February 17, 2000

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

SUBJECT: NRC INTEGRATED INSPECTION REPORT NO. 05000289/1999011

Dear Mr. Cotton:

On January 15, 2000, the NRC completed an integrated inspection at your Three Mile Island Unit 1 reactor facility. The enclosed report presents the results of that inspection which the resident inspectors discussed with you and your staff during the January 26, 2000 exit meeting.

Your staff operated the unit safely during the inspection period. Conduct of operations and maintenance was generally good. Your staff responded well to a partial loss of offsite power caused by problems with the non-safety related auxiliary transformer fault pressure trip circuit. An auxiliary operator performed well in identifying and correcting a loss of flow through both condenser offgas radiation monitoring instruments. We noted lapses in the review of a special temporary procedure on the emergency feedwater steam supply system and with the planning, control, and coordination of fire protection system work. Performance in the area of solid radioactive waste management and transportation of radioactive materials continued to be effective.

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).

No reply to this letter is necessary. We appreciate your cooperation.

Sincerely,

/RA/

John F. Rogge, Chief
Projects Branch 7
Division of Reactor Projects

Docket No.: 05000289
License No.: DPR-50

Enclosure: NRC Inspection Report No. 05000289/1999011

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REGION 1

Docket No.	05000289
License No.	DPR-50
Report No.:	1999011
Licensee:	AmerGen Energy Company, LLC (AmerGen)
Facility:	Three Mile Island Station, Unit 1
Location:	PO Box 480 Middletown, PA 17057
Dates:	December 5, 1999 through January 15, 2000
Inspectors:	Wayne L. Schmidt, Senior Resident Inspector Craig W. Smith, Resident Inspector John R. McFadden, Health Physicist, DRS Gregory C. Smith, Senior Physical Security Inspector, DRS
Approved by:	John F. Rogge, Chief Projects Branch No. 7 Division of Reactor Projects

EXECUTIVE SUMMARY

Three Mile Island Nuclear Power Station
Report No. 05000289/1999011

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a six week period of resident inspection supplemented by regional health physics and security specialists.

On December 20, 1999, GPU Nuclear Inc. (GPUN) transferred the license of Three Mile Island Unit 1 (TMI) to AmerGen Energy, LLC (AmerGen). GPUN, and then AmerGen, operated TMI at 100 percent power throughout the inspection period with the exception of a brief power reduction to 85 percent, on December 31, 1999, to support electrical grid requirements in preparation for the Year 2000 (Y2K) rollover.

Operations

AmerGen developed comprehensive contingency and augmented staffing plans in preparation for the Y2K rollover. Operations department management held briefings with the on-shift operating crew and augmented staff personnel, thoroughly and clearly detailing management expectations, prior to the rollover. AmerGen experienced no abnormal events or unexpected equipment response during the Y2K rollover. (Section O1.1)

The safety related turbine driven emergency feedwater pump unexpectedly started, due to an inadequately reviewed special temporary procedure to reduce seat leakage past the low pressure steam admission valve. No equipment damage occurred. AmerGen addressed two minor steam trap configuration issues identified by the NRC during a subsequent system walkdown. (Section O1.2)

An auxiliary operator properly identified a no flow condition and restored flow to both condenser offgas radiation monitors, within the Offsite Dose Calculation Manual (ODCM) allowed out-of-service time. However, poor control room communications, or a lack of understanding of ODCM requirements, caused the shift manager not to be informed of the no flow condition or the corrective actions taken for over two hours. The shift manager and AmerGen management took appropriate actions to ensure that condensation in the sample lines did not cause a repeated loss of flow condition, however a specific root cause for the abnormal buildup of condensation in the process sample lines could not be determined. (Section O1.3)

The plant electrical system responded as designed to the trip of the non-safety related A auxiliary transformer and partial loss of offsite power. Operators responded well to the annunciated alarms and loss of injection flow to the reactor coolant pump seals. The cause of the transformer trip was an electrical short, caused by moisture intrusion, in the non-safety related fault pressure trip circuit cabinet. The moisture intrusion resulted from a lack of cabinet weatherproofing following a modification made during the Fall 1999 refueling outage. (Section O1.4)

Maintenance

Two lapses were identified in the planning, conduct, and coordination of fire protection maintenance activities in conjunction with AmerGen removing from service the Intermediate Building fire service header for planned maintenance. The risk of the maintenance was low because manual actions could have restored the system. The failure to follow approved fire protection and risk assessment procedures constituted a violation of minor significance not subject to formal enforcement action. (Section M1.1)

Engineering

The safety evaluation and abnormal transient procedure changes prepared to support securing the building spray system, at the point of borated water storage tank depletion and low pressure injection swapover to the reactor building recirculation sump, adequately addressed the changes in containment pressure and temperature response and appropriately considered single failures. (Section E1.1)

GPUN's failure to correctly translate the UFSAR seismic design requirements into the pressurizer support design was an isolated case and constituted a violation of minor significance not subject to formal enforcement action. (Section E8.3)

Plant Support

The solid radioactive waste management program continued to be effective based on proper implementation of the program by knowledgeable personnel, the existence of appropriate procedures and controls, and the acceptable condition of facilities and equipment. (Section R1.1)

The program to transport low level radioactive waste and other radioactive materials was effective. The shipping manifests and supporting documentation were properly prepared. Radiation and contamination limits were met. Waste was properly classified, and shipments were properly typed as to their Department of Transportation (DOT) class. (Section R1.2)

The NRC and DOT training and retraining requirements for the personnel involved in solid radioactive waste management and the shipment of radioactive waste and materials were implemented in an effective manner. The lesson plans, training materials, and training records were readily available, appropriate, well organized, and well documented. (Section R5)

Quality assurance activities were effective. The audit performed as required by technical specifications was appropriate in scope and depth. The Monitoring Reports were appropriately detailed and comprehensive in that they covered the full scope of each monitored evolution. (Section R7)

Based on a limited review of the security program changes, as described in the plan revision, no NRC approval of these changes is required, in accordance with 10 CFR 50.54(p). These changes will be subject to future inspection to confirm that the changes, as implemented, have not decreased the overall effectiveness of the security plan. (Section S3)

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Report Details

Summary of Plant Status

On December 20, 1999, GPU Nuclear Inc. (GPUN) transferred the license of Three Mile Island Unit 1 (TMI) to AmerGen Energy, LLC (AmerGen). GPUN, and then AmerGen, operated TMI at 100 percent power throughout the inspection period with the exception of a brief power reduction to 85 percent, on December 31, 1999, to support electrical grid requirements in preparation for the Year 2000 (Y2K) rollover.

I. Operations

01 Conduct of Operations (71707)

O1.1 Year 2000 Contingency Plans

a. Inspection Scope

The inspectors observed AmerGen's preparations for and were present in the TMI control room during the Y2K rollover .

b. Conclusions

AmerGen developed comprehensive contingency and augmented staffing plans in preparation for the Y2K rollover. Operations department management held briefings with the on-shift operating crew and augmented staff personnel, thoroughly and clearly detailing management expectations, prior to the rollover. AmerGen experienced no abnormal events or unexpected equipment response during the Y2K rollover.

O1.2 Inadvertent Emergency Feedwater Pump Start During Testing

a. Inspection Scope

On December 21, 1999, the inspector observed the conduct of a special temporary procedure (STP) to reduce seat leakage past a low pressure steam admission valve to the turbine driven emergency feedwater pump (EF-P-1).

b. Observations and Findings

During the STP, EF-P-1 unexpectedly started when operators cycled open the low pressure steam admission valve. The STP did not anticipate the start of the pump because the steam isolation valve upstream of the admission valve had been shut. However, the STP did not vent off the isolated steam pressure prior to opening the steam admission valve.

EF-P-1 came up to rated speed and recirculated water, through the normally open minimum flow line, back to the condensate storage tank. No water was pumped to the once through steam generators (OTSGs). The operator immediately shut the steam admission valve, securing EF-P-1.

The inadvertent start of the safety related EF-P-1 did not result in any equipment damage, however this event pointed out a lapse in AmerGen's review and approval process for STPs. AmerGen entered this event into its corrective action process (CAP) as event number T1999-1279.

When the low pressure steam admission valve opened, a minor steam leak developed when the steam trap drain valve attached to the steam header leaked by its seat to an adjacent floor drain. The steam trap functions to prevent condensation from building up in the normally isolated steam admission header and entering the EF-P-1 turbine. The operators submitted a work request to repair the leaking drain valve. In the intervening time, until the drain valve could be fixed, the operators bypassed the steam trap and drain valve by throttling open the installed bypass valve and removed the steam trap and drain valve from service by closing and danger tagging the isolation valves. The operators believed that this would provide an adequate drain path for condensation from the steam header.

During a subsequent system walkdown, the inspectors noted two configuration control issues with the steam trap lineup. First, the operating and surveillance test procedures for EF-P-1, because of the leaking steam admission valve, required that the trap drain valve be operated prior to pump start to measure and drain condensation that collected in the steam admission header. This could not be accomplished with the drain valve tagged out. Second, the piping configuration, with the trap bypass line elevation above the top of the steam admission header, did not provide the same capability for removing condensation from the steam admission header, when steam pressure was not present. The operations department cleared the danger tags and periodically drained the steam line manually, until the trap drain valve was repaired. The inspectors considered these configuration issues to be of low safety significance. Operability was not effected since EF-P-1 starts on the high pressure steam admission valves and the trap bypass would have functioned to drain water from the line with steam pressure, before the low pressure admission valves were opened. AmerGen entered these steam trap issues into the CAP as event number T2000-0038.

c. Conclusions

The safety related turbine driven emergency feedwater pump unexpectedly started, due to an inadequately reviewed STP to reduce seat leakage past the low pressure steam admission valve. No equipment damage occurred. AmerGen addressed two minor steam trap configuration issues identified by the NRC during a subsequent system walkdown.

O1.3 Loss of Flow to Both Condenser Off-Gas Radiation Monitors

a. Inspection Scope

The inspector reviewed that actions taken following auxiliary operator (AO) identification, during normal shift checks, of no flow indicated through either condenser offgas radiation monitors (RM-A-5 and RM-A-15). RM-A-5 and RM-A-15 provide early indication of a primary to secondary leak in the OTSGs. Offsite Dose Calculation Manual (ODCM) Table 2.1-2 requires both detectors be operable. The ODCM provides allowed out-of-service times of up to 28 days if one detector is inoperable and no greater than one hour if both detectors are inoperable. If the allowed out-of-service times are exceeded, the ODCM specifies that the Technical Specification (TS) 3.0.1 applies. TS 3.0.1 would then require that the unit be placed in hot shutdown within 6 hours.

b. Observations and Findings

Following identification, the AO reestablished flow to both detectors within 10 minutes by blowing condensation from the process sample lines through the installed system piping. The one hour ODCM allowed out-of-service time was not challenged, and TS 3.0.1 did not need to be entered.

Although the AO informed the control room of the loss of flow to both detectors, there was a delay of over two hours until the shift manger was informed of the situation. Once informed, the shift manager immediately recognized the potential ODCM impact and directed hourly blowdown of the condensation and the reporting of flow readings to the control room for both detectors. Readings are normally taken each shift and recorded on the AO log sheet. The condition did not repeat, and the time period between blowdowns and readings was gradually increased over the next several weeks back to once per shift. AmerGen could not determine a specific root cause for this loss of flow, other than an abnormal buildup of condensation in the process sample lines.

Although the shift manager responded appropriately when informed of the situation, the inspectors found the control room operating staff's initial lack of response to the loss of flow to both condenser offgas radiation monitors could indicate a weakness in their knowledge of the requirements contained within the ODCM. AmerGen entered this event into the CAP as event number T1999-1282.

The inspectors were concerned that the increased moisture in the sample lines, resulting in the loss of flow, could accumulate in the detectors and result in a non-conservative indication of condenser offgas radiation levels. Both detectors were subsequently opened and inspected with no evidence of significant moisture accumulation.

c. Conclusions

An AO properly identified a no flow condition and restored flow to both condenser offgas radiation monitors, within the ODCM allowed out-of-service time. However, poor control room communications, or a lack of understanding of ODCM requirements, caused the shift manager not to be informed of the no flow condition or the corrective actions taken for over two hours. The shift manager and AmerGen management took appropriate actions to ensure that condensation in the sample lines did not cause a repeated loss of flow condition, however a specific root cause for the abnormal buildup of condensation in the process sample lines could not be determined.

O1.4 Partial Loss of Offsite Power due to an Auxiliary Transformer Fault Pressure Signal

a. Inspection Scope

The inspectors observed operator response to the January 10, 2000, partial loss of offsite power caused when the non-safety related A auxiliary transformer tripped on its fault pressure relay.

b. Observations and Findings

The plant and switchyard electrical systems performed as designed. The trip of the A auxiliary transformer resulted in fast transfer of two reactor coolant pumps and two balance of plant 4160 volt buses to the remaining B auxiliary transformer. The E emergency safeguards bus deenergized and properly isolated itself from the A transformer on an undervoltage condition. The B emergency diesel generator (EDG) automatically started and reenergized the bus.

Control room operators responded well to the transient, including the expected loss of the operating makeup pump and reactor coolant pump seal water injection flow. Seal injection flow was restored within two minutes, after verifying adequate cooling to the reactor coolant pump radial bearings.

AmerGen determined that the auxiliary transformer tripped due to a failure in the fault pressure trip circuit and that the transformer was not damaged. The cause of the failure in the fault pressure trip circuit was moisture intrusion into the trip circuitry resulting in an electrical short and generation of a trip signal. During the Fall 1999 refueling outage, GPUN made modifications to the non-safety related fault pressure trip circuit that required holes to be drilled in the trip circuit cabinet to mount additional terminal strips. The holes were not weatherproofed to prevent moisture intrusion from the environment. The cabinet is located outside, adjacent to the auxiliary transformer.

The plant continued to operate at 100 percent power throughout the event, with the B EDG supplying the E emergency safeguards bus independent of an offsite power source. The fault pressure trip circuit was repaired and the plant was restored to a normal electrical line-up in approximately 11 hours. Prior to returning the auxiliary transformer to service, AmerGen implemented a procedure change to defeat the fault pressure trip device for both auxiliary transformers. The safety determination for the procedure change stated the fault pressure trip device was a backup to the fault pressure relays and that the slight increase in the risk of damage to the non-safety related auxiliary transformers was acceptable to obtain an improvement in reliability of offsite power. A failure of the fault pressure trip device on the B auxiliary transformer in June 1999 resulted in a partial loss of offsite power. AmerGen entered the January 10, 2000, event into the CAP as number T2000-0018.

c. Conclusions

The plant electrical system responded as designed to the trip of the non-safety related A auxiliary transformer and partial loss of offsite power. Operators responded well to the annunciated alarms and loss of injection flow to the reactor coolant pump seals. The cause of the transformer trip was an electrical short, caused by moisture intrusion, in the non-safety related fault pressure trip circuit cabinet. The moisture intrusion resulted from a lack of cabinet weatherproofing following a modification made during the Fall 1999 refueling outage.

08 Miscellaneous Operations Issues (92901)

O8.1 (CLOSED) Licensee Event Report 1999012-00: Main Steam Isolation Valve Motor Operator Failure

On October 19, 1999, during a plant startup, the operators manually opened main steam isolation valve 1B (MS-V-1B) after a motor operator failure. Inspection Report (IR) 99-08 discussed the manually opening of the valve and its inability to be remotely closed from the control room, in detail (Non-cited Violation 99-08-03), including a GPUN commitment to review the TS for Type III containment isolation valves, to determine if any additional TS requirements were necessary.

GPUN submitted Licensee Event Report (LER)1999012-00 on November 17, 1999. This LER adequately discussed the event, the root cause, the safety consequence and corrective actions taken and planned. In their planned corrective action, GPUN committed to complete an evaluation of the operability and reportablity of Type III containment isolation valves, by June 2000. GPUN entered this issue into the CAP as event T1999-1086.

O8.2 (CLOSED) Licensee Event Report 1999010-00: Discovery of a Condition Outside the Updated Final Safety Analysis Report for Flood Protection

The inspectors reviewed GPUN's actions in response to discovering several floor drains that connected a non-flood protected area of the Intermediate Building to a flood protected area, the Fuel Handling Building. The event was identified as a part of AmerGen's corrective actions developed in response to a previous similar event documented in LER 1999005-00 and discussed in IR 99-04. AmerGen took actions to revise the flood emergency procedure to include actions for operators to install seal plugs in the affected floor drains. This condition was of low safety significance. In the unlikely event of a maximum design basis flood, operators would have received indications of rising sump levels within sufficient time to take actions to protect safety related equipment.

GPUN's identification of a condition outside the updated final safety analysis report (UFSAR) design basis flood protection requirements constituted a violation of minor significance not subject to formal enforcement action. GPUN entered this flood protection issue into the CAP as event T1999-0679.

O8.3 (CLOSED) Licensee Event Report 1999009-00: Automatic Start of Emergency Diesel Generator 1A Due to Failure of a Fault Pressure Relay on Auxiliary Transformer 1B

LER 1999009-00 discussed the circumstances and corrective actions taken in response to the automatic start of the A EDG following the trip of the B auxiliary transformer on June 26, 1999. This event was discussed in IR 99-04. GPUN entered the event into the CAP as event number T1999-0516. Corrective actions included modifications to the fault pressure relay circuit and improved calibration testing of the fault pressure trip device.

During the event, two minor equipment anomalies were identified. Condensate pump 2C (CO-P-2C) unexpectedly tripped on fast transfer of the balance of plant (BOP) electrical loads to the remaining auxiliary transformer and the non-safety related secondary river pump 1A (SR-P-1A) failed to trip as expected on the loss of the engineered safeguards electrical bus and loaded onto the A EDG. GPUN concluded the most likely cause for CO-P-2C tripping was transient electrical current surges resulting from the fast transfer of the BOP electrical loads.

The failure of SR-P-1A to trip on a loss of bus voltage was caused by a cut wire in the breaker control circuit which prevented the loss of voltage trip relay from providing a non-safety related breaker trip function. However, the breaker's safety related trip function, for a design basis accident, a loss of coolant accident (LOCA) with loss of offsite power, remained operable through a separate engineered safeguards trip device. The cut wire most likely occurred during a modification to the pump control circuit in 1988. NRC IR 1999009 addresses GPUN's failure to test the non-safety related loss of voltage relay. GPUN identified the wiring and testing issues as CAP event number T1999-0704.

The inspectors found GPUN's actions in response to the failure of the B auxiliary transformer and the two minor equipment anomalies that resulted to be adequate. The two minor equipment issues did not result in any conditions outside the design basis of the plant. However, the inspectors noted that the modifications made to the fault pressure relay circuit in response to this event contributed to subsequent trip of the A auxiliary transformer on January 10, 2000 (Section O1.2).

II. Maintenance

M1 Conduct of Maintenance (62707)

M1.1 Failure to Follow Procedures While Isolating Fire Service Header for Maintenance

a. Inspection Scope

The inspectors reviewed the actions taken by AmerGen, on January 10, 2000, when the fire service header supplying the fire hose stations in the Intermediate Building was removed from service for planned maintenance.

b. Observations and Findings

The inspectors identified several issues during the conduct of this maintenance activity:

- A fire hose was not routed to the unprotected area as required by the AmerGen Administrative Procedure (AP) 1038, Fire Protection Program. A sufficient length of fire hose was staged at an operable fire hose station in an adjacent maintenance shop. Prior to removing the Intermediate Building fire service header from service, the shift manager discussed the appropriate compensatory measures to be taken with a fire protection engineer. They determined that staging the fire hose was acceptable because routing the fire hose to the unprotected area would require breaching the access door into the Intermediate Building, which serves as both a fire barrier and security door. However, AP 1038 did not allow such deviations from the requirement of routing a fire hose to the unprotected area when taking the installed fire service header out of service for greater than one hour.

- The inspectors noted that the fire impairment log entry made by the control room operator when the fire service header was taken out of service was in error. It stated that a fire hose had been routed to the unprotected area in the Intermediate Building, when in fact it was only staged in an adjacent building.

- A risk management evaluation was not prepared prior to taking the fire service header out of service as required by AmerGen AP 1070, TMI Maintenance Plan. A risk document was procedurally required for two reasons. First, the job order packages for the maintenance tasks to be performed were evaluated in the planning process as requiring risk management evaluations. Second, the fire service header in the Intermediate Building serves a Maintenance Rule risk significant function as the back-up cooling water supply to the A and B instrument air compressors. AP 1070 required that tasks that cause a risk significant system to be removed from service in a manner which prevents it from performing its risk significant function shall have a risk management evaluation performed.

The inspectors found these issues indicated a lapse in AmerGen's performance in the planning, conduct, and coordination of fire protection maintenance activities. The risk significance of the maintenance was low because it involved repacking two readily accessible fire service valves located in the Turbine Building. Had the need arose, operators could have quickly restored the Intermediate Building fire header to service through manual actions.

The failure to follow approved procedures, in two instances, during conduct of fire protection system maintenance that removed the Intermediate Building fire service header from service constituted a violation of minor significance not subject to formal enforcement action. AmerGen entered these procedural violations into the CAP as event T2000-0010.

c. Conclusions

Two lapses were identified in the planning, conduct, and coordination of fire protection maintenance activities in conjunction with AmerGen removing from service the Intermediate Building fire service header for planned maintenance. The risk of the maintenance was low because manual actions could have restored the system. The failure to follow approved fire protection and risk assessment procedures constituted a violation of minor significance not subject to formal enforcement action.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (CLOSED) Licensee Event Reports 1999007-00 and 1999007-01: Voluntary Licensee Event Report Regarding Increasing Failure Rate of Engineered Safeguards Actuation System Relays

GPUN submitted LERs 1999007-00 and 1999007-01 to document an increasing failure rate of engineered safeguards actuation system (ESAS) relays. IR 99-09 discussed the past failure history, root cause analysis, and corrective actions taken by GPUN in response to the ESAS relay failures and concluded GPUN's actions were adequate and appropriate. Based on those findings, these LERs are closed.

M8.2 (CLOSED) Unresolved Item 98-09-02: Review Root Cause Analysis and Corrective Actions for Repeated Decay Heat River Strainer Clogging

IR 98-09, documented the January 1999 clogging of the A decay heat river (DR) system strainer and the subsequent actions taken by GPUN to return the strainer to an operable condition. This Unresolved Item (URI) was open pending review of the root cause analysis and corrective actions following the strainer clogging. GPUN documented the event, the root cause analysis, and the corrective actions in CAP T1999-0066.

In review of CAP T1999-0066, the inspector found the root cause analysis acceptable, determining that the clogging was most likely caused by pump discharge head that was lower that the strainer design. This lower discharge head would limit the differential pressure available to backwash debris off the strainer. The A pump discharge pressure was on the order of 13 psig, while on the B pump discharge pressure was about 15 psig. GPUN installed new, higher discharge head DR pumps in the Fall 1999 refueling outage. Following new pump installation, the discharge pressure on both pumps was above 20 psig, which was the optimum pressure for backwashing the strainers. It should be noted that GPUN also disassembled each DR strainer during the outage and found no deficiencies. GPUN planned to conduct testing to determine if any significant flow conditions contributed to a preferential flow of river debris to the A DR pump when river conditions permit. These flow testing items were open and being tracked as corrective action on CAP T1999-0066. The inspectors identified no violations of NRC requirements and closed this URI.

M8.3 (CLOSED) Inspection Followup Item 98-08-01: Improper Isolation of Reactor Coolant Pump Leakoff Flow Instrument

In December 1998, Instrument and Control (I&C) technicians improperly isolated a reactor coolant pump seal leakoff flow transmitter causing seal water to flow to the reactor coolant drain tank. The corrective actions taken on this issue, as documented in CAP T1998-1104, were adequate to provided enhanced procedural guidance to the I&C technicians on how to isolate these transmitters, also the operators were provided with training on the isolation of these instruments. This Inspection Followup Item (IFI) was closed.

III. Engineering

E1 Conduct of Engineering (37551)

E1.1 Safety Evaluation for Changes in Building Spray System Operation

a. Inspection Scope

The inspectors reviewed the safety evaluation and abnormal procedure revisions that implemented, a change in the operation of the building spray (BS) system in response to a design basis LOCA.

Background:

This change, implemented following the Fall 1999 refueling outage, directed the operators to secure BS flow at the point that the borated water storage tank (BWST) is depleted and low pressure injection (LPI) suction is manually switched to the reactor building recirculation sump. Previously, the BS system would continue to spray into the reactor building, taking a suction from the reactor building sump after the suction swapover.

The change was made to resolve an issue with the operators being procedurally required to throttle BS flow, using unqualified flow instrumentation. The throttling was necessary to ensure adequate LPI pump net positive suction head with both BS and LPI taking suction from the reactor building sump.

BS is automatically initiated by the engineered safeguards actuation system in response to a design basis accident when pressure in the containment exceeds 30 psig. The building spray system is designed to provide containment cooling to limit post-accident building pressure to less than the design value. Sodium hydroxide is mixed with the building spray flow to remove airborne fission products from the containment atmosphere, thus reducing the inventory of fission products available for leakage to the environment.

b. Observations and Findings

Safety Evaluation 000214-014 adequately addressed the changes in containment temperature and pressure response as a result of the change in BS operation. The revised containment response remains bounded by the design basis environment qualification envelope. The safety evaluation appropriately addressed single failure considerations for containment response. The NRC previously documented its review of the offsite dose consequences associated with the change in an NRC safety evaluation issued with TS Amendment 215, dated October 14, 1999.

The inspectors identified a minor discrepancy during the review of the safety evaluation and associated calculations. Calculation C-1101-210-E610-013, BWST Depletion Time for Maximum Hypothetical Accident, lists as an assumption a loss of offsite power concurrent with the LOCA. This was not a conservative assumption for operation of the high pressure injection (HPI) system. With offsite power available, three HPI pumps would be running and deplete the BWST faster than with a loss of offsite power and only two HPI pumps running. Faster depletion of the BWST results in larger offsite doses due to system leakages outside of the containment during the sump recirculation phase of the accident. With three HPI pumps running, the BWST depletes 0.3 minutes faster. This was inconsequential compared to the total BWST depletion time of approximately 28 minutes.

c. Conclusions

The safety evaluation and abnormal transient procedure changes prepared to support securing the BS system, at the point of BWST depletion and LPI suction swapover to the reactor building recirculation sump, adequately addressed the changes in containment pressure and temperature response and appropriately considered single failures.

E8 Miscellaneous Engineering Issues (92903)

E8.1 (CLOSED) Licensee Event Report 1999008-01: Reactor Building Emergency Air Cooling System Outside the Design Basis with Reduced Air Flow

On November 22, 1999, GPUN submitted revision 1 to LER 1999008, concerning the root cause and final corrective action taken to address the clogging of the reactor building emergency coolers (RBEC) with crystalized boric acid. This issue was originally discussed in IR 199903, following GPUN identification of degraded cooler air flow and was finally dispositioned as not being a TS violation in IR 1999008.

In LER 1999008-01, GPUN provided additional information on the clogging of the coolers due to boron from known reactor coolant system leakage during the last operating cycle. Also, GPUN discussed the fact that previously installed RBEC differential pressure indication was not adequate to ensure capability of the coolers to pass their design basis air flowrate. As such, GPUN installed additional differential pressure instrumentation to allow better tracking and trending of differential pressure and air flowrates. This LER is closed.

E8.2 (CLOSED) Licensee Event Report 1999013-00: Improperly Made-up Electrical Connection on a Control Rod Drive Breaker Test Switch

LER 1999013 documents the circumstances and actions taken by AmerGen in response to finding a loose wire in the control circuit for the B control rod drive reactor trip breaker. AmerGen concluded the loose wire resulted from deficient work practices by a maintenance technician while performing a modification to the breaker control circuit during the Fall 1999 refueling outage. AmerGen entered this event into its corrective action process as CAP T1999-1202. This event was discussed in IR 1999010 and was evaluated as a violation of minor significance. This LER is closed.

E8.3 (CLOSED) Unresolved Item 99-03-03 and Licensee Event Reports 1999006-00 and 1999006-01: Inability of Pressurizer Support Bolts to Meet Updated Final Safety Analysis Report Requirements

These open items documented the circumstances and corrective actions taken by GPUN following discovery that the pressurizer support bolts did not meet the UFSAR seismic loading design requirements. GPUN initially identified the potential discrepancy on March 19, 1999, during a design basis documentation review, and entered into the corrective action process as CAP 11999-0264. After engineering design reviews and new calculations, on May 25, 1999, GPUN gathered sufficient data to determine the support bolts were operable, but exceeded the UFSAR seismic loading design

requirements. TMI continued to operate in this condition until the unit was shut down for a refueling outage in September 1999. During the refueling outage, GPUN modified the pressurizer supports to bring them in compliance with the UFSAR design requirements. The inspectors found GPUN's actions, and documentation supporting operability from the time of discovery until the refueling outage, acceptable. GPUN took actions to identify if a similar condition existed on the other reactor coolant system components. No additional concerns were identified.

In reviewing the documentation provided in LER 1999006-00, the inspectors identified a discrepancy in GPUN's submittal with regards to a statement made in the LER about previous NRC review and approval of a seismic response spectrum and damping values, different from those listed in the UFSAR. GPUN could provide no documentation supporting this statement. AmerGen will submit a revision to this LER to correct this discrepancy.

The inspectors found GPUN's failure to correctly translate the UFSAR seismic design requirements into the pressurizer support design was an isolated case and constituted a violation of minor significance not subject to formal enforcement action. The URI and LERs are closed.

E8.4 (CLOSED) Inspection Followup Item 98-02-03: Makeup System Suction Alignment Issues; Licensee Event Report 1998009-00: Potential Loss of High Pressure Injection During Postulated Loss of Coolant Accident Due to Misapplication or Interpretation of Design Inputs; Escalated Enforcement Item 98-05-01: Inadequate Assessment and Correction of Makeup Tank Level Instrument Static Pressure Errors; and Violation 98-06-01: Makeup System Pumps Suction Cross Connect

These issues were related to concerns with the opening of the makeup/high pressure injection (MU/HPI) system pump suction cross connect valves, which were previously, normally closed during plant operation. This change in valve alignment allowed the third makeup pump to potentially be affected by an unknown makeup tank (MUT) low level condition. The inspectors were concerned that, under certain conditions, all three makeup pumps could now be affected by a common mode failure. Prior to opening the makeup cross connect valves, the common mode failure existed for only two of the three MU/HPI pumps. Additionally, GPUN did not properly account for calibration errors of the MUT level instruments that affected the change in the MU/HPI system operation, and corrective actions to resolve this issue were slow.

A violation was issued on October 15, 1998, for opening the cross connect valves, during normal plant operation, without prior NRC approval, as required by 10 CFR 50.59. The NRC concluded that continued operation with the makeup pump suction cross connect valves open did not represent an immediate safety concern. However, changing the system configuration created the possibility for an accident of a different type than any previously analyzed in the UFSAR, in that opening of the MU/HPI pump suction cross connect valves created the possibility for a common mode failure of all three makeup pumps.

On October 29, 1999, GPUN submitted License Change Application (LCA) No. 287 to the NRC. This LCA requested approval of changes associated with operation of the

MU/HPI system. The requested TS changes included the addition of operating limits for MUT pressure and level, the addition of surveillance requirements for the MUT pressure instrument channel, and revision of the calibration frequency for the MUT level instrument channel. This LCA is currently under NRC review.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls (86750)

R1.1 Implementation of the Solid Radioactive Waste Program

a. Inspection Scope

Selective reviews of the availability of documentation of regulatory requirements, the licensee's verification of the license status of organizations to which it ships radioactive material and radioactive waste, applicable procedures, processes, and vendors used for solid waste management, radioactive shipments made since the last inspection, use of scaling factors, radiological housekeeping, and the Process Control Program were performed. Information was gathered through observation of activities, tours of the radiologically controlled areas, discussions with cognizant personnel, and review and evaluation of procedures and documents.

b. Observations and Findings

Knowledgeable and experienced personnel continued to be in charge of the solid waste management program. Up-to-date copies of the applicable NRC and Department of Transportation (DOT) regulations and licenses of facilities to which radioactive waste or materials were shipped, were maintained and available. Detailed procedures were available that addressed solid waste processing and disposal including the use of evaporators for processing liquid waste, handling of spent cartridge filters and spent resin, cement solidification, resin dewatering, and waste storage. The several procedures which separately addressed cement solidification and dewatering for burial constituted the Process Control Program. Since the last inspection in this area, a campaign to ship stored radioactive waste had been conducted. Several shipments of dewatered spent resin for burial and numerous waste shipments to radioactive waste processors for volume reduction had taken place. There was a program to minimize the generation of radioactive waste, and the potentially clean materials collected inside the radiologically controlled area (RCA) were sorted onsite for free release or for shipment to an offsite vendor for processing for volume reduction. The site organization continued to maintain appropriate qualification records for individuals authorized to certify low level radioactive waste and radioactive material shipments. The concentrations of hard-to-measure radionuclides in the various waste streams were addressed by sampling and analysis and were updated periodically per procedure.

Radioactive waste facilities and equipment were being maintained. Open areas and aisleways were uncluttered. Radioactive material and waste were properly labeled and generally were stored in an orderly fashion and in designated areas.

c. Conclusions

The solid radioactive waste management program continued to be effective based on proper implementation of the program by knowledgeable personnel, the existence of appropriate procedures and controls, and the acceptable condition of facilities and equipment.

R1.2 Compliance with NRC and Department of Transportation Regulations for Shipping of Low Level Radioactive Waste for Disposal and Transportation of Other Radioactive Materials

a. Inspection Scope

The inspector selectively reviewed a variety of completed shipping documentation packages. The reviews included documentation for shipments of dewatered resin for burial, filter cartridges for burial, powdered resin for volume reduction, stud-cleaning equipment, contaminated protective clothing and other launderable items for cleaning, and dry radioactive waste for volume reduction. These reviews included the radiation and contamination surveys, the licensee's determination of DOT shipment subtype, packaging, marking, labeling, and placarding requirements, shipping paper requirements, driver's instructions, and emergency response information. Information was gathered through observation of activities, tours of the RCAs, discussions with cognizant personnel, and review and evaluation of procedures and documents.

b. Observations and Findings

The reviewed shipping records were found to be appropriate and complete. The waste classifications and DOT shipment type determinations for these shipments were evaluated and met regulatory requirements. The waste manifests and shipping papers were properly completed. The individual signing the shipping papers and certifying that the materials were properly classified, described, packaged, marked, and labeled in accordance with DOT regulations had been trained and approved for this activity by the site organization. Certifications for burial containers (high integrity containers) and for shipping casks were available. Current regulations and licenses for the entities to whom shipments were sent were on file and readily available.

c. Conclusions

The program to transport low level radioactive waste and other radioactive materials was effective. The shipping manifests and supporting documentation were properly prepared. Radiation and contamination limits were met. Waste was properly classified, and shipments were properly typed as to their DOT class.

R5 Staff Training and Qualification in RP&C Activities (86750)

a. Inspection Scope

The inspector selectively reviewed the periodic training of personnel relative to NRC Bulletin No. 79-19, "Packaging of Low-Level Radioactive Waste for Transport and

Burial," and relative to the Subpart H-Training of 49 CFR 172. Information was gathered through discussions with cognizant personnel and review and evaluation of procedures and documents.

b. Observations and Findings

Training for radioactive waste processing, handling/transferring, packaging, and shipping, covering the NRC and DOT regulatory requirements, and for waste burial site requirements was provided by the completion of a detailed computer-based-training module and a subsequent examination on a three-year periodic basis. Separate training and periodic retraining in the NRC and DOT regulatory requirements for shipping, pertaining to radiological considerations, was provided to radiological control technicians using a lesson plan containing appropriate material. The inspector verified that records were available documenting that these individuals had been trained/retrained in the aforementioned topics within the stated periodic training interval. The lesson plans, training materials, and training records were readily available, well organized, and well documented.

c. Conclusions

The NRC and DOT training and retraining requirements for the personnel involved in solid radioactive waste management and the shipment of radioactive waste and materials were implemented in an effective manner. The lesson plans, training materials, and training records were readily available, appropriate, well organized, and well documented.

R7 Quality Assurance and Self-Assessment in RP&C Activities (86750)

a. Inspection Scope

A selective review was performed of quality assurance activities conducted since the last NRC inspection. Audit Report S-TMI-99-04 and Monitoring Reports 99-8 and 99-9 were reviewed. Information was gathered through discussions with cognizant personnel and review and evaluation of documents.

b. Observations and Findings

Audit Report S-TMI-99-04 covered radioactive waste management activities at the site. The scope and depth of this audit were appropriate. The audit plan was detailed. This audit resulted in one corrective action program item involving the lack of a procedurally-required copy of the computer program abstract for the shipping and disposal programs used at the site. The corrective action for this item was reasonable and timely. The audit also identified a minor deficiency involving a radioactive material inventory card. This deficiency was corrected during the audit. The Monitoring Reports reviewed the preparation of the radioactive material shipment portfolio for two different shipments: Radioactive Material Shipments RS-99-014-1 and RS-99-017-1. Both shipments were classified as >Type A/Low Specific Activity II/Reportable Quantity/Fissile Excepted/Class B/Stable and were dewatered bead resin being shipped for burial. The Monitoring Reports were appropriately detailed and comprehensive in that they covered the full scope of each evolution. No deficiencies were identified.

c. Conclusions

Quality assurance activities were effective. The audit performed as required by technical specifications was appropriate in scope and depth. The Monitoring Reports were appropriately detailed and comprehensive in that they covered the full scope of each monitored evolution.

S3 Security Program Plans (81700)

a. Inspection Scope

The inspector reviewed AmerGen's security program plans.

b. Observations and Findings

An in-office review was conducted of changes to the Three Mile Island Physical Security Plan, identified as Revision 39, submitted to the NRC on May 13, 1999, in accordance with the provisions of 10 CFR 50.54(p).

c. Conclusion

Based on a limited review of the changes, as described in the plan revision, no NRC approval of these changes is required, in accordance with 10 CFR 50.54(p). These changes will be subject to future inspection to confirm that the changes, as implemented, have not decreased the overall effectiveness of the security plan.

V. Management Meetings

X1 Exit Meeting Summary

Following completion of the inspection period, the resident inspectors conducted an exit meeting with AmerGen managers on January 26, 2000. The solid radioactive waste program inspector conducted a separate exit meeting on January 14, 2000. AmerGen staff comments concerning the issues in this report were documented in the applicable report sections. No proprietary information was included.

INSPECTION PROCEDURES USED

IP37551	Onsite Engineering
IP62707	Maintenance Observation
IP71707	Plant Operations
IP71750	Plant Support Activities
IP81700	Security Program Plans
IP86750	Solid Radioactive Waste Management and Transportation of Radioactive Materials
IP92901	Followup - Operations
IP92902	Followup - Maintenance
IP92903	Followup - Engineering

ITEMS OPENED, CLOSED AND DISCUSSED

Opened:

None

Closed:

98-02-03	IFI	Makeup System Suction Alignment Issues
98-08-01	IFI	Improper Isolation of Reactor Coolant Pump Leakoff Flow Instrument
98-09-00	LER	Potential Loss of High Pressure Injection During Postulated Loss of Coolant Accident Due to Misapplication or Interpretation of Design Inputs
98-09-02	URI	Review Root Cause Analysis and Corrective Actions for Repeated Decay Heat River Strainer Clogging
98-05-01	EEI	Inadequate Assessment and Correction of Makeup Tank Level Instrument Static Pressure Errors
98-06-01	VIO	Makeup System Pumps Suction Cross Connect
99-03-03	URI	Inability of Pressurizer Support Bolts to Meet UFSAR Requirements
99-06-00	LER	Inability of Pressurizer Support Bolts to Meet UFSAR Requirements
99-06-01	LER	Inability of Pressurizer Support Bolts to Meet UFSAR Requirements
99-07-00	LER	Voluntary LER Regarding Increasing Failure Rate of ESAS Relays
99-07-01	LER	Voluntary LER Regarding Increasing Failure Rate of ESAS Relays
99-08-01	LER	Reactor Building Emergency Air Cooling System Outside the Design Basis with Reduced Air Flow
99-09-00	LER	Automatic Start of Emergency Diesel Generator 1A Due to Failure of a Fault Pressure Relay on Auxiliary Transformer 1B
99-10-00	LER	Discovery of a Condition Outside the Updated Final Safety Analysis Report for Flood Protection
99-12-00	LER	Main Steam Isolation Valve Motor Operator Failure
99-13-00	LER	Improperly Made-up Electrical Connection on a Control Rod Drive Breaker Test Switch

Discussed:

None

LIST OF ACRONYMS USED

AmerGen	AmerGen Energy Company, LLC
AO	Auxiliary Operator
AP	Administrative Procedure
BOP	Balance of Plant
BS	Building Spray
BWST	Borated Water Storage Tank
CAP	Corrective Action Process
CFR	Code of Federal Regulations
DOT	Department of Transportation
DR	Decay Heat River
EDG	Emergency Diesel Generator
EEI	Escalated Enforcement Item
ESAS	Engineered Safeguards Actuation System
GPUN	GPU Nuclear, Inc.
HPI	High Pressure Injection
I&C	Instrument and Control
IFI	Inspection Followup Item
IR	Inspection Report
LCA	License Change Application
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
LPI	Low Pressure Injection
MU/HPI	Makeup/High Pressure Injection
MUT	Makeup Tank
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
OTSG	Once Through Steam Generator
PDR	Public Document Room
psig	pounds per square inch
RBEC	Reactor Building Emergency Cooler
RCA	Radiologically Controlled Areas
RP&C	Radiological Protection and Chemistry
STP	Special Temporary Procedure
TMI	Three Mile Island-Unit 1
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VIO	Violation
Y2K	Year 2000