January 21, 2000

Mr. John B. Cotton
Vice President TMI Unit 1
AmerGen Energy Company, LLC
Three Mile Island Nuclear Station
P. O. Box 480
Middletown, Pennsylvania 17057-0480

SUBJECT: NRC INSPECTION REPORT NO. 05000289/199909

Dear Mr. Cotton:

This refers to the inspection of your problem identification and resolution program including the corrective actions taken in response to Engineered Safeguards Actuation System (ESAS) relay failures. This team inspection was conducted from November 15 to December 8, 1999, at the Three Mile Island Nuclear Station. The enclosed report presents the results of that inspection. The results were discussed with you and other members of your staff on December 8, 1999.

Based on the results of this inspection, the team determined that your problem identification and resolution program was effective. You experienced few significant problems and effectively managed and resolved matters that had the potential to affect plant safety. Significant problems were appropriately identified, evaluated and appropriately corrected. Notwithstanding, we observed occasional deficiencies regarding operations shift supervision in making initial operability and reportability determinations without the involvement of other technical personnel; and that some minor problem evaluations and application of corrective actions were less than thorough and incomplete (e.g., post-maintenance testing and auxiliary operator valve mispositioning). Departmental self-assessments varied in quality and depth. While engineering self-assessments were probing and self-critical, operations and maintenance self-assessments were shallow and narrowly focused, and not generally regarded as a tool for performance improvement.

In the past two years, the rate of ESAS relay failures has been high. However, you have taken effective initial corrective actions and established an adequate monitoring process to improve the performance of ESAS relays.

The NRC has determined that a violation of NRC requirements occurred, regarding the drain down of the reactor vessel below reactor coolant loop and decay heat removal pump suction level without the use of an approved procedure. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VII.B.1 of the Enforcement Policy. This NCV is described in the subject inspection report. You do not need to respond to the violation, but you may contest the violation or severity level. If you so choose, you should provide a response within 30 days of the date of this inspection report, with the basis for 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 NRC Resident Inspector at the Three Mile Island Unit 1 reactor facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room (PDR). Your cooperation with us was appreciated.

Sincerely,

/RA by Brian E. Holian Acting For/

Wayne D. Lanning, Director
Division of Reactor Safety

Docket No: 05000289
DPR-50

Enclosure: NRC Integrated Inspection Report No. 05000289/199909

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REGION I

Docket No:	05000289
License No:	DPR-50
Report No:	05000289/199909
Licensee:	AmerGen Energy Company, LLC
Facility:	Three Mile Island, Unit 1
Location:	P. O. Box 480 Middletown, PA 17057
Dates:	November 15, 1999 through December 8, 1999
Inspectors:	James D. Noggle, Senior Health Physicist Stephen Pindale, Reactor Engineer Geoff Wertz, Resident Inspector Kathy Modes, Health Physicist Joseph Carrasco, Reactor Engineer Edward Lawrence, Reactor Engineer (in Training) Ram S. Bhatia, Reactor Engineer
Approved by:	John R. White, Chief Radiation Safety and Safeguards Branch Division of Reactor Safety

EXECUTIVE SUMMARY

Three Mile Island Nuclear Power Station
Report No. 05000289/199909

During the period between November 15 and December 8, 1999, the NRC conducted a team inspection to review the corrective actions associated with engineered safeguards actuation system (ESAS) relay failures and to review the problem identification and resolution program at the Three Mile Island Station, Unit 1. The objective of the inspection was to assess the ability of your staff to effectively identify problems, evaluate root cause, and develop and implement corrective actions. The results of this inspection are described below:

Maintenance

Over the past two years, Three Mile Island has experienced a significant number of engineered safeguards actuation system (ESAS) relay failures. The root cause analysis and corrective actions taken to address failures in the ESAS system relays were adequate and appropriate. The ESAS relays that were most susceptible to failure have been replaced. The licensee continues to provide adequate monitoring via surveillance testing and conducts preventive maintenance activities to assure proper relay operation. Measures taken were determined to adequately resolve the ESAS relay failures. (M2.1)

Problem Identification

Overall, GPUN appropriately identified problems and entered the deficiencies in the corrective action process (CAP) as required with one exception related to operating a decay heat removal pump in a manner inconsistent with approved procedures resulting in a non-cited violation. Deficiencies entered into the corrective action system were properly classified and prioritized. Examples were identified that indicate material non-conformance reports (MNCRs) were not well integrated into the Corrective Action Program, as they focus on material defects with the result that human performance issues have not always been addressed. The team observed occasional deficiencies with initial operability and reportability determinations that were incomplete and did not include an appropriate technical review. (P1)

Root Cause Evaluation

Appropriate attention was focused on investigating problem causes commensurate with the level of risk, and the detail and accuracy of the analyses were acceptable. (P2)

Corrective Actions

Corrective actions were effective in focusing on resolution of the identified root cause and prevention of significant problem recurrence. Corrective actions were generally completed in a timely manner consistent with the safety significance of the issue. Corrective actions associated with some minor problems were not completed in a timely manner and other minor problems, despite completion of corrective actions, continued to occur. (P3)

Trending/Extent of Condition

Overall, problems were being identified and captured in one of the many tracking database systems at the site and the CAP system was appropriately utilized to capture trend results. Most extent of condition reviews were generally effective in identifying associated concerns and implementing appropriate corrective actions. (P4)

Self-Assessment/Operating Experience

Departmental self-assessments varied in quality and depth. While engineering self-assessments were generally probing and self-critical, operations and maintenance self-assessments were not. Quality assurance assessments supplied by Nuclear Safety Assessment and the Independent Onsite Safety Review Group provided excellent reviews of important areas. Operating experience information was of broad scope, was appropriately tied into the corrective action program, and this program area was annually assessed. (P5)

Resolution of Non-Cited Violations

There were no identified deficiencies relative to the disposition of non-cited violations. (P6)

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Report Details

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Engineering Safeguard Actuation System (ESAS) Material Condition

a. Background and Inspection Scope (92903)

Over the past two years, GPUN has experienced a significant number of engineered safeguards actuation system (ESAS) relay failures. The relay failures occurred in the ESAS system equipped with a higher number of contacts compared to other plant systems. The ESAS relays are designed to initiate plant engineered safeguards equipment and logic circuitry to accomplish safe shutdown, long term decay heat removal, and accident mitigation functions in the event a limiting safety system setting is exceeded. Previously, IFI 98-08-02 was initiated to track the licensee's evaluation of root cause assessment and corrective actions to prevent recurrence. The results of these licensee actions were reviewed during this inspection.

b. Observations and Findings

Past Failure History

The inspector reviewed the past 2-year failure history of ESAS relays and noted that a total of 13 relay failures had been experienced in the ESAS system, including a repeated failure of one relay in 1998. Further review of relay configuration revealed that the maximum number of relays failed were those configured with fourteen relay contacts. Also, there were no relay failures experienced in any other system. The majority of the failed relays experienced overheating. In two cases, the coils overheated to the extent that a small flame was evidenced and, in one case, overheating resulted in the coil opening. The inspector noted that twelve out of the total thirteen relays that overheated were part of the logic in the ESAS actuation cabinets. With respect to twelve cases, the relays were designed to be in a normally energized (fail safe) condition. As a result, if the relay coils were to overheat to the point of failing open, the relay would travel to its actuated state. Failure, in this state, would place the ESAS for the affected components in one-out-of-two logic (conservative mode), instead of the usual two-out-of-three logic. The remaining relay failure caused operators to allow a channel to automatically enable during a plant heat-up, because the manual enable of the channel was inoperable. In addition, this typical failure had occurred in a de-energized state, after the surveillance testing, when the relay was ready to be put back in service by re-energizing it into the armed state. The inspector noted in all cases the licensee had either replaced the relay coils or replaced the relay.

Root Cause Analysis

GPUN completed a root cause investigation in 1998 that focused on the magnet kit and coil assembly since these were the parts that were replaced in 1995. At that time, the licensee found no evidence of manufacturing defects that would contribute to overheating. In June 1999, another evaluation was completed by a multi-disciplinary team. This team focused their investigation to determine the cause of the recurring relay failures. The inspector found that this team also did not find the exact cause of the

relay overheating and recurring failures of ESAS relays. However, to address the immediate concern of the ESAS relays (as documented in the previous NRC inspection reports 98-08 and 99-03), GPUN initiated visual inspection of all the ESAS relays for overheating coils and continued to replace relays in this system that were hot or noisy. At the same time, GPUN continued to seek the root cause of these relay failures and was planning to submit a voluntary LER.

Finally, on July, 2, 1999, with the help of an experienced contractor (Southwest Research Institute of San Antonio, Texas), the licensee determined the cause of these relay failures was inadequate preventive maintenance. Specifically, the frictional buildup from the gradual wear of moving parts and loosening of screws of the coil assembly went uncorrected. As a result, the moving components of the contact and actuator sections of the relay were occasionally binding during the repositioning to an energized state. This finding was consistent with that of another contractor's evaluation of 14 pole failed relays conducted at another facility (Clark PM Magnetic Inspection Report dated October 28, 1999).

Corrective Actions

GPUN submitted a voluntary LER 99-07, on June 18, 1999, and a supplement on August 20, 1999 to document their planned corrective actions to address this relay issue. The inspector verified that the licensee adequately completed all the short term corrective actions in the LER including, replacing overheated relay coils, updating the applicable procedures to look for overheating relays during surveillance and post-maintenance testing, and enhancing the commercial grade dedication test of the ESAS, as recommended by the manufacturer. In addition, the plant operators were made aware of these failures and had been provided guidance to manually assist closure of relays, if necessary. The review of the maintenance rule and trending record revealed that the system engineer was trending the failures of these relays appropriately and this system was appropriately placed in the Maintenance Rule with an (a)1classification.

A review of the documentation and work order associated with the replacement of the ESAS system relays revealed that approximately 64 relays, including all with 13 or 14-contact relays, had been replaced with new ones during the recent 13R outage. As part of this upgrade, any spare, unused pairs of contacts on these replacement relays were removed to decrease the number of contacts and improve relay performance. In addition, the licensee inspected and tightened all relay mounting screws during the 13R outage. At the conclusion of this inspection, the licensee was planning to schedule periodic inspection of relay coil mounting screws for tightness starting in January 2000.

The inspector inspected several ESAS system relays in control room relay room panels and found no hot or noisy relays. The relay cabinets were clean and free of dust. The inspector verified that changes were made in the post-maintenance testing procedure for corrective actions to replace defective relays and scheduled replacement of coil kits. In addition, the inspection also verified (by reviewing training records and through discussion with staff personnel) that operators had been trained and made aware of the possible problems and the actions to take to manually reposition a relay if needed.

c. Conclusion

Over the past two years, Three Mile Island has experienced a significant number of engineered safeguards actuation system (ESAS) relay failures. The root cause analysis and corrective actions taken to address failures in the ESAS system relays were adequate and appropriate. The ESAS relays that were the most susceptible to failure have been replaced. The licensee continues to provide adequate monitoring via surveillance testing and by conducting preventive maintenance activities to assure proper relay operation. Based on the review of corrective actions taken by the licensee, the inspector concluded that IFI 98-08-02 is closed.

Problem Identification and Resolution

P1 Problem Identification

a. Inspection Scope (40500/71152)

The team reviewed several documents and administrative systems. Plant walkdowns were conducted to review equipment condition and interviews were conducted with applicable personnel to assess whether deficiencies were properly identified and entered into the CAP system. The team also reviewed approximately 140 CAP items to verify that they were properly classified and prioritized for evaluation. While assessing the CAP items, the team reviewed the associated operability and reportability determinations.

b. Observations and Findings

Overall, GPUN properly identified and entered problems into the CAP as required, with an exception related to operating a decay heat removal pump in a manner inconsistent with approved procedures. In general, deficiencies were properly classified and prioritized, although material non-conformance reports (MNCR) within the CAP program are not designed to address human performance issues. The team observed occasional deficiencies with operability and reportability determinations. These individual deficiencies are described below.

a. Inappropriate Decay Heat Removal System Operation to Drain the Reactor Cavity

Operators used a safety-related decay heat removal pump in a manner inconsistent with existing procedures to lower the reactor vessel level to the bottom of the reactor coolant system hot leg. There was no fuel in the reactor vessel at the time. General instructions were provided to operators via the TMI Operations Night Orders dated September 24, 1999, to drain down the fuel transfer canal. However, these instructions were informal, had not received safety reviews, and provided guidance inconsistent with existing operating procedures. The decay heat operating procedure did not permit decay heat pump operation at a level less than reactor coolant loop centerline. During the reactor coolant loop drain down activity, which was performed on September 25, 1999, the operators secured the decay heat pump when a decrease in pump motor amps was observed concurrent with a high vibration alarm associated with the operating decay heat system pump. This was one of the termination criteria verbally communicated to operators by system engineering. At the time, it did not appear that personnel considered that the suction for the decay heat pump was at a level above the bottom of the reactor coolant system hot leg and that this configuration would result in pump cavitation before reaching the desired level (bottom of loop).

In response to this issue, GPUN informed the team that subsequent operation and test data for the affected decay heat pump (DH-P-1B) prior to startup from the recent fall refueling outage indicated no performance degradation. The team determined that the safety significance of this activity was low, as there was no fuel in the reactor and no damage to the pump resulted. However, the failure to use procedures for operating a safety-related pump represented non-conservative decision making. On December 7, 1999, GPUN initiated a CAP to document the details related to failure to use approved procedures for operating the 1B decay heat pump. The team concluded that failure to implement procedures regarding operation of the decay heat system pump to drain the reactor coolant hot leg is a violation of Technical Specification 6.8.1, pursuant to Reg. Guide 1.33, Section 9.d.(4) (procedure for draining the reactor vessel). This Severity Level IV violation is being treated as a Non-Cited Violation consistent with Section VII.B.1 of the NRC Enforcement Policy. This violation is in GPUN's corrective action system as CAP T1999-1220. **(NCV 05000289/199909-01)**

a. Examples were identified that indicate material non-conformance reports (MNCRs) were not well integrated into the Corrective Action Program. MNCRs focus on material defects. Consequently, root cause analysis may not be fully addressed (i.e., examples identified where human performance issues have not been addressed). For example, CAP T1998-1031 documented GPUN's identification of a blown fuse associated with a solenoid valve for one of the six turbine steam bypass valves. GPUN's initial investigation identified that a 0.5 amp fuse was installed, but a 2 amp fuse was required. This CAP item was characterized as an MNCR and engineers assigned to evaluate the CAP did not consider whether a human performance error was the cause for the improperly installed fuse. The team found that operability was not compromised for the steam dump and bypass system and appropriate corrective actions were taken for the six fuses in question, but the MNCR resulted in a review of fuse availability, whereas, a related review for human performance errors was not considered.

b. Two examples involving operability and reportability determinations were previously evaluated in detail in separate NRC inspection reports. The first item, documented in NRC inspection report 50-289/99-03, was related to an operability assessment for the reactor building emergency cooler system. The NRC concluded that the operability determination was inadequate after degraded air flowrates were suspected (flowrates were less than assumed in the UFSAR). The second item, documented in NRC inspection report 50-289/99-08, involved a deficiency where operators could not remotely operate the 'B' main steam isolation valve from the control room and operated it locally without completing a required procedure change. This placed the unit in a condition outside of the design basis. The inspection report also documented that management oversight was deficient in that startup was allowed to continue without an associated operating procedure change or an engineering review of this degraded condition. These issues are examples of operability determinations that were incomplete and did not involve appropriate technical review.

During this inspection, the team identified the following additional instances where operability and reportability assessments were incomplete.

c. Intermediate Closed Cooling Water (ICCW) System Containment Isolation Valves

A system engineer identified that two normally open ICCW containment isolation valves (IC-V-3 & IC-V-4) may not fail closed on a loss of the instrument air system (CAP

T1999-0685). This is in conflict with design basis documents (DBD), which state that the valves shall close on a loss of instrument air. The valves can fail as-is if a loss of the instrument air system occurs and the air contained in accumulators depletes. If a containment isolation is then required, local manual operator action would be required to close IC-V-3 & IC-V-4.

The safety significance of this issue was low. The CAP specified a Directed Action to resolve the DBD conflict with no root or apparent cause evaluation performed.

With regard to operability determination, not all relevant details were considered. The CAP did not identify that the abnormal procedure should be revised for the loss of instrument air event to ensure containment isolation occurs, if required. Since the valves do not "fail-safe" closed under certain conditions due to the design discrepancy, operators should have been provided guidance regarding expected system response and operator actions in such a scenario. GPUN agreed that the emergency loss of instrument air procedure requires revision and plans to process the appropriate changes. This issue is an example of operability determinations that were incomplete and did not involve appropriate technical review.

d. Post-Maintenance Testing (PMT) Issues

There were two instances where initial PMT and operability assessments made by operators did not involve the correct technical personnel in a timely fashion. Although no equipment was rendered inoperable, the potential existed that decisions or changes to PMT requirements could have resulted in an adverse operability impact. GPUN self-identified these near misses and documented them in the corrective action system.

In the first instance, incorrectly specified oil was added to the emergency diesel generator (EDG). Ten gallons of oil was added that contained a high zinc concentration (1200 ppm) versus the specified oil that contained 0 ppm zinc. CAP T1999-0307 was written to document the inadvertent oil addition. After operations shift supervision initially declared the EDG operable, the system engineer was contacted five hours later. The system engineer's review required an evaluation for silver bearing components in the EDG that would be adversely affected by the zinc. The subsequent analysis determined that no silver bearing components were present. The operations shift supervisor, when initially declaring the EDG operable, was unaware of the zinc/silver concern.

In the second instance, operators changed a PMT for fire pump repair activities that had been originally specified by a qualified welding engineer. Operators did not consult the welding engineer prior to implementing the change. The operators changed the original one hour pressurization and visual inspection of the repair to a 10 minute operational test. The welding engineer was contacted after the revised PMT was performed and the equipment was restored to service; the engineer subsequently determined the revised PMT was acceptable. CAP 1999-1175 was documented for this item.

These are two PMT examples of initial operability determinations that were incomplete and did not involve appropriate technical review.

c. Conclusions

Overall, GPUN appropriately identified problems and entered the deficiencies into the CAP as required with one notable exception related to operating a decay heat removal pump in a manner inconsistent with approved procedures. This Severity Level IV Violation, for failing to perform the activity in accordance with approved procedures, is being treated as a Non-Cited Violation. Deficiencies entered into the corrective action system were properly classified and prioritized. Material non-conformance reports (MNCRs) were not well integrated into the Corrective Action Program, as they focus on material defects with the result that human performance issues have not always been identified. The team observed occasional deficiencies with operability and reportability determinations that were incomplete and did not include an appropriate technical review.

P2 Root Cause Evaluations

a. Inspection Scope (40500/71152)

The team reviewed approximately 140 CAPs to assess whether root cause or apparent causes were properly assigned. The team also reviewed the adequacy of the root cause evaluations associated with these CAPs through a review of CAP documents and interviews with cognizant personnel.

b. Observations and Findings

CAPs that were characterized as Significant Problem Report (SPR), required root cause evaluations to be performed. CAPs that were characterized as Material Non-conformance Reports (MNCR) or Problem Reports (PR), did not require root cause analyses to be performed. Instead, apparent causes were assigned. The root cause evaluation (RCE) process is governed by the RCE Procedure 1000-ADM-7216.02, Revision 1, which is used in conjunction with GPU Nuclear Root Cause Handbook. In general, the root cause evaluations reviewed followed this guidance. Cause evaluations received appropriate attention commensurate with risk, and the details and accuracy of the analyses were acceptable. For example:

CAP T1999-0722 was designated a Significant Problem Report and involved incomplete control rod insertion during testing. GPUN's root cause evaluation for this problem was extensive and thorough, and resulted in identifying a potential generic concern related to distortion or bowing of the fuel assembly guide tubes. GPUN submitted voluntary License Event Report 50-289/99-011 to describe the details of this issue.

c. Conclusion

Appropriate attention was focused on investigating problem causes commensurate with risk, and the detail and accuracy of the analyses were acceptable.

P3 Corrective Actions

a. Inspection Scope (40500/71152)

Approximately 140 safety significant corrective action process (CAP) corrective actions (CAs) were reviewed to assess completeness of resolving the root cause and preventing recurrence. Interviews with applicable staff were also conducted.

b. Observations and Findings

Two loss of voltage relay contacts identified in the licensee's Generic Letter (GL) 96-01 task effort, requiring a new procedure and testing, were missed and not corrected. These involved loss of offsite power load shedding of river water pumps. The GL 96-01 team disbanded before all CAs were developed and implemented. The licensee's CAP is addressing these missing actions as open CAs.

Post-Maintenance Testing

PMT deficiencies continue to occur two years after a failure to perform a PMT on a power-operated relief valve (PORV) rendered it incapable of operation during an entire operating cycle. This resulted in a severity level III violation (EA 97-533) issued in January 1998. Maintenance self-assessments (SA) in 1998 (3220-PA-98-003) and 1999 (3220-PA-99-001) accurately and effectively identified numerous PMT deficiencies. Programmatic improvements were implemented which included enhanced procedure guidance for PMT specifications, additional training of the maintenance job order planners, and assignment of an SRO to provide additional support to the planning group. NSA audits in 1998 and in 1999 during the recent refueling outage identified that improvements in PMTs have been made, however, weaknesses in planning and scheduling of PMTs still exist.

The inspectors identified the following recent examples where CAs have not been effective in the PMT area. CAPs T1999-0939 and T1999-1000 issued on October 1 and 7, 1999, respectively, were for job orders that did not contain local leak rate testing (LLRT) requirements. This omission was identified and corrected prior to plant startup. However, one of the completed CAs from the 1999 maintenance SA specified a review of all upcoming refueling outage job orders for PMT correctness. This review did not capture these PMT omissions.

CAP T1999-1171 documented radioactive waste valve WDL-V-106 which was returned to Operations for use but did not have valve position limit switches installed. When

Operations used the valve, there was no remote indication of valve position. The PMT specified mechanical maintenance to verify that the valve stroked smoothly with no external leakage. No PMT requirements were listed in the work package for verifying the limit switches were installed and providing proper indication.

Configuration Control

There have been multiple repetitive minor equipment mispositioning events over the last two years. The team reviewed 12 of the associated CAPs, and verified that the individual errors were non-consequential, however, the nature and number of errors represented a concern that more significant errors could result. GPUN Human Performance Review Board trending indicated that the current equipment mispositioning rate is about eight per quarter. The root cause and corrective action efforts to date have not been completely effective as evidenced by the continued occurrence and nature of mispositioning events. GPUN recently performed reviews to identify common causes for the individual events. These reviews identified some potential common causes that were related to human performance and administrative control weaknesses. Station management recognized this area as a challenge that is continuing to be reviewed by the Human Performance Review Board.

c. Conclusions

Corrective actions were effective in focusing on resolution of the identified root cause and prevention of significant problem recurrence. Corrective actions were generally completed in a timely manner consistent with the safety significance of the issue. Corrective actions associated with some minor problems were not completed in a timely manner and other minor problems, despite completion of the assigned corrective actions, continued to occur.

P4 Trending/Extent of Condition

P4.1 Trending

a. Inspection Scope (40500/71152)

Approximately 140 problem reports, 90 self-assessments, and 1998 and 1999 meeting minutes of the Human Performance Review Board were reviewed to assess the adequacy of trending problem reports. In addition, interviews were conducted with selected licensee employees.

b. Observations and Findings

The Human Performance Review Board (HPRB) meets monthly to provide a review of CAP program trending and seek solutions to human performance problems. Since May 1998 through October 1999, the HPRB has developed an “Event Free Behavior” poster for site-wide distribution in response to repetitive valve mispositioning events. Few actions have been taken by the HPRB during this 18 month time period, although the principal cause of CAPs identified have been poor work practices (human performance issues). Trends have also identified repeat valve mispositionings (32/year). Over the past 2 years, one adverse trend theme has been selected and evaluated approximately

every other month for trend exploration and review. Quarterly CAP trending by cause, system, department, and backlog are routinely provided.

c. Conclusions

Overall, problems were being identified and captured in one of the tracking database systems at the site and the CAP system was appropriately utilized to capture adverse trend results.

P4.2 Extent of Condition

a. Inspection Scope (40500/71152)

The inspectors reviewed approximately 140 CAPs to assess the adequacy of the extent of condition reviews performed. In addition, interviews were conducted with selected licensee employees.

b. Observations and Findings

Most extent of condition reviews were generally effective in identifying associated concerns and implementing appropriate corrective actions. However, the inspectors identified one example of inadequate extent of conditions.

CAP T1999-0479 indicated that during a scheduled surveillance test, the Station Blackout (SBO) diesel generator river water cooling valves failed to open upon receipt of a start signal. A root cause evaluation was performed. Repairs were made and a subsequent surveillance test was performed satisfactorily. However, while the CAP accurately and effectively described the problem, root cause and corrective actions, no documentation was found for the extent of condition. Interviews with the cognizant component engineer indicated that an extent of condition review was informally performed, but not documented. The component engineer planned to update the CAP extent of condition.

c. Conclusions

Most extent of condition reviews were generally effective in identifying associated concerns and implementing appropriate corrective actions.

P5 Self-Assessments/Operating Experience

a. Inspection Scope (40500/71152)

The team reviewed approximately 200 departmental self-assessments conducted during 1998 and 1999 by operations, maintenance, engineering, radiation protection, security, and emergency planning organizations. In addition, approximately 30 NSA and Independent Onsite Safety Review Group (IOSRG) audits were also reviewed over the same time period. In addition, interviews were conducted with members of the NSA and plant department staff. The 1999 industry and TMI experience data was reviewed within the context of the Operational Experience Feedback Program to assess its scope and utility with respect to the Corrective Action Program.

b. Observations and Findings

Department Self-Assessments

Engineering self-assessments were adequate in technical content, sufficiently probing and constructively critical.

Physical protection program contained more than 28 self-assessments for 1998 and 1999. Most have no negative findings and no CAPs were issued as a result.

An emergency preparedness self-assessment dated 12/31/98, evaluated the effectiveness of the offsite notification process and resulted in 4 action items. A CAP was initiated to track completion of these action items. This was an adequate self-assessment.

Routine maintenance self-assessments were shallow and narrowly focused. Rarely were there any findings or recommendations.

Based on 15 Operations self-assessments, overall quality and depth of self-assessments was weak. Many assessments were shallow and narrowly focused. Useful findings/recommendations were typically not identified. Lack of departmental/individual ownership in the program was evident. Tracking of recommendations was not clearly defined. Response to self-assessment recommendations was very low priority. Self-assessments were not typically used as a tool by operations. For example, Assessment No. 3211-OB-99-005 was conducted to gauge employee familiarity with a temporary red tag removal procedure. The assessment team developed a survey and provided it to only one shift of maintenance and operations personnel, and did not perform any independent tag verifications. The corrective action consisted of a voice mail to training to emphasize the weak areas (recommendation was closed based upon the voice mail). The report noted a strength that every one of the shift workers willingly participated in the survey. The inspection team considered this assessment to be shallow and not performance-based.

NSA Audits

NSA audits conducted during the last 2 years were generally detailed, were thorough reviews, focused on safety important areas, and resulted in the identification of many minor deficiencies that resulted in CAPs. The team did not identify any discrepancies during our review.

An Independent Onsite Safety Review Group (IOSRG) fire protection program assessment, dated June 3, 1999, was very detailed, broad and resulted in significant recommendations.

Operational Experience Feedback

Implementation of the Operational Experience (OE) Feedback Program is accurately reflected in procedure 1086, “Industry Operating Experience Review Procedure”. Current OE program data was derived from: INPO Significant Operating Experience Reports, INPO Significant Event Reports, 10 CFR Part 21 Notifications, NRC

Information Notices, EPRI related information, and site issues including Corrective Action Items.

Interviews with selected working level personnel and management identified strong managerial support for the OE Program. The licensee maintains a large and current OE database that allows for the documentation of initial screening results, actions assigned as a result of the item, and documentation of resolution or disposition of the item. This OE Program ties significant items to the generation of CAPs based on management determination and OE process reviews. All incoming items are also routed to the training group for evaluation for program impact and as examples for training.

c. Conclusions

Departmental self-assessments varied in quality and depth. While engineering self-assessments were generally probing and self critical, operations and maintenance self-assessments were shallow, narrowly focused, and not regarded as a tool for performance improvement. Quality assurance assessments supplied by NSA and IOSRG provided excellent reviews of important areas. Operating experience information was of broad scope, was appropriately tied into the corrective action program, and this program area was annually assessed.

P6 Resolution of Non-Cited Violations

a. Inspection Scope (71152)

Three non-cited violations were reviewed to determine the adequacy and completeness of problem evaluation and resolution.

b. Observations and Findings

NCV 99-02-01 addressed an improperly configured Thermo-Lag fire barrier constituting a violation of the fire protection program. The corrective actions were addressed in CAP T1998-0489. The team reviewed the status of the corrective actions and noted that as of November 22, 1999, the licensee completed all corrective actions with the exception of one item that was under construction during the inspection. The team found the licensee has allocated the necessary resources to complete barrier IAXD-FB01 as scheduled. This NCV was appropriately resolved.

NCV 98-02-02 (CAP T1998-0112). This was due to an event on May 23, 1998, when both trains of the reactor building spray system were unavailable due to a problem with a control room push-button for one train while the other train was removed from service for surveillance testing. This CAP was closed, found to be properly resolved and corrected, and no deficiencies were identified.

NCV 99-04-12 (CAP T1999-0939). GPUN identified in May 1999 that the 2B emergency feedwater (EFW) pump outboard bearing had failed and the pump was unable to perform its safety function for longer than the TS allowed out-of-service time of 72 hours. This inspection determined that a good root cause evaluation had been performed and the extent of condition included all other pumps site-wide. No deficiencies were identified.

c. Conclusions

There were no identified deficiencies relative to the disposition of non-cited violations.

V. Management Meetings

V1 Exit Meeting Summary

The team presented the inspection results to members of licensee management at the conclusion of the inspection in a meeting on December 8, 1999. The licensee acknowledged the findings presented without comments. The licensee did not indicate that any of the information presented at the exit was proprietary.

PARTIAL LIST OF PERSONS CONTACTED

GPU Nuclear

A. T. Asenpota	Manager Modification
D. Atherholt	Manager Operations
R. Barley	Manager Component Engineering
E. Frederick	Corrective Action Program Coordinator
R. Fraile	AmerGen
E. Fuhrer	Manager Nuclear Safety and Licensing
C. Hartman	Manager System Engineering
D. Hoskings	Manager Nuclear Safety Assessment
C. Incorvati	Manager Maintenance Support
M. G. Kapil	Manager EP&I
R. Knight	Licensing Engineer
J. Langenbach	Vice President and Director TMI
W. Lopkoff	Root Cause and Self-assessment Coordinator, NSA
A. Miller	Licensing Engineer
M. Press	NSA Lead Assessor
S. Queen	Manager System Engineering
M. Ross	Director of Operations and Maintenance
J. Schork	PRG Chairman
G. R. Skillman	Director, Configuration Control
J. Telfer	Director of Radiation Control
J. Tesner	System Engineer
P. Walsh	Director Equipment Reliability
R. Warren	IOSRG Engineer
John Tesmor	Plant System Engineer
Harvey Tennis, Jr.	Technician-Electrical

AmerGen

J. B. Cotton	Transition Team
R. Fraile	

NRC

W. Schmidt	Sr. Resident Inspector
C. Smith	Resident Inspector

INSPECTION PROCEDURES USED

IP 40500	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems

ITEMS OPENED, CLOSED AND DISCUSSED

Opened & Closed

50-289/99-09-01	NCV	The failure to implement procedures regarding operating the decay heat system pump to drain the reactor coolant hot leg was a violation of Technical Specification 6.8.1 (Procedures) and was appropriately resolved in the licensee's corrective action program.

Closed

50-289/98-08-02	IFI	Failure of ESAS Relays to Properly Re-energize.

LIST OF ACRONYMS USED

CA	Corrective Actions
CAP	Corrective Action Process
CFR	Code of Federal Regulations
CGD	Commercial Grade Dedication
DBD	Design Basis Document
DCP	Design Change Package
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
EFW	Emergency Feedwater
EPRI	Electric Power Research Institute
ESAS	Engineered Safeguards Actuation System
ETTS	Electronic Task Tracking System
GL	Generic Letter
GPUN	General Public Utilities Nuclear
HPRB	Human Performance Review Board
ICCW	Intermediate Closed Cooling Water
IOSRG	Independent Onsite Safety Review Group
LER	Licensee Event Report
LLRT	Local Leak Rate Test
LOCA	Loss of Coolant Accident
MNCR	Material Non-Conformance Report
MTAN	Maintenance Trend Action Notice
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NSA	Nuclear Safety Assessment
OE	Operating Experience
OER	Operating Experience Report
PMT	Post-Maintenance Test
PORV	Power Operated Relief Valve
PR	Problem Report
PRA	Probability Risk Assessment
PRG	Plant Review Group
RCE	Root Cause Evaluation
SA	Self-assessment
SBO	Station Blackout
SPR	Significant Problem Report
UFSAR	Updated Final Safety Analysis Report