

Three Mile Island 1

4Q/2006 Plant Inspection Findings

Initiating Events

Significance:  Mar 31, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Deficient Abnormal Operating Procedures for Loss of Vital 120 Volt Electrical Bus, Loss of 4160 Volt Bus, and Loss of NSCCW

The inspectors identified a non-cited violation (NCV) of Technical Specification (TS) 6.8.1, for failure to adequately establish and implement procedures required by Regulatory Guide 1.33, Section 6, "Procedures for Combating Emergencies and Other Significant Events." Specifically, no procedure existed to combat an emergency caused by a loss of electrical power to a vital bus. Additionally, the procedures to combat emergencies caused by a loss of 4160V AC and a loss of Nuclear Services Closed Cooling Water (NSCCW) were inadequate in that pump trip criteria and detailed guidance to the control room operators were not provided. AmerGen has acknowledged that these problems exist and provided the team an abnormal operating procedure (AOP) implementation schedule showing that new AOPs will be generated to correct these deficiencies in 2006.

This finding is more than minor because it is associated with the procedure quality attribute of the Initiating Events cornerstone and the associated cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. However, this finding was determined to have very low safety significance (Green) using Phase 1 of the NRC significance determination process described in NRC Inspection Manual Chapter (IMC) 0609, Appendix A, since the finding does not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available.

The finding has a cross-cutting aspect related to the area of Problem Identification and Resolution in that AmerGen personnel did not identify that some AOPs were inadequate.

Inspection Report# : [2006007](#) (*pdf*)

Mitigating Systems

Significance:  Dec 31, 2006

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Inattentiveness to Duty by a Shift Manager

A self-revealing violation of Technical Specification 6.8.1 occurred on Sunday, December 11, 2005 at 3:45 AM when the on-duty Operations Shift Manager, a licensed senior reactor operator, was observed by three control room operators to be inattentive to duty in an office in the control room complex. An Office of Investigation (OI) investigation (1-2006-011) was initiated on December 19, 2005 to determine if any willful violations had occurred. The OI investigation concluded that the Shift Manager was inattentive; however, it was not considered an intentional act.

The inattentiveness of the on-duty Shift Manager is a performance deficiency. Traditional enforcement does not apply because the NRC determined that the Shift Manager's actions were neither intentional nor deliberate, the actions did not have the potential for impacting the NRC's ability to perform its regulatory function, and there were no actual safety consequences. The issue is considered more than minor because it affects the Human Performance attribute of the Mitigating Systems cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). There is currently no SDP that applies to FFD events. Therefore, this finding is not suitable for SDP evaluation. However it was reviewed by NRC management and is

determined to be a finding of very low safety significance in accordance with IMC 0612, Section 05.04 (c).

Inspection Report# : [2006006](#) (*pdf*)

Significance:  Dec 31, 2006

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Follow FFD Procedures

A self-revealing violation of 10 CFR Part 26, "Fitness For Duty Programs" occurred on Sunday, December 11, 2005 at 3:45 AM when three control room operators failed to follow station procedures and initiate actions to have an inattentive Operations Shift Manager relieved of duty and escorted while in the protected area until Fitness for Duty (FFD) testing could be completed. The control room operators also failed to promptly notify station management. Each of the control room operators had observed the Operations Shift Manager in an inattentive position in an office within the control room complex.

An OI investigation (1-2006-011) was initiated on December 19, 2005 to determine if any willful violations had occurred. The OI investigation concluded that the three licensed operators failed to follow the FFD procedure, but they did not do so in willful violation since they were unaware that operator inattentiveness was a FFD issue.

The failure of the licensed operators to implement the station FFD procedure requirements after observing an inattentive Shift Manager is a performance deficiency. These requirements were not completed or carried out in a timely manner. Traditional enforcement does not apply since it was determined that the actions of the operators were neither intentional nor deliberate, the actions did not have the potential for impacting the NRC's ability to perform its regulatory function, and did not have actual safety consequences. The issue is considered more than minor because it affects the Human Performance attribute of the Mitigating Systems cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). There is currently no SDP that applies to FFD events; therefore, the finding was not suitable for SDP evaluation. As a result, the finding was reviewed by NRC management and it was determined to be of very low risk significance in accordance with IMC 0612 section 05.04 (c). This finding has a cross-cutting aspect in the area of problem identification and resolution for operating experience because AmerGen failed to effectively evaluate and communicate relevant external operating experience in a timely manner to train TMI operators on fatigue related FFD issues.

Inspection Report# : [2006006](#) (*pdf*)

Significance:  Sep 30, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Untimely Corrective Actions for Unreliable BWST Level Alarm Instrument.

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

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

Inspection Report# : [2006005](#) (*pdf*)

G**Significance:** Mar 31, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Deficient Work Instructions and Maintenance Implementation on Control Building Chiller

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

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

Inspection Report# : [2006003 \(pdf\)](#)G**Significance:** Mar 31, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Inservice Testing Reference Values Not Reestablished as Required by ASME Code Following Maintenance to Decay Heat, NSCCW, and Emergency Feedwater Pumps

The team identified an NCV of 10 CFR 50.55a.(f)(4)(ii) "Codes and Standards," which requires, in part, that testing of safety-related pumps meet the requirements of the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code requirements following maintenance on the "A" Decay Heat Removal (DH) pump. Specifically, AmerGen did not establish new vibration reference values or reconfirm the previous values following maintenance that can affect the reference values. This finding has been entered into the licensee's corrective action program as IRs 467551, 467056, 472106 and 471745. The planned corrective actions include an evaluation of the "A" DH pump reference values and a review of the methodology and process used to perform reference value evaluations.

This finding is more than minor because it is similar to IMC 0612, Appendix E example 2C and the same issue affected a number of pumps tested that include 2B emergency feedwater pump and the 1C NSCCW pump. This issue affected the Mitigating System cornerstone. The issue had very low safety significance (Green) because the "A" DH pump remained operable, there was no loss of safety function, and it was not related to a seismic, flooding, or fire initiating event.

Inspection Report# : [2006007 \(pdf\)](#)G**Significance:** Mar 31, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Evaluate and Correct Indications of Air in 'A' Decay Heat Removal System

The inspectors identified an NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for a deficient evaluation that resulted in ineffective corrective actions for indications of air in the Decay Heat (DH) system following maintenance. The ineffective corrective actions resulted in unknown quantities of air being forced through the 'A' DH pump casing and into the downstream piping, without an evaluation of the potential consequences to the DH and makeup systems. This finding has been entered into the licensee's corrective action program as IR 475218. Corrective actions include a comprehensive root cause evaluation, ultrasonic testing to verify no air remained in the piping, and actions to add new vent valves to enhance system fill and venting.

This finding is more than minor because it is associated with the equipment performance attribute of the Mitigating System cornerstone and the objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the risk significance of this finding using NRC IMC 0609, Appendix A, Phase 1. The finding screened to very low safety significance (Green) because the condition did not result in an actual failure of any safety-related system or component, or result in the system being declared inoperable for greater than its allowed technical specification outage time.

This finding is related to the cross-cutting area of Problem Identification and Resolution, because engineers and component maintenance optimization personnel missed several opportunities to properly evaluate and correct this degraded condition due to multiple reoccurrences of DH pump high vibrations and not appropriately applying prior industry operating experience. TMI also did not implement a void monitoring/periodic venting program as recommended by industry operating experience.

Inspection Report# : [2006007](#) (*pdf*)

Significance:  Mar 31, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Deficient Test Procedure Causes Air Introduction to Emergency Core Cooling Systems

The inspectors identified an NCV of TS 6.8.1.a for deficient surveillance procedures that resulted in the introduction of air into the sodium hydroxide (NAOH) piping to several emergency core cooling systems (ECCS) during in-service testing (IST) activities. This finding has been entered into the licensee's corrective action program (IRs 475218 and 474439). The corrective actions included venting of the initial air void via a check valve vent port, initiation of a modification to install a high point vent valve to vent the large section of voided pipe, revision of applicable procedures to prevent draining of piping, and ultrasonic testing of multiple sections of pipe in the ECCS piping.

This finding is more than minor because it is associated with the equipment performance attribute of the Mitigating System cornerstone and the associated cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the risk significance of this finding using NRC IMC 0609, Appendix A, Phase 1. The finding screened to very low safety significance (Green) because the condition did not result in an actual failure of any ECCS systems, and engineers concluded the 3.6 cubic feet of air void identified would not have prevented the ECCS systems from performing their design safety function.

This finding is related to the cross-cutting area of Problem Identification and Resolution, because engineers and operators missed several opportunities to recognize that proper refilling of drained piping was not possible due to the inability to vent based on prior industry operating experience. AmergenI also did not implement a void monitoring/periodic venting program as recommended by industry operating experience.

Inspection Report# : [2006007](#) (*pdf*)

Barrier Integrity

Significance:  Mar 31, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Inservice Test Failure Not Identified and Evaluated for Containment Isolation Check Valve

The inspectors identified an NCV of 10 CFR 50.55a.(f)(4)(ii) "Codes and Standards" which requires, in part, that testing of safety-related check valves meet the requirements of the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code. Specifically, AmerGen did not comply with IST requirements for a binding containment isolation check valve that was identified on November 6, 2005. IST program personnel did not declare the check valve inoperable, the cause of the failure was not analyzed, and other check valves in the sample group that may also be affected by this failure mechanism were not examined or tested during the same refueling outage to determine the condition of internal components and their ability to function, as required by the current TMI ASME IST Program. (ASME OM Code-

2001, ISTC-5224, Corrective Action).

This issue is more than minor because it affected the Barrier Integrity containment barrier performance attribute and the associated cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The inspectors evaluated the risk significance of this finding using NRC IMC 0609, Appendix A, Attachment 1. The finding screened to very low safety significance (Green).

The cause of the finding is related to the cross-cutting area of human performance, because engineering personnel did not evaluate the performance of a containment isolation check valve against IST program requirements properly and declare the observed condition as an IST/Code failure.

Inspection Report# : [2006007](#) (*pdf*)

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Physical Protection

[Physical Protection](#) information not publicly available.

Miscellaneous

Significance: N/A Mar 31, 2006

Identified By: NRC

Item Type: FIN Finding

Overall Biennial PI&R Team Assessment Summary

Identification and Resolution of Problems:

The team concluded that overall, problems were properly identified, evaluated and corrected; however, during the middle of the two year inspection period, AmerGen identified some substantial challenges to their implementation of the corrective action program as a result of issues identified by external organizations. Later in the period, improvements were made in the corrective action program, particularly with the quality of the evaluation products. The team attributed the improvements to a station wide effort to improve the corrective action program standards which were driven by the station ownership and management review committees. Nonetheless, problem identification was inconsistent throughout the period and some of the AmerGen staff were not aligned with current expectations to identify problems and initiate Issue Reports (IRs), and in a few cases, did not initiate IRs for known deficiencies that resulted in these issues not being evaluated and corrected. Further, many of the more significant issues continue to be identified by external organizations, including the NRC. For example, NRC findings related to Abnormal Operating procedures, surveillance test acceptance criteria, and surveillance test results represented issues that Engineering and Operations had the opportunity to identify. The AmerGen staff also did not effectively use industry operating experience, resulting in additional NRC findings. A large number of NRC identified lower level issues were concentrated in some single owner engineering program areas such as in-service testing, that may be indicative of isolated issues with problem identification standards.

At the time of the inspection, the station ownership and management review committees were effective in the initial review and prioritization of IRs. Nonetheless, throughout the period there has been a station wide problem related to procedure usage and procedure adequacy that station management has been slow to recognize and address. AmerGen staff has not effectively used the corrective action program to address these procedure problem areas. While many IRs have been initiated related to procedure usage and adequacy, no root cause evaluations have been performed, and the evaluation tools such as common cause and apparent cause evaluations have not been effectively used to identify and resolve underlying issues. While Amergen is investing a significant effort to improve the problems with procedure use and adequacy, without a clear understanding of the underlying causes their efforts may not be efficient, or effective, or achieve the desired result. Further, while the corrective actions for identified deficiencies were typically effective, and completed in a timely manner, AmerGen continues to be challenged in the area of procedure adequacy and adherence, as evidenced by a recent audit which identified a number of maintenance program deficiencies that are related to processes not being followed. The continued problems related to procedure usage and adequacy indicate corrective actions to date have not been fully effective for this station wide issue.

Some evaluation products were not thorough and as a result AmerGen did not identify problems or address the cause of some issues. NRC-identified issues and trends were not evaluated in aggregate to determine the cause of the cross-cutting aspects. Further, some of the individual IRs for NRC findings did not identify and correct the underlying causes of issues. Some of the lower level evaluation products, particularly early in the period, did not appropriately evaluate the cause of events and deficiencies, resulting in missed opportunities to identify broader issues.

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