

## Three Mile Island 1

### 2Q/2005 Plant Inspection Findings

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## Initiating Events

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## Mitigating Systems

**Significance:**  Jun 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

### **Deficient Maintenance Procedures Result in Undetected Expansion Joint Degradation and Safety-Related Expansion Joints Exceeding Service Life**

The inspectors identified a non-cited violation (NCV) of Technical Specification (TS) 6.8.1.a for deficient maintenance procedures on safety-related system expansion joints, and for not performing engineering evaluations when in-service safety-related expansion joints exceeded their recommended service life. The maintenance procedure and scheduling inadequacies resulted in station personnel being unaware of the age or condition of numerous expansion joints that had exceeded their recommended service life by an unknown period of time.

This finding was more than minor because it affected the mitigating systems cornerstone and affected the reliability of two trains of a nuclear river water mitigating safety system. In all three systems that were reviewed, expansion joints would have continued to degrade if left uncorrected. Additionally, two expansion joints in the condensate system were degraded. The complete failure of these partially collapsed expansion joints would likely result in an initiating event. The finding is of very low safety significance since no equipment was rendered inoperable due to the aged expansion joints.

A contributing cause of this finding is related to the cross-cutting area of human performance, because maintenance and testing procedures were insufficient to provide reasonable assurance that safety related and important-to-safety expansion joints would continue to remain capable of performing their design functions. Specifically, procedures did not address expansion joint service life, incorporate industry experience, or specify vendor recommended inspections be performed to support the continued use beyond the established service life.

Inspection Report# : [2005004\(pdf\)](#)

**Significance:**  Jun 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

### **Deficient Maintenance Procedures and Personnel Error Degrade Safety-Related Emergency Diesel Generator**

A self revealing non-cited violation of TS 6.8.1.a was identified for not properly implementing maintenance procedures that affected the performance of the safety-related 'B' emergency diesel generator (EDG). Licensee staff did not properly apply lubricant and torque the exhaust manifold bolts to the EDG turbocharger. This caused an exhaust leak and degraded the EDG during a monthly surveillance run due to loose and missing bolts in an exhaust manifold extension. Maintenance personnel performed an extent-of-condition investigation and documented the occurrence in their corrective action program.

This finding is more than minor because it affects the mitigating systems cornerstone objective of ensuring reliability of systems that respond to initiating events and is associated with the equipment performance reliability attribute. The finding is of very low safety significance since the missing bolt did not cause the EDG to become inoperable.

A contributing cause of this finding is a cross-cutting issue in the area of human performance, because maintenance personnel did not follow work instructions to apply lubricant and torque the turbocharger exhaust manifold bolts, document final torque values, or document lubrication used in completed work orders. A second contributing cause affected the cross-cutting area of problem resolution, because the initial engineering evaluation was too narrowly focused. Engineers did not use technical calculations or modeling to support conclusions regarding the quantity of leaking exhaust and its associated impact on diesel loading capability and room design temperature until challenged by the inspectors.

Inspection Report# : [2005004\(pdf\)](#)

**Significance:**  Jun 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

### **Deficient Procedure and Personnel Error While Replacing 'B' 125/250 Volt Battery Cell**

The inspectors identified a non-cited violation of TS 6.8.1.a for deficient maintenance procedures that did not contain sufficient work instruction or acceptance criteria to ensure the safety related 'B' 125/250 volt battery was properly reassembled following replacement of battery cell #2. Additionally, workers did not properly follow the procedure instructions in that certain steps were performed out of order.

This issue affected the mitigating systems cornerstone and was more than minor because it affected the reliability of the 'B' train of the 125/250 volt power system to perform its accident mitigation functions in response to initiating events. The deficiency affected the procedure quality and equipment performance attributes of the mitigating system cornerstone. The finding is of very low safety significance because the 'B' 125/250 volt battery bank was not inoperable for greater than the TS allowed outage time.

A contributing cause of this finding is related to the cross-cutting area of human performance, because operators did not follow procedure 1420-DC-3 steps in the order specified and procedure quality was deficient because it did not provide instruction to perform intercell battery resistance checks or torque the battery rack connection bolts to verify seismic qualification prior to declaring the battery operable. Additionally, procedure usage level was insufficient based upon the potential impact of an error.

Inspection Report# : [2005004\(pdf\)](#)

G

**Significance:** Jun 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

### **Deficient Procedure and Operator Error Degrade Two-Hour Emergency Air Supply to Emergency Feedwater and Main Steam Systems**

The inspectors identified a non-cited violation of TS 6.8.1.a in that on March 29, 2005, operators did not properly implement procedural requirements for recharging the two-hour emergency air system, and mispositioned valve IA-V-1769. The mispositioned valve caused both air banks to partially depressurize and reduced the reliability of the supported mitigating systems (emergency feedwater (EFW) and main steam (MS)) to perform their decay heat removal function. Operators identified and repressurized the air banks, but did not recognize and correct the cause of the degraded condition until the inspectors identified the causes.

The finding was more than minor because the degraded two-hour air system pressure affected the reliability of the EFW and MS systems to perform their accident mitigation functions in response to initiating events. The deficiency affected the configuration control, equipment performance, and human performance attributes of the mitigating system cornerstone. The finding is of very low safety significance because bank air pressure did not drop below the value required for operability and, therefore, the system remained capable of performing its safety function.

A contributing cause of this finding is related to the cross-cutting area of human performance, because operators did not follow procedural instructions to open IA-V-1769 and procedure quality was deficient in that procedure usage category 3 (informational use only) was insufficient to ensure the procedure was properly followed step-by-step for this important safety-related activity. The finding is also cross-cutting in the area of problem resolution in that AmerGen's initial assessment of the event did not determine or correct the actual causes of the degraded air bank pressure.

Inspection Report# : [2005004\(pdf\)](#)

G

**Significance:** Mar 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Maintain Fire Barriers for the 'A' and 'B' Makeup Pump Rooms**

The inspectors identified a non-cited violation of TMI-1, Facility Operating License Condition 2.C(4), "Fire Protection." Station personnel breached fire barrier doors that separated two of three safety related makeup pump rooms from a common hallway and did not implement compensatory measures as required by the TMI Fire Protection Program.

This finding is more than minor because it affects the mitigating systems cornerstone objective of ensuring the availability of systems that respond to initiating events and is associated with the protection against the external factors attribute (fire). This finding is of very low safety significance because the combustible load for the affected areas was small, concrete walls located immediately outside the rooms help minimize potential fire propagation, and there is no credible scenario by which a fire on one side of the barrier could propagate through both degraded fire doors to affect equipment in both fire areas. In addition, the fire detectors on each of the rooms affected were operable.

A contributing cause of this finding is related to the cross-cutting area of human performance, because station personnel did not implement a TMI Fire Protection Program procedure (AP-1038) despite being trained on its requirements to maintain fire barriers. A second contributing cause is related to the cross-cutting area of problem identification and resolution, because station personnel did not implement adequate corrective actions to prevent recurrence of the inoperable fire barriers.

Inspection Report# : [2005002\(pdf\)](#)

G

**Significance:** Mar 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

### **Construction of Seismic Scaffolding Near Safety-Related Equipment Not Performed in Accordance with Procedure Requirements**

The inspectors identified a non-cited violation of TS 6.8.1 in that station personnel did not properly implement station procedures to erect and control the construction of seismic scaffolding in the vicinity of safety-related equipment. The required clearance distance between the seismic

scaffold and safety-related equipment was not maintained, resulting in damage to and contact with safety-related building spray (BS) and main steam (MS) system components, respectively.

This issue affected the mitigating systems cornerstone and was more than minor because station personnel did not properly install scaffolding in safety-related areas, and did not perform required engineering evaluations when needed. If left uncorrected it could become a more significant safety concern in that inadequate constructed scaffold could affect the availability and reliability of mitigating systems during plant operations or a seismic event. This finding was determined to be of very low significance because engineers determined the scaffold, as installed, would not prevent the BS and MS systems from performing their safety functions.

A contributing cause of this finding is a cross-cutting issue in the area of human performance, because craft personnel did not adhere to station scaffold procedures on two occasions. A second contributing cause affected the cross-cutting areas of problem resolution and corrective action, because (1) after the procedure violation was identified, station personnel did not initially enter the issue into the corrective action program for evaluation of actions to preclude recurrence and (2) this finding is repetitive, in that the NRC issued a similar Green finding in May 2004 and previous corrective actions were not effective to preclude recurrence.

Inspection Report# : [2005002\(pdf\)](#)

**Significance:** SL-IV Dec 31, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

**Untimely Licensee Event Report for Both Trains of High Pressure Injection Being Inoperable**

A non-cited violation of 10 CFR 50.73 was identified for untimely submittal of a licensee event report (LER). In March 2004, station personnel had all necessary information available to identify that both trains of high pressure injection (HPI) had been inoperable for a brief period in 2003. The issue was not reported until December 2004, following identification by the inspectors. A contributing cause of this finding is a shortcoming in problem identification in the cross-cutting area of PI&R in that station personnel did not consider unavailability of the emergency power supply to the second HPI train and associated technical specification requirements when determining reportability of this condition. Additionally, the original operability determination did not correctly address seismic qualification of HPI support systems until identified by the inspectors. Corrective actions included submittal of the condition report, training for station personnel, and entering the issue into the corrective action program as issue report 267630.

Inspection Report# : [2004005\(pdf\)](#)

**G**

**Significance:** G Dec 31, 2004

Identified By: Self Disclosing

Item Type: NCV NonCited Violation

**Inadequate Configuration Control - Incorrect Material for MS-PI-22 Causes Main Steam Leak**

A self-revealing Green NCV was identified for not maintaining control of materials as required by 10 CFR 50, Appendix B, Criterion VIII, "Identification and Control of Materials, Parts, and Components." Use of incorrect material (brass) for an instrument line cap near main steam (MS) pressure instrument MS-PI-22 resulted in a steam leak, a plant transient, and subsequent isolation of safety-related components. Not identifying the visible difference in materials is considered a cross-cutting issue in the area of problem identification, because technicians and operators missed several opportunities to identify the problem prior to the steam leak. Corrective actions included replacement of the fitting with stainless steel per design specifications, extent of condition evaluations, and issue entry to the corrective action program as issue report 281003.

This issue is more than minor because it affected the Mitigating System cornerstone objective by reducing availability of mitigating systems when operators isolated mitigating system components (one steam supply train to EFW turbine pump, turbine bypass valves, an atmospheric steam dump valve) in order to isolate the steam leak. The finding had very low safety significance due to the short duration of train inoperability during the leak isolation procedure. In each case, the single train loss of safety function existed for much less than the TS allowed outage time.

Inspection Report# : [2004005\(pdf\)](#)

**G**

**Significance:** G Dec 31, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

**Degraded Main Steam Isolation Valve Snubber MS-225 Not Identified and Corrected**

The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for not identifying a degraded main steam isolation valve snubber (MS-225) during extent of condition review walkdowns following a steam leak in the intermediate building. Specifically, the inspectors identified that the snubber hydraulic oil reservoir was empty when conducting inspections after plant personnel had performed area walkdowns after the steam leak. A contributing cause of this finding is related to the cross-cutting area of problem identification, because system engineers did not identify the empty hydraulic snubber reservoir during inspections intended to look for this type of condition. Corrective actions included replacement of the degraded snubber and extent of condition walkdowns of all similar safety-related snubbers located in the intermediate building.

This issue is considered more than minor because it affected the mitigating system cornerstone by reducing the reliability of the 'B' main steam isolation valve [MSIV], a mitigating system component used during a loss of the normal heat sink or a steam generator tube rupture.

Additionally, this issue resulted in the snubber being declared inoperable, thereby affecting its availability during replacement activities. This finding is of very low safety significance because the loss of hydraulic snubber fluid did not result in a failed snubber, nor did it cause the 'B' MSIV to become inoperable.

Inspection Report# : [2004005\(pdf\)](#)

**G**

**Significance:** Sep 30, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Identify and Correct a Degraded 'A' EDG Fuel Injection Line**

The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI "Corrective Action" for failure to identify a degraded 'A' emergency diesel generator (EDG) common header fuel injector tube. In addition, after the condition was identified by the inspectors, station personnel failed to document, evaluate and correct this degraded condition, which had the potential to degrade further and adversely affect the operability of the 'A' EDG, until prompted by the inspectors. The tube degradation was caused by rubbing between the tube and the fuel oil duplex filter metal cover plate and resulted in a 40 percent reduction in tube wall thickness. (This finding is considered a cross-cutting issue in the area of problem identification and evaluation, because station personnel failed to identify the degraded fuel injector tube and) the initial assessment of this degraded condition was untimely and lacked technical rigor. The duplex filter cover plate was ultimately modified to establish proper clearance and prevent further tube degradation. In addition, corrective actions were initiated to replace the degraded fuel ejector tube during the next 'A' EDG outage.

This issue is more than minor since the failure to identify and correct the degraded EDG fuel ejector tube reduced the reliability of a mitigating system component. In addition, if left uncorrected, the condition could have degraded further and affected the operability of the 'A' EDG. This finding is of very low safety significance (Green) because it did not result in an actual failure of the 'A' EDG fuel injector tubing, nor did it cause the 'A' EDG to be inoperable.

Inspection Report# : [2004004\(pdf\)](#)

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## **Barrier Integrity**

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**Significance:** Dec 31, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Untimely Investigation and Repair of a Degraded Control Building Ventilation Exhaust Fan AH-E-19B**

The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for not investigating and repairing a degraded control building air return ventilation fan AH-E-19B in a timely manner. Elevated fan vibrations were identified in December 2001, but not sufficiently evaluated until September 2004, following concerns raised by the inspectors. This untimely response resulted in a cracked hub where the bolt holes penetrate the hub and attach to the motor. A contributing cause of 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 evaluate, and prevent or correct the degraded condition based on prior internal and external operating experience with similar fans. Corrective actions include complete replacement of the fan/motor assembly and entering this issue into the corrective action program as issue reports 258108 and 197544.

This issue is considered more than minor because it affected the control room envelope Barrier Integrity cornerstone since the cracked fan hub could cause a partial loss of control building ventilation. This finding is of very low safety significance since the condition did not result in an actual failure of the control room ventilation system.

Inspection Report# : [2004005\(pdf\)](#)

**G**

**Significance:** Dec 31, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Computer-calculated Reactor Power Malfunctions Not Promptly Corrected**

A self-revealing, non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Actions" occurred on February 6, 2004, when the reactor had an unplanned power increase from full power, in which reactor power increased 0.9 percent over 17 minutes. The power increase resulted when the input signal for calculated reactor power was removed from the integrated control system with reactor power control in automatic. A contributing cause of this finding is related to the cross-cutting area of problem identification and resolution, because problems with computer-calculated reactor power had occurred previously, but corrective actions to address the problem were untimely, and corrective actions to address the consequences of the problem were ineffective. Additionally operators were slow to identify and respond to the overpower condition.

This finding is more than minor because it potentially affected the reactivity control attribute of the barrier integrity cornerstone objective of providing reasonable assurance that physical barriers (i.e., fuel cladding) protect the public from radionuclide releases caused by overpower events. Specifically, the integrated control system escalated reactor power automatically upon loss of an input signal during scheduled maintenance. This finding is considered to be of very low safety significance, because all mitigating systems remained functional and other barriers would not have been affected.

Inspection Report# : [2004005\(pdf\)](#)

**G****Significance:** Sep 30, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Perform Testing of the Reactor River Water Pumps in Accordance with ASME OM Code**

The inspectors identified a self-revealing non-cited violation 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 Code. Contrary to this requirement, AmerGen did not perform quarterly Inservice Testing of the reactor river water (RR) pumps in accordance with the ASME OM-6 Code. Specifically, the quarterly test procedure did not set pump differential pressure or flow at a reference value which was readily duplicated during subsequent tests. Additionally, the test throttle valve position, which could significantly influence pump d/p, was not monitored, documented or analyzed. The inspectors determined that over the last five years, the quarterly RR pump test was not in accordance with the Code and would not have detected a degraded pump hydraulic condition.

This issue is more than minor because it affected the Barrier Integrity cornerstone objective and the containment barrier performance attribute. Failure to test the pumps in accordance with the code did not ensure the availability of the RR system's safety function to provide containment cooling and pressure suppression in the event of a design basis accident. However, because full flow testing had been satisfactorily conducted in November 2003 and testing performed subsequent to the identification of the issue determined that the pumps were operable, this violation was determined to have a very low safety significance. Corrective actions included revision of the test method to meet code requirements as documented in Issue Report 244066.

Inspection Report# : [2004004\(pdf\)](#)

## Emergency Preparedness

**W****Significance:** May 18, 2005

Identified By: NRC

Item Type: VIO Violation

**Emergency Response Organization Qualifications Expired Due to Untimely Training**

An apparent violation associated with EP planning standard 10 CFR 50.47(b)(15) was identified. This apparent violation, which has low to moderate safety significance, occurred because AmerGen did not conduct annual required radiological response classroom retraining for approximately 50 percent of the ERO as specified in the TMI Annex Emergency Plan (E-Plan).

The finding is more than minor because it is associated with the EP cornerstone attribute of ERO readiness (training). It affects the cornerstone objective of ensuring the capability to implement measures to protect the health and safety of the public during an emergency. The ERO, including several key responders, had not received the training necessary to maintain familiarity with their specific emergency response duties. As a consequence, for an approximate five month period (June-November 2004), those individuals would not have been considered available to respond to a radiological emergency. This resulted in some key ERO positions not being filled by qualified ERO members in accordance with AmerGen's TMI E-Plan requirements. (1EP3)

Using Inspection Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process, Section 4.15 and Sheet 1," this finding was determined to be of low to moderate safety significance because it was considered to be a loss of an EP planning standard function because several key responders were not trained as required.

(Following excerpt from Inspection Report 2005-004:)

(A contributing cause of) this finding is related to the cross-cutting area of human performance, because the TMI emergency preparedness department staff did not follow applicable requirements, specified in the TMI Annex Emergency Plan, when scheduling ERO training. Additionally, AmerGen corporate emergency preparedness supervision was deficient, because they did not ensure required ERO training periodicity was properly understood and implemented.

Inspection Report# : [2005004\(pdf\)](#)Inspection Report# : [2005006\(pdf\)](#)**Significance:** SL-IV Dec 31, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

**Plant Modification Decreased Effectiveness of Emergency Plan Without Prior NRC Approval, Deficient 10 CFR 50.54(q) Evaluation**

A non-cited violation of 10 CFR 50.54(q) was identified for not properly maintaining the TMI Radiological Emergency Plan (the Plan) up-to-date to address a modification made within the owner controlled area. Specifically, plant modifications which blocked the south gate access bridge resulted in a decrease in effectiveness in the Plan without prior NRC approval. Corrective actions included discussions with the local railroad company to establish a memorandum of understanding, establishment of a shift night order, training for emergency directors, reassessment of south gate accessibility, and entry of the issue into the licensee's corrective action program as issue reports 260849, 260697, 266937, 269032, 282239 and 282851.

A contributing cause of this finding is related to the cross-cutting area of problem identification and resolution, because (1) the 10 CFR 50.54

(q) evaluation did not identify the potential that a train (or crossing gate) malfunction could occur and cause delays in accessing or leaving the site, despite several such occurrences; (2) evaluation of the issue following three train (or crossing gate) malfunctions in October 2004 was cursory in that it did not take positive actions to verify contingency actions were identified, understood, and trained upon; and (3) substantive corrective actions such as establishing a memorandum of understanding with the railroad and establishing written guidance shift manager/emergency director guidance for this contingency were not developed until repeatedly questioned by the inspectors. This finding was of very low safety significance, because it did not constitute a loss of a planning standard function required by 10 CFR 50.47(b)(2) or (b)(3).  
Inspection Report# : [2004005\(pdf\)](#)

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## Occupational Radiation Safety

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### Public Radiation Safety

**Significance:**  Jun 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Conduct Radiological Evaluation to Support Waste Transfer**

The inspectors identified a non-cited violation of 10 CFR 20.1501 associated with failure to evaluate the adequacy of a change to the procedure for collecting samples of radioactive spent resin for analysis to support transfer of radioactive material to a waste processor for ultimate disposal. Specifically, in December 1998, AmerGen reduced the tank recycle requirements, prior to sample collection, from three tank volumes to 15 minutes, and did not evaluate the effect of this change on the representativeness of the sample. Consequently, the spent resin tank sample procedure instruction was not evaluated to ensure a representative sample, and therefore AmerGen could not validate that the total radionuclide activity was accurately determined and provided to the waste processor prior to the shipment in accordance with 10CFR20, Appendix G.

The finding is greater than minor in that it affected the public radiation safety cornerstone objective. Specifically, the issue involved an occurrence in the radioactive material transportation program that was contrary to NRC or Department of Transportation regulations. Using the Public Radiation Safety SDP flow chart, this finding is of very low safety significance, because it involved a radioactive material control issue, it did involve transportation, no radiation limit was exceeded, it did not involve a breach of packaging, it did not involve a Certificate of Compliance finding, it did not involve a low-level burial ground issue, and it did not involve a failure to make an emergency notification issue. AmerGen reviewed previous shipments and concluded that, due to the generally low radioactivity of the shipments made, there was no likelihood that a shipment was improperly packaged for shipment or would have been misclassified per 10 CFR 61. Consequently, no actual safety consequence was identified.

A contributing cause of this finding is related to the cross-cutting area of problem identification in that AmerGen did not identify this problem during routine self-assessments and audits of its radioactive waste transportation and disposal program.

Inspection Report# : [2005004\(pdf\)](#)

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### Physical Protection

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

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### Miscellaneous

Last modified : August 24, 2005