions which is contrary to 10 CFR 55.46(c)(1), "Plant-referenced simulators." Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or AmerGen's

procedures. This finding is more than minor because it affects the human performance (human error) attribute of the mitigating systems cornerstone objective to ensure reliability and availability of mitigating systems.

This finding was evaluated using the Operator Requalification Human Performance SDP (MC 0609 Appendix I) because it is a requalification training issue related to simulator fidelity. The SDP, Appendix I, Block 12, requires the inspector to determine if deviations between the plant and simulator could result in negative training or could have a negative impact on operator actions. "Negative Training" is defined, in a later version of the standard (ANSI 3.5-1993), as "Training on a simulator whose configuration or performance leads the operator to incorrect response or understanding of the reference unit." The Office of Nuclear Reactor Regulation (NRR) was requested to review and clarify the requirement that negative training could have occurred versus did occur. Based on the review, NRR determined that negative training did not have to occur, but there had to be a potential for negative training based on the difference between the simulator and plant. Therefore, based on this clarification, if differences between the simulator and plant could negatively impact operator actions or potentially result in negative training, then the finding is Green. In this case, several steady state parameters in the simulator exceeded the allowed 2 percent tolerance. Therefore, the answer to the Block 12 question is yes, which resulted in a finding of very low safety significance (Green). The finding is of very low safety significance because the discrepancy did not have an adverse impact on operator actions such that safety-related equipment was made inoperable during normal operations or in response to a plant transient.

The NRC staff has concluded that this NCV regarding simulator fidelity, along with the two minor violations documented in section 4OA5 of this report (Failure of the Simulator to Demonstrate Expected Plant Response for River Water Return Flow and Turbine Megawatt Output), are further examples of the substantive cross-cutting issue at TMI in the area of problem identification and resolution. These issues appear to share a common theme of plant staff or operators being aware of the issues or should have been aware of the issues and not entering them into the TMI CAP.

Enforcement. 10 CFR 55.46(c)(1) requires, in part, that "A plant-referenced simulator used for administration of the operating test or to meet experience requirements ... must demonstrate expected plant response to operator input and to normal, transient... to which the simulator is designed to respond." 10 CFR 55.46 (d)(2) further requires, in part, "...Facility licensees that maintain a simulation facility shall correct modeling and hardware discrepancies...from performance testing." Contrary to these requirements, the TMI simulator did not demonstrate expected plant response when compared to actual plant steady-state data. Specifically, the following simulator steady state parameters were more than the allowed 2 percent deviation from actual plant data (i.e., at 100 percent power "A" OTSG level - 9.84 percent, Feed Flow 2.26 percent, MWe

4.2 percent and at 60 percent power control rod Position Group 7 average was 10 percent). The failures of the simulator to accurately replicate and model plant response can result in negative operator training. The failure to ensure that the simulator correctly replicates expected plant response to steady-state conditions is of very low safety significance and has been entered into the CAP (CR 212636). This violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: **NCV 05000289/2004002-05, Simulator Did Not Replicate Expected Plant Response to Steady State Conditions.**

5. Simulator Fidelity Discrepancies Regarding 2004 Feed Pump Trip Data

During the inspection, the inspectors requested that AmerGen provide supporting data to prove that the MWe simulator fidelity issue (i.e., the plant could only achieve 880 MWe and the simulator was modeled at 924 MWe) did not result in significant negative training to the operators. Consequently, the licensee compared data from the 2004 feed pump trip against 1990 OE plant data. However, several potential simulator fidelity discrepancies in data points were identified that were not adequately explained (i.e., OSTG levels 1990 initial/final - 78.8/44.5 and 2004 initial/final - 58.7/31.4; unit load demand output 1990 initial/final - 868.7/582 and 2004 - 924.9/558; feed water flows 1990 initial/final - 5.31/3.5 mlbm/hr and 2004 initial/final 5.34/3.45 mlbm/hr; rod position 1990 final - 60.345 and 2004 final 45.78), but later attributed to steam generator tube plugging and chemical cleaning over the years. The NRC Region I staff requested at the exit meeting that the AmerGen further investigate the simulator versus plant response differences and provide a more detailed engineering evaluation of these potential simulator fidelity discrepancies so that it could be determined if the data is acceptable, a finding, a deviation, or a violation. AmerGen initiated CR 203907 to investigate these discrepancies. In order to obtain information and evaluate it to ensure compliance with 10 CFR 55.46, this issue is an unresolved item (URI): **URI 05000289/2004002-06, Simulator Fidelity Discrepancies Regarding 2004 Feed Pump Trip Data.**

6. Simulator Fidelity Concern Regarding Natural Circulation Transport Time

During licensed operator interviews, the inspectors identified a potential simulator fidelity/negative training concern. The Natural Circulation Transport Time may be faster in the simulator (5 minutes) than in the plant (15 minutes). AmerGen agreed to compare station blackout data from the plant to simulator data to verify if this was a concern. AmerGen's response indicated that based on engineering analysis, natural circulation should be five to six minutes for both the plant and simulator. The NRC Region I staff requested at the exit meeting that AmerGen determine the transport time based on actual plant data. This will allow the NRC to determine if this potential simulator fidelity discrepancy is acceptable, a finding, a deviation, or a violation. AmerGen initiated CR 203907 in order to document the further investigation of this concern. This issue is unresolved pending determination of actual RCS loop natural circulation

transport time and evaluation to ensure compliance with 10 CFR 55.46: **URI 05000289/2004002-07, Simulator Fidelity Concern Regarding Natural Circulation Transport Time.**

7. Policy to Re-Examine Licensed Operators Using Only One Scenario Vice Two for Retake Exams Following Failures on the Annual Operating Exam

Exelon procedure, TQ-AA-106-0304, "Licensed Operator Requalification Training Exam Development Job Aid," Rev. 2 states in section 4.5.1.1.D, "each operating test shall consist of at least two scenarios...." However, AmerGen ran only one scenario instead of two for the retake exams after remediation on the Annual Operating tests for seven candidates that failed in 2003. Additionally, 10 CFR 55.59(a)(2), states in part, "Each licensee shall pass a comprehensive requalification written examination and an annual operating test." As a result of this concern, this item was documented in AmerGen's CAP as CR 206911, which notes approximately 50 percent of Exelon plants re-evaluate with one dynamic scenario. This practice appears to be inconsistent with the intent of 10 CFR 55.59. This item is unresolved pending further evaluation and guidance from the NRR program office: **URI 05000289/2004002-08, Policy to Re-Examine Licensed Operators Using Only One Scenario Vice Two for Retake Exams Following Failures on the Annual Operating Exam.**

2. Quarterly Licensed Operator Requalification (71111.11Q)

a. Inspection Scope

The inspectors observed licensed operator requalification training at the control room simulator. The inspectors reviewed the operators' ability to correctly evaluate the simulator training scenario and implement the emergency plan. The inspectors observed the operators' simulator drill performance and compared it to the criteria listed in simulator scenario #21, "Once Through Steam Generator (OTSG) Tube Leak Shutdown Requiring Manual Integrated Control System Operation, Followed by an OTSG Tube Rupture and Loss of Subcooled Margin," Rev. 6. The inspectors observed supervisory oversight, command and control, communication practices, and crew assignments to ensure they were consistent with normal control room activities. The inspectors observed operator response during the simulator drill transient and verified the fidelity of the simulator to the actual plant. The inspectors observed the affect training evaluators had in recognizing and correcting individual and operating crew errors including post-training remediation actions. Deficiencies noted during the drill, including two incorrect emergency event classifications, were documented in CR 209825 and were discussed further in section 1R11.1. The inspectors attended the post-drill critique in order to evaluate the effectiveness of problem identification. Additional documents used for this inspection activity included:

- OP-TM-EOP-001, "Reactor Trip," Rev. 4
- OP-TM-EOP-002, "Loss of 25 Degree F Subcooled Margin," Rev. 2

- OP-TM-EOP-004, "Lack of Primary-to-Secondary Heat Transfer," Rev. 1
- OP-TM-EOP-005, "Once Through Steam Generator Tube Leakage," Rev. 1
- OP-TM-EOP-006, "Loss of Coolant Accident Cooldown," Rev. 2
- OP-TM-EOP-010, "Abnormal Transients Rules, Guides, and Graphs," Rev. 2
- EP-AA-1009, "TMI Unit 1 Emergency Action Level Matrix," Rev. 2
- EP-AA-111, "Emergency Classification and Protective Action Recommendations," Rev. 7

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors evaluated Maintenance Rule (MR) implementation for the issues listed below. Specific attributes reviewed included MR scoping, characterization of failed structures, systems, and components (SSCs), MR risk categorization of SSCs, SSC performance criteria or goals, and appropriateness of corrective actions. The inspectors verified that the issues were addressed as required by 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Rev. 2, and AmerGen procedure ER-AA-310, "Implementation of the Maintenance Rule," Rev. 2.

- Instrument air (IA) system availability was challenged by two occurrences during the period. On February 2, 2004, a planned 12-hour maintenance outage on instrument air compressor IA-P-1B actually incurred 46 hours of unavailability due to work planning and post maintenance testing issues (CR 200121). On February 24, an IA surveillance test revealed a maintenance deficiency which degraded the two-hour back-up bottled air supply to the emergency feedwater (EFW) flow control valves (CRs 203857 and 204037). The two-hour air supply remained operable as described in section 1R15.
- CR 212104 and AR A2084162, evaluated a failure of fuel handling building ventilation motor AH-E-10 that resulted in damage to the alarm card for heating and ventilation panel B-1-7, "Fuel Handling Building Supply Fan No Flow." The inspectors verified that engineers properly categorized this issue as not a maintenance rule functional failure because the alarm function was not within the scope of the TMI maintenance rule program.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed the scheduling and control of maintenance activities in order to evaluate the effect on plant risk. This review was against criteria contained in AmerGen Administrative Procedure, "TMI Risk Management Program," Rev. 4. The inspectors reviewed the routine planned maintenance, restoration actions, and/or emergent work for the following equipment removed from service:

- On January 18, 2004, operators identified that the auxiliary oil pump (MU-P-2B) for the 'B' makeup pump was operating abnormally. Technicians subsequently determined that a 5/8" motor controller spacer was missing for each of the two oil pumps (main and auxiliary). These pumps supply lubricating oil to makeup pump MU-P-1B. Accordingly, the two oil pumps were not seismically qualified. Operators promptly verified the 'A' and 'C' makeup pumps were properly aligned as the two required safety-related makeup trains. Technicians performed repairs and retested the auxiliary oil pumps in accordance with work order C2007038.
- On January 23, operators identified reactor coolant leakage from a weld on the 'A' makeup pump (MU-P-1A) recirculation line vent connection. Operators secured and isolated MU-P-1A promptly to prevent the leak from getting worse. The 'B' makeup pump was already inoperable due to a planned maintenance activity to replace an oil pressure switch. The condition of having two inoperable makeup pumps was an Orange maintenance risk condition which required additional maintenance and operational controls. Actions to verify operability of the remaining 'C' makeup pump and work activities to repair the 'B' makeup pump were expedited. The 'B' makeup pump was returned to service early on January 24, and repairs to MU-P-1A were completed early on January 25.
- On January 28, station personnel initiated maintenance activities to clean and inspect the NSCCW heat exchangers NS-C-1A and NS-C-1D. Isolation of the shell side and configuration control of the available NSCCW coolers to support operating and emergency response heat loads were properly managed.
- On February 20, operators received a motor overload alarm (B-2-5) on the decay heat river water pump (DR-P-1B). Operators promptly started the redundant pump (DR-P-1A) and secured the DR-P-1B pump. Investigations determined that the motor was in satisfactory condition and no operability concerns existed. The problem was a degraded relay which affected only the alarm function circuit.
- On February 24, operators discovered that both trains of the two-hour backup bottle air supply to the EFW flow control valves were below their design air pressure of 1500 pounds per square inch gauge (psig). The two bottled air supply trains were 1420 psig and 1430 psig, respectively. Operators responded promptly to recharge the air banks to 2200 psig and established additional compensatory measures to verify continued instrument air availability to the EFW flow control valves.

- On March 28, operators identified metal specks floating in the lubrication oil at the 'B' EFW pump (EF-P-2B) outboard bearing fill cap. The pump was secured and declared inoperable for 13 hours to investigate the source of the metal specks. The source was concluded to be metal-to-metal contact at the fill cap connection and was determined to not be an issue. Other planned risk significant maintenance including testing of the OTSG atmospheric steam dump valves and a planned outage on the 'A' emergency diesel generator were appropriately managed.

#### 1R14 Personnel Performance During Non-routine Plant Evolutions (71111.14)

##### a. Inspection Scope

The inspectors reviewed human performance during the following non-routine plant evolutions to determine whether personnel performance caused unnecessary plant risk or challenges to reactor safety.

- On February 6, 2004, technicians replaced and calibrated the 'D' reactor coolant flow transmitter using work orders C2005165 and R2030643. The work had been deferred from the October 2003 outage work scope. Unknown to the operators, the ongoing work generated a false outward control rod demand signal. In response, reactor power unexpectedly rose above 100 percent power (peaking at 101.1 percent). Operators were alerted to the power increase when they received a turbine load set alarm, indicating the turbine governor valves were open further than programmed. Operators reduced power and maintained manual control of reactor power until the cause was identified and addressed. Station personnel identified areas for performance improvement associated with this event including work instructions, decision making by the control room supervisor, communications, timely operator response, and operator logs. The inspectors further identified that operators did not promptly reduce power based on neutron indication after realizing that core thermal power indication was inaccurate due to the ongoing maintenance. Evaluation and corrective actions from this event are documented in CR 200195.
- (Closed) Licensee Event Report 50-289/2003-002-00: Reactor Building Polar Crane Hoist Operation Over The Fuel Transfer Canal During Movement Of Fuel Due to Inadequate Understanding of Requirements.

The licensee event report described reactor building polar crane hoist operation over the fuel transfer canal during movement of a fuel assembly. The inspectors reviewed the LER and determined that a violation of TS requirements had occurred since TMI TS 3.12.1 prohibits operation of polar crane hoists over the fuel transfer canal when any fuel is being moved. The engineering evaluation determined the cause to be a lack of formal entrance process to review and implement local station rules and restrictions. Corrective actions included the development of a formal process specific to outage services that periodically evaluate situational risk as conditions change in the reactor building, and actions

to revise TMI site-specific polar crane training using a performance based training approach. This finding constitutes a violation of minor significance since there were no adverse safety consequences associated with this event, and is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy. The licensee documented and evaluated the problem in CR 183463. This LER is closed.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors verified that degraded conditions in question were properly characterized, operability of the affected systems was properly justified, and no unrecognized increase in plant risk resulted from the equipment issues listed below. The inspectors performed several field walkdowns, interviewed plant engineers and technicians, and consulted with regional NRC specialists. The inspectors also referenced IMC Part 9900, "Operable/Operability-Ensuring the Functional Capability of a System Component" and AmerGen procedure LS-AA-105, "Operability Determination," Rev. 1, to determine acceptability of AmerGen's operability evaluations. The inspectors reviewed operability evaluations for the following degraded equipment issues:

- On January 14, 2004, operators identified a leaking drain valve (EG-V-40A) in the 'A' EDG coolant system. Additional tightening of the valve slowed the leakage. The engineering evaluation for this condition (CR 194787) determined that the amount of the as-found leak-by (1 gallon per day) past the drain valve did not affect operability of the EDG. This was due to the 80 gallon capacity of the coolant expansion tank and the 7-day mission time of the EDG. In addition, a coolant expansion tank alarm is available to alert operators of a low level condition, and coolant could be added even with the EDG running.
- On January 30, operators received unexpected 1'C' inverter trouble alarms (L2612 & A-3-7). Investigations documented under CR 198660 determined that a new oscillator circuit (installed during last refueling outage) went out of sync and was cycling. The oscillator needed to be readjusted. The system engineer determined that past experience shows that readjustment is sometimes required after the burn-in of a new oscillator. The inspectors verified that the 1'A' inverter was declared inoperable and the required technical specification action statements were entered (TS 3.1.6.8, 3.8.1, 3.5.1, 3.5.5, 3.5.1.9). The inspectors also verified that corrective actions were captured in the CR.
- On February 12, operators discovered that the pre-lubrication pump for the 'B' emergency diesel generator (EDG) failed to start during performance of the quarterly EDG surveillance test. The pre-lubrication pump is operated prior to all

planned starts to limit the wear on the engine and it is not credited for emergency start of the EDG. The inspectors verified that the pre-lubrication pump is not required for operability of the EDG.

- On February 24, operators discovered that both trains of the two-hour backup bottle air supply to the EFW flow control valves (1420 psig and 1430 psig respectively) were below their design air pressure of 1500 psig. Engineers updated design calculations to reflect current plant components, which use less air than the original plant design, and determined that EFW remained operable.
- On February 26, the inspectors reviewed the availability/operability of the high pressure injection (HPI) and low pressure injection (LPI) systems during planned work on interface valve DH-V-7A. The work involved scheduled valve motor operator troubleshooting and repairs. The inspectors interviewed the system engineer and control room operators, and attended the plant operations review committee meeting which reviewed safety measures necessary during this evolution.

Additional documents reviewed and/or referenced for these inspections included:

- TMI Condensate Storage Tank Seismic Qualification No. SQ-TI-CO-T-0001A, Rev. 1
- Calculation C-1101-852-5360-004, "Two Hour Backup Instrument Air System As-Built Capacity Calculation & Evaluation," Rev. 1
- Calculation C-1101-852-E540-015, "Backup Air Capacity Requirements for RR-V-6," Rev. 0
- SDBD-T1-853, "System Design Basis Document for Instrument Air System (#852)," Rev. 3
- SDD-424C, "System Design Description for Two Hour Air Supply for Main Steam and EFW System Controls," Rev. 3
- Vendor Technical Manual VM-TM-0316, "Fisher Controls Valve Bodies and Valve Assemblies," Rev. 20
- CR 198660, "1C Inverter Frequency Cycling"
- On-line station risk evaluation #552 for DH-V-7A
- Drawing 302-661, "Make-up & Purification Flow Diagram," Rev. 64
- Drawing 302-640, "Decay Heat Removal Flow Diagram," Rev. 79
- CR 201148, "Pre-lube pump (EDG-P-5B) appeared to have failed to start"

b. Findings

No findings of significance were identified.

1R16 Operator Work-arounds (71111.16)

a. Inspection Scope

The inspectors reviewed the cumulative effects of the existing operator work-arounds (OWAs), the list of operator challenges, and the list of open main control room deficiencies to identify any effect on emergency operating procedure (EOP) operator actions, and impact on possible initiating events and mitigating systems. The inspectors evaluated whether station personnel were identifying, assessing, and reviewing OWAs as specified in AmerGen administrative procedure OP-AA-102-103, "Operator Work-Around Program," Rev. 0.

Additionally, the inspectors reviewed the status of planned and ongoing efforts to reduce the number of open OWAs and challenges with the coordinator responsible for the program. The inspectors also toured the control room, and discussed items of particular concern with the responsible system engineers to ensure the items were being addressed on a schedule consistent with their relative safety significance. Most of the items involved inoperable chart recorders, radiation monitors, and noisy ventilation fans.

The inspectors also reviewed one control room deficiency (noisy control room emergency ventilation fan motor AH-E-19B) in detail. The inspectors observed that the scheduled corrective maintenance would require both trains of the control room emergency ventilation system to be out of service. This configuration would place the plant in very short (e.g., 1 or 2 hours) TS shutdown limiting condition of operation. The inspectors noted that the degraded ventilation fan condition had existed for almost 3 years. The inspectors discussed TS requirements and risk management associated with the planned repair with station management. Station management directed further review of the proposed maintenance plan. The inspectors verified that none of the items involved an immediate safety or operability concern.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed and/or observed several post-maintenance tests (PMTs) to ensure: 1) the PMT was appropriate for the scope of the maintenance work completed; 2) the acceptance criteria were clear and demonstrated operability of the component; and 3) the PMT was performed in accordance with procedures. The following PMTs were observed and/or evaluated:

- In September 2003, a momentary loss of all control room overhead alarm annunciators occurred while technicians investigated an alarm deficiency. Subsequent troubleshooting identified defective controller boards and a defective remote logic chassis. The boards and chassis were replaced and post maintenance tested using ARs A2067880 and C2006357.

- Various material problems with the two-hour backup IA supply system were identified in November 2003 and corrected as documented in CR 194970. Three-way air supply valves IA-V-1626A/B were replaced and tested using work orders M2075497 and R2012974 and procedure 1300-4F, "Test of 2-Hour Backup Supply Air System," Rev. 3. While reviewing the cause of the February 24, 2004, degraded two-hour backup air supply event (see Section 1R13), the inspectors identified PMT deficiencies. Engineers documented these deficiencies for resolution using CR 204037.
- On January 15, 2004, a planned nuclear river pump 1'B' outage was extended eight hours due to failure of a newly refurbished breaker during the PMT. Technicians reinstalled the old breaker and initiated actions to investigate the cause of the breaker failure (CR 195626). The inspectors interviewed the system engineer and verified that the subsequent PMT was satisfactory.
- On January 18, operators identified that the auxiliary oil pump (MU-P-2B) for the 'A' makeup pump was operating abnormally. Technicians subsequently determined that a 5/8" motor controller spacer was missing for each of the two auxiliary oil pumps. These pumps supply lubricating oil to makeup pump MU-P-1B. Technicians replaced the spacer for each motor controller and post maintenance tested the auxiliary oil pumps in accordance with work order C2007038. The inspectors also determined that the assessment of past operability (CR 197045) and train availability were incorrect. Engineers initiated CR 212206 to address this concern. Engineers concluded that the HPI unavailability NRC performance indicator remained green.
- On February 24, both trains of the two-hour backup bottle air supply to the EFW flow control valves unexpectedly fell below the design air pressure of 1500 psig. Engineers determined that the bottles discharged due to premature repositioning of valves IA-V-1626A/B during a quarterly surveillance test during which the normal IA header pressure is reduced to 90 psig. Corrective maintenance was performed to recharge the air bottles to 2200 psig. The pressure monitoring and compensatory measures to maintain normal IA header pressure above 100 psig were established using CR 204037.
- On March 19, operators declared EFW pump EF-P-2A inoperable due to lower than expected pump suction flow during a surveillance test. Technicians calibrated flow gage EF-FIS-77. Operators performed procedure 1300-3F, "Inservice Surveillance Test of EF-P2A/B and Valves," Rev. 50, to test the gage and EFW train following this maintenance. The inspectors identified additional procedure deficiencies to engineers for resolution (CRs 209412 and 215125).
- On March 23, technicians replaced the existing 4160 volt MU-P-1C breaker with a newly designed vacuum breaker. Installation and testing were successfully completed on March 25, using work order A2044013, Procedure E-142, "Siemens 3AH Vacuum Circuit Breaker Pre-Installation Test," Rev. 2, and

Functional Test Procedure (FTP) 732.01, "4160 volt Breaker Replacement (MR-P-1c)," Rev. 0.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed and reviewed the following operational surveillance tests, concentrating on verification of the adequacy of the test to demonstrate the operability of the required system or component safety function.

- On January 7, 2004, quarterly surveillance testing of the motor driven EFW system and pumps per AmerGen procedure 1300-3F, "IST of EF-P-2A/B and Valves," Rev. 50. The inspectors reviewed CR 2079621 which evaluated a condition identified by the inspectors involving the failure of the flow indicator to go to zero after the 'A' pump was stopped. The inspectors also interviewed the EFW system engineer and operators and verified that this condition did not affect the operability of the 'A' EFW pump.
- On February 3, quarterly surveillance testing of the turbine driven EFW system and pump per AmerGen procedure 1303-11.42B, "EFW Capacity Test," Rev. 6. The inspectors also reviewed CR 202535 which evaluated a condition identified by the inspectors involving a potential preconditioning of the associated steam traps during testing. The evaluation determined that although no actual preconditioning had occurred, several corrective actions were necessary to eliminate the potential for preconditioning of the steam traps. The inspectors performed several field walkdowns, interviewed the EFW system engineer and operators, and verified that this condition did not affect the operability of the turbine driven EFW pump.
- Procedure 1303-4.2D, "Reactor Protection System (RPS) Channel 'D' Control Rod Drive Breaker Logic Test," Rev. 5
- Procedure 1303-4.1D, "RPS Channel D Test," Rev. 15
- On March 19, the 'A' EFW pump (EF-P-2A) was declared inoperable due to flow being insufficient to verify a check valve in the re-circulation line had opened (see Section 4OA2). Following re-calibration of flow instrument EF-FIS-77, the pump was successfully tested using procedure 1300-3F (See Section 4OA2).
- From January 9 to March 31, the inspectors reviewed TMI's actions for inspection of the intake pump house per surveillance procedure 1301-9.7, 'Intake Pump House Floor, Silt Accumulation and Inspections,' Rev. 21. The inspectors

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interviewed the system engineer and his supervisor, and reviewed data from prior inspections. The inspectors reviewed TS 4.1 and Table 4.1-2, and also TMI's response to Generic Letter 89-13, dated June 6, 1996, to assess compliance regarding divers' inspections and measurements of silt accumulation. The inspectors reviewed CR 195686 which evaluated several discrepancies identified by the inspectors regarding compliance with divers' visual inspections to measure for silt accumulation.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness [EP]**

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

a. Inspection Scope

A regional in-office review was conducted of licensee-submitted revisions to the emergency plan, implementing procedures and EALs which were received by the NRC during the period of January - March 2004. The review included plan aspects related to the risk significant planning standards (RSPS), such as classifications, notifications and protective action recommendations. A cursory review was conducted for non-RSPS portions. These changes were reviewed against 10 CFR 50.47(b) and the requirements of Appendix E and they are subject to future inspections to ensure that the combination of these changes continues to meet NRC regulations. In addition, in January 2003, the licensee generated a consolidated emergency plan for all Exelon sites (Peach Bottom, Limerick, TMI) and an annex plan related specifically to TMI. The 10 CFR 50.54(q) reviews associated with the specific changes/deletions made from the original Plan to the current Plans will be reviewed and assessed during the next EP program inspection to ensure that Exelon did not decrease the effectiveness of the original Plan during the transition. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 4, and the applicable requirements in 10 CFR 50.54(q) were used as reference criteria.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors observed an emergency event training evolution conducted at the control room simulator to evaluate emergency procedure implementation, event classification, event notification, and protective action recommendation development. The event scenario involved plant conditions which warranted declaration of an Unusual Event and

subsequent escalation to an Alert event classification. The event included plant conditions which warranted declaration of an Alert emergency event. The licensee counted this training evolution for evaluation of Emergency Preparedness Drill/Exercise Performance (DEP) Indicators. The inspectors observed the training critique to determine whether the licensee critically evaluated drill performance to identify deficiencies and weaknesses. Additionally, the inspectors verified the DEP performance indicators (PIs) were properly evaluated consistent with Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Rev. 2. Additional documents used for this inspection activity included:

- Procedure 1203-20, "Nuclear Services Closed Cooling System Failure," Rev. 21
- OP-TM-EOP-001, "Reactor Trip," Rev. 4
- OP-TM-EOP-002, "Loss of 25 degree F Subcooled Margin," Rev. 2
- OP-TM-EOP-006, "Loss of Coolant Accident Cooldown," Rev. 2
- OP-TM-EOP-010, "Abnormal Transients Rules, Guides, and Graphs," Rev. 2
- EP-AA-1009, "TMI Unit 1 Emergency Action Level Matrix," Rev. 2
- EP-AA-111, "Emergency Classification and Protective Action Recommendations," Rev. 7

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY**

**Cornerstone: Occupational Radiation Safety [OS]**

2OS1 Access Control To Radiologically Significant Areas (71121.01)

a. Inspection Scope

The inspectors reviewed selected activities, and associated documentation, in the below listed areas. The evaluation of AmerGen's performance in these areas was against criteria contained in 10 CFR 20, applicable TSs, and applicable station procedures.

Inspection Planning

The inspectors reviewed Occupational Exposure Cornerstone performance indicators for follow-up, as appropriate.

Plant Walkdowns and Radiation Work Permit Reviews

The inspectors toured selected radiologically controlled areas in Unit 1 and made independent ambient radiation surveys to verify the adequacy of postings relative to existing conditions.

The inspectors reviewed and discussed external and internal dose assessments since the previous inspection to identify unplanned external and internal occupational doses or potential performance indicator occurrences.

#### High Risk Significant, High Dose Rate HRA and VHRA Controls

The inspectors reviewed high and very high radiation area (HRA) posting and controls, as appropriate, discussed the status of applicable procedures, and physically challenged the locked access points to three locked HRA access points. The inspectors also conducted an HRA access key inventory.

The inspectors reviewed access controls for personnel entry into steam generators during the Unit 1 2003 outage including locked HRA access control sheets.

#### Problem Identification and Resolution

The inspectors selectively reviewed corrective action reports in the area of access controls to determine if access control issues were entered into the corrective action program for resolution. The inspectors evaluated the corrective action database since the late 2003 outage to identify repetitive deficiencies or significant individual deficiencies. The review also included evaluation of data to determine if any problems involved undetected performance indicator events (See Section 4OA2).

The inspector selectively reviewed personnel whole body counting data for the 2003 outage associated with personnel contaminations and potential intakes of radioactive materials. The inspectors also reviewed personnel contamination logs.

#### b. Findings

No findings of significance were identified.

### 2OS2 ALARA Planning and Controls (71121.02)

#### a. Inspection Scope

The inspectors conducted the following activities to determine if AmerGen was properly implementing operational, engineering, and administrative controls to maintain personnel occupational radiation exposure as low as is reasonably achievable (ALARA). The review was against the criteria contained in 10 CFR 20, applicable industry standards, and station procedures.

#### Verification of Dose Estimates and Exposure Tracking

The inspectors compared the results achieved (dose and dose rate reductions, person-rem expended) with the estimated occupational doses established in the initial ALARA plans for selected work activities conducted during the 2003 outage. In particular, the inspectors reviewed those work activities exhibiting the highest accrued occupational

exposures (greater than 5 person-rem) to determine the adequacy and effectiveness of dose reduction efforts, as appropriate. Work activities reviewed included scaffolding, in-service inspection, and steam generator work activities. Preliminary reviews were conducted of reactor vessel head replacement and reactor vessel disassembly activities. The inspectors also reviewed ALARA planning on emergent work activities (pressurizer heater replacement, pressurizer surge line weld overlay). The inspectors reviewed station ALARA committee meeting minutes relative to this emergent work.

#### Source-Term Reduction and Control

The inspectors reviewed AmerGen's evaluations, in the area of source term controls, following identification of elevated Co-58 concentrations during the 2003 Unit 1 outage. The inspectors reviewed assessment activities associated with the elevated Co-58 concentrations, exposure mitigation activities, and results achieved.

#### Problem Identification and Resolutions

The inspectors reviewed corrective action assignment reports in the ALARA area since the last inspection to determine if ALARA program issues were entered into the corrective action program. The review included self assessments, audits and corrective action reports related to the ALARA program to determine if follow-up activities were being conducted (See Section 4OA2).

#### b. Findings

No findings of significance were identified.

### 2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03)

#### a. Inspection Scope

The inspectors reviewed selected activities, and associated documentation, in the below listed areas. The evaluation of AmerGen's performance in these areas was against criteria contained in 10 CFR 20, applicable Technical Specifications, and applicable station procedures.

#### Self-Contained Breathing Apparatus

The inspectors reviewed the use and testing of self-contained breathing apparatus (SCBA) to determine if adequate quantities of such devices were available, filling stations were available, and appropriate personnel had been trained in the use of the devices, including the changing of air bottles, as appropriate. The inspectors also reviewed SCBA training and qualification records for control room operator crews for the week of February 23, 2004. The inspectors also reviewed training records for maintenance, chemistry, and radiation protection personnel.

The components of three selected SCBA units, ready for use and stored in the Control Room (Kits 4 and 7) and the Operations Support Center (Kit 42), were checked against approved component lists published by the SCBA manufacturer and the National Institute for Occupational Safety and Health. The inspectors reviewed periodic testing of the three SCBA units' components (i.e., hydro testing of tank, maintenance and testing of regulators, low pressure alarms) and reviewed conformance of the SCBAs with published certification lists.

#### Problem Identification and Resolution

The inspectors reviewed audits and self-assessments in the area of instruments and protective equipment to determine if identified issues in this area were entered into the corrective action program. The inspectors reviewed CRs and action requests to evaluate AmerGen's threshold for identifying, evaluating, and resolving problems in this area (See Section 4OA2).

#### b. Findings

No findings of significance were identified.

### 4. **OTHER ACTIVITIES**

#### 4OA1 Performance Indicator Verification (71151)

#### a. Inspection Scope

The inspectors reviewed selected station records to verify NRC PIs had been accurately reported to the NRC as required by NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Rev. 2. The PIs listed below were verified for the period April to December 2003.

#### Initiating Events Cornerstone

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

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

#### b. Findings

No findings of significance were identified.

#### 4OA2 Identification and Resolution of Problems (71152)

1. Annual Sample Review

a. Inspection Scope

The inspectors selected two CRs and one AR for detailed review (CRs 196916 and 209412, AR 2079621). These documents were associated with a flow instrument (EF-FIS-77), used during periodic surveillance testing of EFW pumps and valves (procedure 1300-3F), which did not return to zero following completion of a surveillance test. The inspectors first identified and questioned the impact of the gage condition on January 7, 2004, following completion of procedure 1300-3F. Station personnel determined the as-found condition had no impact on pump operability and re-calibrated the EF-FIS-77 prior to the next scheduled quarterly performance of 1300-3F. On March 19, upon performing 1300-3F, operators declared EF-P-2A inoperable due to inadequate re-circulation flow. The pump was inoperable for 11 hours while station personnel evaluated the pump, the flow observed during the test, and re-calibrated EF-FIS-77. The inspectors evaluated the CRs and AR against the requirements of procedure LS-AA-125, "Corrective Action Program (CAP) Procedure," Rev. 6 and 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action."

b. Findings and Observations

No findings of significance were identified. However, the inspectors determined that station personnel's resolution of CR 196916 was narrowly focused and did not recognize and address associated procedure deficiencies. This was one of three deficient operability assessments the inspectors identified during the inspection (CR 196916, 197045, and 204037). Specifically, inservice test procedure (1300-3F) acceptance criteria did not adequately address flow instrument (EF-FIS-77) scale and calibration accuracy in determination of EFW re-circulation line check valve operability. Station personnel overlooked this deficiency during assessment of CR 196916. The incomplete problem assessment directly led to EF-P-2A failing the next scheduled surveillance test and being declared inoperable on March 19 (CRs 209412 and 215125). Engineers subsequently determined that EF-P-2A remained fully functional and available on March 19 while the gage was recalibrated and pump operability was evaluated. The inspectors concluded that the performance deficiency was minor because it did not affect the Mitigating Systems cornerstone objective of availability, reliability, or capability of the EFW system. During this inspection the inspectors identified and discussed several procedure 1300-3F discrepancies with engineers. Engineers acknowledged the concerns and indicated they planned to address the deficiencies outside of the corrective action program. The inspectors noted this example was similar to the theme discussed below, associated with Section 1R11.1.

2. Cross-References to PI&R Issues Reviewed Elsewhere

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. This review was accomplished by reviewing hard

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copies of each CR, attending daily screening meetings, and accessing the licensee's computerized database.

Section 1R11.1 describes a Green NCV that was identified for failure to correct modeling discrepancies that should have been identified and corrected during required steady state performance testing as required by ANSI/ANS 3.5-1985 and 10 CFR 55.46 this NCV along with the two minor violations documented in section 4OA5 of this report (Failure of the Simulator to Demonstrate Expected Plant Response for River Water Return Flow and Turbine Megawatt Output), indicate a potential cross cutting issue in the area of problem identification and resolution. These issues appear to share a common theme of issues not being entered into the TMI CAP.

Sections 2OS1 through 2OS3 included reviews of ARs and CRs to determine if identified problems were entered into the corrective action program for resolution and to evaluate AmerGen's threshold for entering issues into the program. The review included a check of possible repetitive issues, such as radiation worker or radiation protection technician errors. (ARs.144472, 144475, 144483, 156151, 159129, 195051, 18226, 181807, 182530, 185512, 183832, 197219, 180358, 1611669, 151301, 2029490, and 180008). Also reviewed were recent audits and assessments as appropriate (Focused Area Self-Assessments 195051, 180358). The review was against the criteria contained in 10 CFR 20, Technical Specifications, and station procedures.

#### 4OA3 Event Follow-up (71153)

(Closed) Licensee Event Report (LER) 05000289/2003003. Reactor Coolant System (RCS) Pressure Boundary Leakage Due to Degradation of an Alloy 600 Pressurizer Heater Bundle Diaphragm Plate

On November 4, 2003, during refueling outage #15, station personnel identified RCS strength boundary leakage through a pressurizer heater diaphragm. Subsequent assessment concluded that the cause was primary water stress corrosion cracking and that the leak existed for greater than two years. This event and associated enforcement action were previously documented in NRC Inspection Report No. 05000289/2003-005. The inspectors reviewed the LER and associated licensee corrective actions. No new performance issues were identified during this review. The licensee documented the event in CR 184753. This LER is closed.

#### 4OA5 Other

##### 1. Review of Institute of Nuclear Power Operations Plant Assessment

The Institute of Nuclear Power Operations performed a TMI plant assessment during the period April 28 to May 10, 2003. The final INPO assessment report was issued on January 7, 2004. The inspectors reviewed the plant assessment report. Problems identified in the report were consistent with NRC findings and no new safety issues were identified.

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2. Licensee Strike Contingency Plans (92709)

a. Inspection Scope

The contract between AmerGen and union personnel (including reactor operators, non-licensed operators, chemists, health physicists, and maintenance technicians) was set to expire February 29, 2004. The inspectors conducted interviews, plant walkdowns, various document reviews to evaluate AmerGen's strike contingency planning and readiness to operate the plant safely in the event of a strike. The inspectors further communicated with NRC management to verify NRC readiness for enhanced safety oversight in the event of a strike. The inspectors verified readiness as described in the following procedures. Union personnel subsequently ratified a new five-year contract in early March 2004, without declaring a strike.

- NRC Region I Instruction 1080.2, "NRC Preparations for Pending Licensee Strike," Rev. 5
- Exelon Nuclear Mid-Atlantic Regional Operating Group TMI Plan for Work Force Support dated 2/12/04
- TMI Technical Specification 6, "Administrative Controls," through Amendment 219

b. Findings

No findings of significance were identified.

3. Simulator Does Not Accurately Model Expected Plant Response for River Water Return Flow

The inspectors identified that the plant river water return flow averaged 13,728 gpm versus the 35,000 gpm displayed in the simulator. AmerGen indicated that this indicator is only used during on-the-job training (OJT) performed in the plant for dilution of radioactive discharges. This fidelity issue was identified by the NRC while conducting operator interviews. This issue had not been documented in a simulator work request (SWR) prior to the inspection.

The inspectors determined that the failure to ensure that the TMI simulator correctly replicates expected plant response to river water return flow is a performance deficiency because AmerGen is expected to meet the requirements of 10 CFR 55.46(c)(1), "Plant-referenced simulators." The simulator modeling of river water return flow is a violation of 10 CFR 55.46(c)(1) because a plant-referenced simulator used for administration of the operating test or to meet experience requirements must demonstrate expected plant response to operator input and to normal conditions to which the simulator is designed to respond. This finding was considered minor in that it did not have any actual safety consequences, the issue was not a precursor to a significant event, if left uncorrected it was not likely to become a more significant event, the issue did not relate to a performance indicator, and the issue was not directly associated with one of the cornerstones objectives. Although this issue constitutes a violation of minor significance

that is not subject to enforcement action, it is being documented because it is associated with an issue of agency-wide concern (i.e., fidelity of simulation facilities, 10 CFR 55.46). AmerGen placed this issue in its corrective action program (SWR 5974).

4. Simulator Does Not Accurately Model Expected Plant Response for Turbine Megawatt Output

The inspectors identified that an in-plant modification upgraded the turbine to 924 megawatt electric (MWe) output through turbine improvements. This modification was completed in the plant and the simulator model was changed in 2001. After the outage, the plant could only achieve 880 MWe. However, AmerGen left the simulator model at 924 MWe. This fidelity issue was identified by the NRC while conducting operator interviews. This issue had not been documented in an SWR prior to the inspection.

The inspectors determined that the failure to ensure that the TMI simulator correctly replicates expected plant response to turbine MWe output is a performance deficiency because AmerGen is expected to meet the requirements of 10 CFR 55.46(c)(1), "Plant-referenced simulators." The simulator modeling of turbine MWe output is a violation of 10 CFR 55.46(c)(1) because a plant-referenced simulator used for administration of the operating test or to meet experience requirements must demonstrate expected plant response to operator input and to normal conditions to which the simulator is designed to respond. This finding was considered minor in that it did not have any actual safety consequences, the issue was not a precursor to a significant event, if left uncorrected it was not likely to become a more significant event, the issue did not relate to a performance indicator, and the issue was not directly associated with one of the cornerstones objectives. Although this issue constitutes a violation of minor significance, it is being documented because it is associated with an issue of agency wide concern (i.e., fidelity of Simulation Facilities, 10 CFR 55.46). AmerGen placed this issue in its corrective action program (SWR 5382) and indicated that an extent of condition will be conducted to review the last two years of modifications to ensure simulator fidelity was maintained).

4OA6 Management Meetings

Exit Meeting Summary

On April 13, 2004, the resident inspectors presented the inspection results to Mr. George Gellrich and other members of his staff who acknowledged the findings. The regional specialist inspection results were previously presented to members of AmerGen management. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

K. Bartes, Plant Operations Director  
R. Brady, Emergency Preparedness Manager  
M. Bruecks, Security Manager  
G. Chick, Director, Maintenance  
L. Clewett, Director, Site Engineering  
V. Cwietniewicz, Training Director, Exelon East  
E. Fuhrer, Regulatory Assurance  
G. Gellrich, Plant Manager  
R. Hess, LOR Lead  
D. Laudermilch, Security Analyst  
D. Lawyer, Radiological Engineer  
L. Lucas, Chemistry Manager  
D. Merchant, Manager, Radiological Health and Safety  
A. Miller, Regulatory Assurance  
P. Omaggio, Project Planner  
M. Paul, Training Director  
S. Queen, Design Engineering Manager  
G. Rombold, Regulatory Assurance  
T. VanWyen, Operations Training Manager  
B. Williams, Vice President, TMI Unit 1  
M. Wyatt, Training Manager, Exelon

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

Opened and Closed

2004002-01	NCV	Failure to Follow Scaffolding Installation Procedures (Section 1R04)
2004002-02	FIN	Inability of 25 Percent of the Crews to Pass the Dynamic Simulator Portion of the Facility-Administered Annual Operating Examinations (Section 1R11.1)
2004002-03	NCV	Lack of Assurance that Each Section of the Operating Exam is at Least 50 Percent Unique Compared to any Other Operating Exam Administered During the Same Cycle (Section 1R11.1)
2004002-04	NCV	Lack of Documentation of Adequate Remediation Plans for SROs and ROs (Section 1R11.1)

2004002-05 NCV Simulator Did Not Replicate Expected Plant Response to Steady State Conditions (Section 1R11.1)

Opened

2004002-06 URI Simulator Fidelity Discrepancies Regarding 2004 Feed Pump Trip Data (Section 1R11.1)

2004002-07 URI Simulator Fidelity Concern Regarding Natural Circulation Transport Time (Section 1R11.1)

2004002-08 URI AmerGen's Policy to Re-Examine Licensed Operators Using Only One Scenario Vice Two for Retake Exams Following Failures on the Annual Operating Exam (Section 1R11.1)

Closed

2003002-00 LER Reactor Building Polar Crane Hoist Operation Over The Fuel Transfer Canal During Movement of Fuel Due to Inadequate Understanding of requirements (Section 1R14)

2003003-00 LER Reactor Coolant System (RCS) Pressure Boundary Leakage Due to Degradation of an Alloy 600 Pressurizer Heater Bundle Diaphragm Plate (Section 4OA3)

**LIST OF ACRONYMS**

ADAMS	Agencywide Documents and Management System
ALARA	as low as is reasonably achievable
AmerGen	AmerGen Energy Company, LLC
ANSI	American National Standards Institute
AR	Assignment Report
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
CRS	Control Room Supervisor
CST	Condensate Storage Tank
DEP	Drill/Exercise Performance
DH	Decay Heat
EAL	Emergency Action Level
EDG	Emergency Diesel Generator
EFW	Emergency Feedwater
FHAR	Fire Hazards Analysis Report
FS	Fire Protection System
HRA	High Radiation Area

IA	Instrument Air
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operations
IR	Inspection Report
JPM	Job Performance Measures
LER	Licensee Event Report
LORT	Licensed Operator Requalification Test
mlbm	Million Pounds Mass
MR	Maintenance Rule
MWe	Megawatt Electric
NCV	Non-Cited Violation
NR	Nuclear River Water
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
NSCCW	Nuclear Services Closed Cooling Water
OTSG	Once Through Steam Generator
OWA	Operator Work-around
PI	Performance Indicator
PD	Performance Deficiency
PMT	Post Maintenance Test
PRC	Performance Review Committee
psig	pounds per square inch gauge
RCS	Reactor Coolant System
RO	Reactor Operator
RSPS	Risk Significant Planning Standards
RPS	Reactor Protection System
SCBA	Self-Contained Breathing Apparatus
SDP	Significance Determination Process
SRO	Senior Reactor Operator
SSC	Safety Systems and Components
SSE	Seismic Event
SWR	Simulator Work Requests
TI	Temporary Instruction
TM	Temporary Modifications
TMI	Three Mile Island, Unit 1
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item

**LICENSED OPERATOR REQUALIFICATION INSPECTION  
INSPECTION PROCEDURE 71111.11  
LIST OF DOCUMENTS REVIEWED**

Requalification Program Procedures

TQ-AA-106-106, "Licensed Operator Requal Training Program," Rev. 3  
TQ-AA-106-304, "Licensed Operator Requal Training Exam Development Job Aid," Rev. 2  
TQ-AA-210-4102, "Performance Review Committee Data Sheet"  
TQ-AA-106-0119, "Exelon Nuclear Licensed Operator Requal Evaluation Failure Checklist,"  
Rev. 0  
TQ-AA-106-0119, "Exelon Nuclear Licensed Operator Requal Training Exam Administration  
Job Aid," Rev. 0  
TQ-AA-106-0113, "Simulator Demonstration Exam Individual Competency Evaluation Form,"  
Rev. 1

Simulator Procedures

TQ-AA-301, "Simulator Configuration Management," Rev. 4  
TQ-AA-302, "Simulator Testing and Documentation," Rev. 4  
TQ-AA-303, "Controlling Simulator Core and Thermal-Hydraulic Model Updates," Rev. 2  
TQ-AA-301-0101, Simulator Hardware Service Level Agreement, Rev. 0  
TQ-AA-301-0102, Simulator Software Service Level Agreement, Rev. 0

Active Simulator Work Requests (SWRs)

2507, 2512, 2580, 3510, 3818, 4297, 4523

Closed SWRs in 2002, 2003

2487, 2494, 2498, 2509, 2515, 2517, 3058, 3082, 3151, 3722, 3887, 4080, 4498, 4503, 4744,  
4949, 5557, 5974

Condition Reports

181346, 206967, 206534, 212636, 209825, 203907, 206911, 213469, 206967, 201039, 206911

Action Requests

00194093, 00156683, 00096391, 00104157, 00114487, 00114940, 00116352, 00121800,  
00125150, 00132810, 00133055, 00149672, 00150021, 00176592, 00177214, 00189592

Miscellaneous

LOR/STA Biennial Technical Review 2003-2004