March 22, 2000

Mr. Sander Levin
Acting Vice President
GPU Nuclear Incorporated
Oyster Creek Nuclear Generating Station
P.O. Box 388
Forked River, New Jersey 08731

SUBJECT: NRC INTEGRATED INSPECTION REPORT NO. 05000219/2000001

Dear Mr. Levin:

On February 13, 2000, the NRC completed an integrated inspection at your Oyster Creek reactor facility. The enclosed report presents the results of that inspection.

During the six-week period covered by this inspection report, your conduct of activities at the Oyster Creek facility was characterized by safe operations, sound engineering and maintenance practices, and careful radiological work controls. Early in this period, you appropriately identified an adverse trend in human performance related errors and took action to reinforce management expectations. However, after this action, human performance related errors forced operators to manually trip the reactor during the conduct of a routine test procedure, indicating the need for continued emphasis in this area.

Based on the results of this inspection, the NRC has determined that three Severity Level IV violations of NRC requirements occurred. These violations are being treated as Non-Cited Violations (NCVs), consistent with Appendix VII.B.1.a of the Enforcement Policy. These NCVs regard the failure to follow procedures during a TS surveillance, several examples of failure to follow station procedures and maintenance work packages, and the failure to properly implement a conduct of maintenance planning requirement are described in this inspection report. If you contest the violations or severity level of these NCVs, 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 1; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Oyster Creek 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).

We appreciate your cooperation.

Sincerely,

/RA/

John F. Rogge, Chief
Projects Branch No. 7
Division of Reactor Projects

Docket/License: 05000219/DPR-16

Enclosure: NRC Inspection Report No. 05000219/2000001

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U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No.	05000219/2000001
Docket No.	05000219
License No.	DPR-016
Licensee:	GPU Nuclear Incorporated 1 Upper Pond Road Parsippany, New Jersey 07054
Facility Name:	Oyster Creek Nuclear Generating Station
Location:	Forked River, New Jersey
Inspection Period:	January 3, 2000 - February 13, 2000
Inspectors:	Laura A. Dudes, Senior Resident Inspector Thomas R. Hipschman, Resident Inspector Jason C. Jang, Senior Health Physicist, January 10-14, 2000 Gregory C. Smith, Senior Physical Security Inspector, in-office review
Approved By:	John F. Rogge, Chief Projects Branch No. 7

EXECUTIVE SUMMARY

Oyster Creek Nuclear Generating Station
Report No. 05000219/2000001

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers about a six-week period of inspection.

Plant Operations

Poor communications, weak command and control, and inadequate procedural adherence led to a reactor scram. The test performers failed to follow the procedure as written when they did not verify that a channel trip signal had been appropriately reset prior to tripping the second channel. Several management expectations for control room performance were not met, including, failure to conduct a pre-evolution brief prior to implementing a risk significant surveillance, inadequate use of three part communications, poor self checking and inadequate procedural adherence. This failure to follow procedures is a violation of Technical Specification 6.8.1. This matter is in the corrective action program as CAP No. 2000-101. **(NCV 05000219/2000001-01)** (Section O1.1)

GPUN appropriately identified an adverse trend in the occurrence of human performance related incidents. Several examples of failure to follow procedures, poor self checking and insufficient attention to detail were observed in January. The multiple examples of failure to follow procedures constitute a violation of Technical Specification 6.8.1. Licensee management appropriately halted station activities and conducted information sessions to reinforce management expectations for self checking, procedural adherence and focusing on individual work activities. **(NCV 05000219/2000001-02)** (Section O1.2)

Maintenance

Maintenance personnel obtained approval for work and conducted activities in accordance with approved job orders and applicable technical manuals and instructions. Personnel were knowledgeable of the activities and observed appropriate safety precautions and radiological practices. The licensee was appropriately monitoring performance for equipment within the scope of the maintenance rule. (Section M1.1)

Personnel used the appropriate procedure, obtained prior approval, and completed applicable surveillance testing prerequisites. Personnel used properly calibrated test instrumentation, observed good radiological controls practices, and properly documented test results to ensure that equipment met TS requirements. Qualified technicians conducted the tests and appeared knowledgeable about the test procedure. (Section M1.2)

Cold weather preparations were not adequate in some areas and challenged both operators and plant equipment. Most notably, cold weather issues contributed to the inadvertent actuation of the fire suppression systems for the recirculation pump motor-generator sets. Also, non safety-related freezing fluid lines challenged operators with alarms during a severe cold spell in January. (Section M2.1)

Maintenance planners demonstrated less than thorough work practices when they did not involve engineering in the approval of modifications to a security barrier. The licensee did not demonstrate effective corrective actions to identify inadequate work management planning concerning a prior security barrier modification. The licensee's failure to evaluate changes when modifying a security barrier is a violation of Technical Specification 6.8.1. Security documented this issue in CAP 2000-0136. **(NCV 05000219/2000001-03)** (Section M4.1)

Maintenance personnel did not document deficiencies associated with receiving inadequate replacement parts from the warehouse. (Section M4.2)

Engineering

Engineering did not identify that a 1994 modification to upgrade the generator protection system, prevented the automatic transfer of electrical loads under certain initial power conditions after a turbine trip. In addition, the post modification testing of the 1994 modification did not verify that the turbine steam cutoff signal would initiate an electrical bus transfer as designed. Although some deficiencies associated with this modification were identified during a similar event in 1996, the event review did not recognize that the design of the turbine cutoff signal included a low generator load block feature, which, if corrected, would have prevented the bus transfer failure. (Section E1.1)

Plant Support

The licensee maintained adequate radioactive liquid and gaseous effluent control programs. The Offsite Dose Calculation Manual (ODCM) contained sufficient specification and instruction to acceptably implement and maintain the radioactive liquid and gaseous effluent control programs. (Section R1.1)

The licensee implemented an adequate Radiation Monitoring System (RMS) calibration program and improved the calibration methodology for the radioactive liquid and gaseous effluent radiation monitors. However, improvements are needed in the purchasing program for repair parts in order to shorten the out-of-service period. (Section R2.1)

The licensee maintained and implemented an effective routine surveillance test program for effluent air cleaning systems. (Section R2.2)

The QA Surveillance Audit program for effluent control was effectively implemented. The QC program for radioactive liquid and gaseous effluent control to validate analytical results was appropriate. (Section R7)

Overall the post accident sampling system drill was conducted satisfactorily with no regulatory issues identified. (Section P1.1)

An in-office review of a change to the Oyster Creek Security Plan, submitted to the NRC in accordance with 10 CFR 50.54(p) was conducted. Based on the licensee's determination that the changes did not decrease the overall effectiveness of the security plan and after limited review, no NRC approval was determined to be required. Implementation of these changes will be subject to future inspection. (Section S3)

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Report Details

Summary of Plant Status

Oyster Creek began this inspection period at full power and remained there until January 21, 2000, when the licensee initiated a power reduction to perform planned maintenance on a feedwater string and a quarterly main steam isolation valve test. On January 21 operators initiated a manual reactor scram due to the loss of recirculation pumps as a result of a human error during a routine surveillance. The unit remained in a maintenance outage until January 31. The plant remained at approximately 59 percent power for the remainder of the period due to maintenance activities on one of the two main transformers.

I. OPERATIONS

O1 Conduct of Operations

O1.1 Reactor Scram Due to Loss of Recirculation Pumps

a. Inspection Scope (71707, 61726)

The inspector reviewed the performance of the control room operators, and instrumentation and control (I&C) technicians that contributed to a condition requiring a manual scram of the reactor. In addition, the inspector observed and reviewed the performance of the operations crew during the manual scram transient.

b. Observations and Findings

On January 21, 2000, while performing surveillance 609.3.113, "Isolation Condenser Automatic Actuation Bistable Calibration and Test," the reactor recirculation pumps tripped. The reactor operator immediately noted the trip and appropriately inserted a manual reactor scram as required by abnormal operating procedure 2000-ABN-3200.34. All plant safety systems performed as designed during the transient; however, approximately 15 minutes after the reactor scram the operators noted that the electrical generator had not tripped off nor did the electrical buses transfer power transmission paths to the appropriate startup transformers.(Section E1.1) The operators then manually transferred electrical power to the appropriate startup transformers.

The licensee performed a root cause investigation to determine the causes of the recirculation pump trips. In reconstructing the sequence of events, it was clear that a surveillance test step was not performed such that the channel remained actuated. This step would have reset a channel of the recirculation pump trip circuitry. The I&C technicians proceeded to test the second channel and input a trip signal into the recirculation pump circuitry. Once the second channel was actuated, the logic circuitry tripped the recirculation pumps because both channels were actuated. The operators noted the recirculation pump trip and initiated a manual reactor scram.

While investigating the cause of the scram, the licensee reviewed both equipment and human performance. The isolation condenser surveillance was performed twice after the event to assure that all circuitry was working as designed. The root cause team believed that human error was the only possible cause of this event due to the equipment performing appropriately and the alarm data indicating that the signal had not been reset.

Several inappropriate actions by the operators and the I&C technicians were identified by the root cause team, while reviewing this scram. Initially, the lead control room operator (LCRO) who has responsibility for all control room activities was assigned to aid the I&C technicians performing this test. The LCRO was involved in other activities in the control room and was not able to dedicate full attention to the performance of the surveillance. A second control room operator (CRO), who had been performing field work, entered the control room and was assigned to relieve the LCRO in the performance of the surveillance. The operators did not perform a thorough turnover briefing prior to resuming the surveillance. In addition, communications between the I&C technicians and the CROs were poor and did not meet management standards operations. Most notably the test performers, including an operator and an I&C technician, did not mark the appropriate procedural steps as they proceeded through the steps of the evolution. In addition, neither the operator or the I&C technician verified that the alarm had cleared prior to continuing the test on to the second channel. The operations management guidance for event free performance includes following procedures in a step by step manner and verifying the completion of each step as the test is performed. It is clear that the verification initials for this surveillances were not being performed concurrently with the implementation of the steps. Other inappropriate actions included the failure to perform a pre-evolutionary brief in the control room prior to the start of the surveillance to provide the appropriate management focus on the significance of the equipment trip signals that were being manipulated. This failure to follow procedure 609.3.113, "Isolation Condenser Automatic Actuation Bistable Calibration and Test," is a violation of Technical Specification (TS) 6.8.1, which requires that written procedures shall be established, implemented and maintained. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. **(NCV 05000219/2000001-01)**

GPU management reviewed the circumstances surrounding this event and declared the incident a plant event according to their event free behavior procedure. The human performance review committee developed several initiatives to reinforce the current event free behavior program at Oyster Creek. For example enhanced human performance training for site personnel and increased management attention on human performance in the field.

c. Conclusions

Poor communications, weak command and control, and inadequate procedural adherence led to a reactor scram. The test performers failed to follow the procedure as written when they did not verify that a channel trip signal had been appropriately reset prior to tripping the second channel. Several management expectations for control room performance were not met, including, failure to conduct a pre-evolution brief prior to implementing a risk significant surveillance, inadequate use of three part communications, poor self checking and inadequate procedural adherence. This failure to follow procedures is a violation of TS 6.8.1. This matter is in the corrective action program as CAP No. 2000-101. **(NCV 05000219/2000001-01)**

O1.2 Adverse Trend in Human Performance

a. Inspection Scope (71707, 62707, 61726, 71750)

On January 6, 2000, station management identified an adverse trend in the occurrence of human performance related incidents. The inspector reviewed the issues identified, the root cause evaluations and corrective actions.

b. Observations and Findings

GPUN appropriately identified the following human performance issues in the corrective action process. Although the safety significance of some of these human performance issues was low, the inspector noted that these events were indicative of declining human performance in the area of procedural compliance and self checking.

- On January 3 an operator discovered he was contaminated, and proceeded to de-contaminate himself, rather than contact radiation control personnel as required by plant procedures. The next day, the operator self-assessed his actions and brought them to the attention of plant management and radiation controls personnel. The individual was not internally contaminated, and did not spread contamination outside of controlled areas. This is a failure to follow administrative procedure 6630-ADM-4000.11, “Rules for Conduct of Radiological Work.” The licensee has captured this issue in the corrective action program (CAP 2000-0008).

- On January 4 radiological controls personnel identified radiation control area boundaries were missing and were removed without approval. Because of the missing boundary, workers could have entered who were not properly trained or did not have the proper dosimetry. Although the area did not require posting per 10 CFR 20, it was not posted in accordance with licensee administrative procedures. This is a failure to maintain a proper posting in accordance with procedure 6630-ADM-4110.01, ”Establishing and Posting Areas in the Radiologically Controlled Area.” The licensee has captured this issue in the corrective action program (CAP 2000-0006).

- On January 5 the core spray booster pump 2B was returned to service following a maintenance activity on the undervoltage device, although the pump breaker did not meet the acceptance criteria. The licensee discovered the error and returned the undervoltage device to within specifications. The pump was returned to service for a short period of time and did not exceed TSs. This failure to follow the steps within the job order (JO 535890) text constitutes another example of a failure to follow procedures. The licensee has captured this issue in the corrective action program (CAP 2000-0015).

- On January 5 electrical technicians, assigned to perform a maintenance activity of components in 1-1 Circulation Water Pump Field Application Panel (FAP) 1-1, incorrectly accessed and manually actuated a relay in FAP 1-2 actuating the 1-2 FAP Trouble Alarm. This event was classified as a plant event. This failure to follow the step text within the job order (JO 535892) constitutes another example of a failure to follow procedures. The licensee has captured this issue in the corrective action program (CAP 2000-0016).

- On January 6 a radiological survey on a radwaste shipping trailer was re-performed and found to be approximately 10 times higher than the previous survey. This near-miss incident would have been a violation of shipping regulations if the trailer had been transported off site. This failure to follow procedures constitutes a violation of

minor significance and is not subject to formal enforcement action. (CAP 2000-0028)

The inspector determined that a lack of attention to detail, failure to follow procedures, and poor self and peer checking contributed to the above incidents. These are all examples of failure to follow radiological, maintenance and administrative conduct procedures. These incidents constitute multiple examples of a failure to follow procedures and as such is a violation of TS 6.8.1, which requires that written procedures shall be established, implemented and maintained. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. **(NCV 05000219/2000001-02)**

On January 7 the Acting Site Director stopped all plant activities until all work centers held meetings to review the events. The licensee re-enforced the stations expectations regarding procedural adherence, self checking and overall focusing on all aspects of the tasks that personnel are performing.

c. Conclusions

GPUN appropriately identified an adverse trend in the occurrence of human performance related incidents. Several examples of failure to follow procedures, poor self checking and insufficient attention to detail were observed in January. The multiple examples of failure to follow procedures constitute a violation of TS 6.8.1. Licensee management appropriately halted station activities and conducted information sessions to reinforce management expectations for self checking, procedural adherence and focusing on individual work activities.

II. MAINTENANCE

M1 Conduct of Maintenance

M1.1 Maintenance Activities

a. Inspection Scope (62707)

The inspectors observed selected maintenance activities on risk significant safety-related and non safety-related equipment to ascertain that the licensee conducted these activities in accordance with approved procedures, TS, and appropriate industrial codes and standards. Activities were selected based on systems, structures, or components being contained within the scope of the maintenance rule.

b. Observations and Findings

The inspectors observed all or portions of the following job orders (JO):

- JO 539124, WR# 782295, "Troubleshoot and Repair Reactor Recirculation Valve (V-37-0009)
- JO 539157, "A" MG Set Sprinkler Repair
- JO 535648, Spent Fuel Pool Debris Cask Transfer
- JO 538474, Investigate and Repair Oil Level Alarm on "A" Recirculation Pump

c. Conclusions

Maintenance personnel obtained approval for work and conducted activities in accordance with approved job orders and applicable technical manuals and instructions. Personnel were knowledgeable of the activities and observed appropriate safety precautions and radiological practices. The licensee was appropriately monitoring performance for equipment within the scope of the maintenance rule.

M1.2 Surveillance Activities

a. Inspection Scope (61726)

The inspectors performed technical procedure reviews, witnessed in-progress surveillance testing, and reviewed completed surveillance packages. They verified that the surveillance tests were performed in accordance with TS, approved procedures, and NRC regulations. Activities were selected based on systems, structures, or components being within the scope of the maintenance rule.

b. Observations and Findings

The inspectors reviewed all or portions of the following surveillance tests:

- 607.4.007, "Containment Spray and Emergency Service Water System 1 Operability Test,"
- 607.4.005, "Containment Spray and Emergency Service Water System 2 Operability and Inservice Test,"
- 651.4.001, "Standby Gas Treatment System Test,"
- 636.4.003, "Diesel Generator Load Test,"
- 642.4.002, "Reactor Building Closed Cooling Water Valve Operability and Inservice Test,"
- 617.4.013, "Hydraulic Control Unit Valve Inservice Test."

c. Conclusions

Personnel used the appropriate procedure, obtained prior approval, and completed applicable surveillance testing prerequisites. Personnel used properly calibrated test instrumentation, observed good radiological controls practices, and properly documented test results to ensure that equipment met TS requirements. Qualified technicians conducted the tests and appeared knowledgeable about the test procedure.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Cold Weather Issues and Equipment Challenges

a. Inspection Scope (62707)

The inspector reviewed the implementation of cold weather preparations and several corrective action documents associated with the impact of cold weather on plant components.

b. Observations and Findings

Several days with temperatures well below the freezing point were encountered at the beginning of this inspection period. The cold weather created several challenges to the operation of the Oyster Creek facility. Specifically, frozen fluid lines in various non safety-related systems, demineralized water lines, and some piping in the canal intake and dilution areas resulted in alarms in the control room. In addition, inadequate room heating also had the potential to impact the feed pump room instrumentation and in one case contributed to the inadvertent actuation of a fire suppression systems.

The inspector reviewed the licensee's winterization preventive maintenance (PM) packages to determine the scope of the cold weather preparations. Overall, the cold weather PMs were appropriate and addressed the potential for adverse cold weather conditions. However, the inspector noted that there was no system interaction plan to

resolve issues associated with changing plant configurations and out of service equipment during severe cold weather. In addition, heating systems in the feed pump room, augmented off gas building, and recirculation pump motor generator room did not maintain adequate temperatures during the severe cold spell. The feed pump room experienced near freezing temperatures on multiple occasions, which had the potential to impact safety-related flow transmitters. During the plant shutdown in January, cold temperatures caused a fire suppression system to actuate fire water onto the recirculation pump motor generators.

The licensee initiated a corrective action document (CAP 2000-137) to review the cumulative effects of cold weather issues. No significant safety issues were identified during the review, however some improvements to cold weather planning were noted. Specifically, enhanced heat trace performance tracking and preventive maintenance as well as long term reviews of heating and ventilation systems were identified.

c. Conclusions

Cold weather preparations were not adequate in some areas and challenged both operators and plant equipment. Most notably, cold weather issues contributed to the inadvertent actuation of the fire suppression systems for the recirculation pump motor-generator sets. Also, non safety-related freezing fluid lines challenged operators with alarms during a severe cold spell in January.

M4 Maintenance Staff Knowledge and Performance

M4.1 Work Management Practices During Repairs to a Security Barrier

a. Inspection Scope (62707, 71750)

The inspector performed routine walkdowns of protected and vital areas to determine if security requirements were met.

b. Observations and Findings

On January 10, 2000, the inspector performed a routine walkdown of the plant vital areas. The inspector noted that there were recent modifications to a security barrier (door) and questioned the overall effectiveness as a security barrier. The inspector identified that a modification package and engineering evaluation concerning the modification had not received the system engineer's approval. Subsequent review by licensee personnel determined that a maintenance activity replaced the door. The planner who prepared the maintenance activity considered the security barrier modification was a "like-for-like" replacement, and did not consult the system engineer and the security department prior to ordering the new component. In February, the licensee contracted a security component specialist who identified needed improvements and noted several additional deficiencies.

The inspector determined that the licensee did not demonstrate effective corrective actions to identify inadequate work management planning concerning the security barrier modification. In December 1999, the licensee documented a different deficiency on this security barrier. Although corrective actions were taken to address the specific concern, the licensee failed to fully evaluate the cause of the deficiency, and to

determine if there were additional corrective actions. The inspector noted a similar occurrence in 1999 when another security barrier was modified and it was later discovered that the barrier could be bypassed. The barrier was modified to correct the deficiency.

When the planner issued the job order to perform work on the security barrier, he did not follow the requirements of procedure 105, *Conduct of Maintenance,* section 4.2.2.1.H, which requires, in part, that "engineering prepares specifications for new parts, that are acceptable for the required end use, and that all repair parts shall be those designated for the component or part is qualified for that particular component or use." The planner's failure to ensure that appropriate components were replaced in a security barrier in accordance with procedure 105, *Conduct of Maintenance*, is a violation of TS 6.8.1, which requires that written procedures shall be established, implemented and maintained. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Appendix VII.B.1.a of the NRC Enforcement Policy. Security documented this issue in CAP 2000-0136. **(NCV 05000219/2000001-03)** The licensee plans to make changes to procedures and planning guidance concerning security barriers. The licensee did not identify any unauthorized access to vital areas. Security adequately protected vital areas during this inspection period.

c. Conclusions

Maintenance planners demonstrated less than thorough work practices when they did not involve engineering in the approval of modifications to a security barrier. The licensee did not demonstrate effective corrective actions to identify inadequate work management planning concerning a prior security barrier modification. The licensee's failure to evaluate changes when modifying a security barrier is a violation of TS 6.8.1. Security documented this issue in CAP 2000-0136. **(NCV 05000219/2000001-03)**

M4.2 Documentation of Repair Part Deficiencies

a. Inspection Scope (62707)

The inspector performed routine reviews of completed maintenance activities and noted that during the replacement of the 'A' feed string minimum flow valve switch (DPS-0003) the technician documented that the component only contained one switch, when it should have had two.

b. Observations and Findings

On September 29, 1999, during an unplanned power reduction to 70 percent due to a leak from the "A" Feed feedwater regulating valve (FRV), the 'A' string minimum flow valve (V-2-18) did not open. I&C technicians investigated and found that internal micro-switches in pressure switch DPS-0003 failed and required replacement. Job order 536086 documented the replacement of the switch. On January 5, 2000, during a review of the job order, the inspector identified that a technician documented that the replacement DPS-0003 procured from the warehouse was missing one of two internal micro-switches. The I&C Superintendent stated that he told the technician to use one of the internal micro-switches from the old DPS-0003.

The I&C Superintendent stated that re-using a micro-switch was not a problem since the component was not safety significant or within the maintenance rule. He also stated that the component successfully passed post-maintenance testing. A few days later, the inspector discussed the receipt of this part with the Configuration Maintenance Manager. He agreed this was a repair part procurement problem, and that it should be documented in the corrective action process as either a corrective action process (CAP) report or a Receipt Deficiency Report (RDR). The Configuration Maintenance Manager discussed this with the I & C Superintendent, who then documented the concern in CAP 2000-0043. The licensee performed an extent of condition review of similar parts in the warehouse. The remaining stocked switch was inspected January 18. The licensee verified both control micro-switches were within the assembly by visual checks and electrical continuity. Procedure 125.2.10 requires in part, any organization or individual identifying a deficiency to document the requirement, condition and probable cause(s) as appropriate on a RDR. The action party for the RDR will provide a proposed disposition to resolve the deficiency (Use-As-Is, Repair, Rework, Scrap, Other), and the Configuration Maintenance Manager shall evaluate the proposed disposition and either concur or provide the required disposition. This failure to comply with procedure 125.2.10 constitutes a violation of minor significance and is not subject to formal enforcement action.

c. Conclusions

Maintenance personnel did not document deficiencies associated with receiving inadequate replacement parts from the warehouse.

III. ENGINEERING

E1 Conduct of Engineering

E1.1 Main Generator Protection System Modification

a. Inspection Scope (37551)

The inspector reviewed the engineering modification documentation associated with the main generator digital relay protection system. Specifically, the inspector reviewed documents associated with the automatic transfer of the auxiliary buses to the offsite power start up buses after a turbine trip.

b. Observations and Findings

As a result of the manual scram on January 21, 2000, the main turbine tripped as designed. However, the main generator output breakers did not trip because the generator reverse power level did not reach the programmed setpoint. In addition, the 4160V breakers 1A and 1B did not automatically open to transfer electrical loads to the offsite start up transformer when the turbine stop valves went closed. In this case the operators quickly recognized the condition and manually transferred power loads to the offsite power start up transformers.

A review of the original digital protection relay system (DPRS) modification indicated that a turbine steam cutoff circuit anticipates the loss of the turbine as sensed by the turbine stop valve closure and automatically trips the 4160V breakers 1A and 1B, which will transfer electrical loads to the start up transformers. However, the DPRS was programmed to block this trip function when a generator low load signal is present. This block essentially defeats the automatic bus transfer feature originally intended by the DPRS system. Other trip sequences added by this modification include, an anti-motoring protection signal to prevent reverse power on the main generator and a sequential tripping sequence actuated by all turbine stop valves closing and a reverse power indication.

In 1996, after a plant trip, the licensee identified that the turbine generator does not always reach the reverse power level setpoint and therefore would not trip the lockout breakers to initiate the electrical power transfer after a turbine trip. A modification to the reverse power current transformers was planned for the fall 2000 refueling outage to correct this problem. However, during the review of the 1996 event engineering did not identify that the turbine steam cutoff trip also did not occur. In addition, the original modification paperwork did not address the presence of the low load bypass feature, and the post modification test in 1994 did not verify that the turbine steam cutoff signal would initiate the electrical bus transfer. Although, the 1996 trip sequence of events was similar to the recent January 21, 2000, event no review of the electrical transfer system was performed which could have identified the fact that the turbine steam cutoff trip was bypassed. The inspector concluded that the 1996 event review was a missed opportunity to perform a review of the electrical bus transfer system design and identify all the deficiencies with the 1994 modification.

Engineering modified the protection system prior to restart from the January 21, maintenance outage. The modification assured that when the main turbine stop valves were closed, the auxiliary transformer breakers would automatically get an open signal to initiate the transfer of electrical loads to the offsite power source. This issue has been captured in the corrective action program (CAP 2000-167).

c. Conclusions

Engineering did not identify that a 1994 modification to upgrade the generator protection system, prevented the automatic transfer of electrical loads under certain initial power conditions after a turbine trip. In addition, the post modification testing of the 1994 modification did not verify that the turbine steam cutoff signal would initiate an electrical bus transfer as designed. Although some deficiencies associated with this modification were identified during a similar event in 1996, the event review did not recognize that the design of the turbine cutoff signal included a low generator load block feature, which, if corrected, would have prevented the bus transfer failure.

E8 Miscellaneous Engineering Issues (90712)

E8.1 (Closed) Licensee Event Report (LER) 99-004, Supplement 1: Spent Fuel Pool Cooling Piping Supports. The inspector performed an in office review of this LER and concluded that no new issues were raised requiring additional review. This LER is closed.

IV. PLANT SUPPORT

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Implementation of the Radioactive Liquid and Gaseous Effluent Control Programs

a. Inspection Scope (84750)

The inspection consisted of:

(1) review of radioactive liquid and gaseous effluent release permits;
(2) review of selected effluent control procedures;
(3) review of the 1997 and 1998 Annual Radioactive Effluent Reports;
(3) review of the Offsite Dose Calculation Manual (ODCM); and
(4) review of overall effluent program implementation.

The inspection included of tours of: (1) the control room; (2) selected radioactive gas processing facilities and equipment; and (3) effluent and process radiation monitoring systems (RMS).

b. Observations and Findings

All TS/ODCM required effluent radiation monitors were operable during this inspection, with the exception of the turbine building sump effluent radiation monitor. Air cleaning systems were operable at the time of the plant tour.

Reviewed effluent control procedures were detailed and easy to follow, and TS/ODCM requirements were incorporated into the appropriate procedures. Reviewed radioactive liquid and gaseous effluent release permits were complete, including projected dose calculations to the public, as required by TS/ODCM.

The ODCM provided descriptions of the sampling and analysis programs, which were established for quantifying radioactive liquid and gaseous effluent activities, and for calculating projected doses to the public. All necessary parameters, such as effluent

radiation monitor setpoint calculation methodologies, and site-specific dilution factors, were listed.

The 1997 and 1998 Annual Radioactive Effluent Reports provided data indicating total released radioactivity for liquid and gaseous effluents. The assessment of the projected maximum individual doses resulting from radioactive airborne and liquid effluents were included, as required. Projected doses to the public were well below the TS/ODCM limits. There were no anomalous measurements, omissions or adverse trends in these reports.

c. Conclusions

The licensee maintained adequate radioactive liquid and gaseous effluent control programs. The ODCM contained sufficient specification and instruction to acceptably implement and maintain the radioactive liquid and gaseous effluent control programs.

R2 Status of RP&C Facilities and Equipment

R2.1 Calibration of Effluent/Process Radiation Monitoring Systems (RMS)

a. Inspection Scope (84750)

The inspector reviewed the most recent calibration results for the following list of effluent/process RMS and associated flow rate measurement devices. The inspector also reviewed RMS availability trending analyses.

Radiation Monitoring Systems

- Main Stack Wide Range Noble Gas Effluent Monitor
- Main Stack Normal Range Noble Gas Effluent Monitors
- Turbine Building Vent Wide Range Noble Gas Effluent Monitor
- Turbine Building Vent Normal Range Noble Gas Effluent Monitor
- Off gas Building Exhaust Vent Noble Gas Monitor
- Liquid Radwaste Effluent Line Monitor
- Reactor Building Service Water Effluent Line Monitor
- Turbine Building Sump No.1-5 Radiation Monitor

Flow Rate Measurement Devices

- Main Stack Effluent Flow Measuring Device
- Turbine Building Vent Effluent Flow Measuring Device
- Liquid Radwaste Effluent Line Flow Rate Measurement Device

b. Observations and Findings

The I&C Department had the responsibility for performing electronic and radiological calibrations for the above-listed radiation monitors. All reviewed calibration results were within the licensee's acceptance criteria.

The licensee updated several effluent monitor calibration procedures for performing the linearity test, plateau check, and validating conversion factors (sensitivity). The licensee was pursuing procedure updating on a continuous basis.

The inspector also reviewed the availability of the above-listed effluent RMS with the following findings:

- Turbine Building Sump No.1-5 Radiation Monitor was out of service since July 1999. (The licensee did not and will not release radioactive liquid through this pathway.)

- Stack Radioactive Gaseous Effluent Monitoring System (RAGEMS) Low Range Noble Gas Monitor, Channel 1 was out of service during the period of September 10, 1998 through May 6, 1999.

- Stack RAGEMS Low Range Noble Gas Monitor, Channel 2 was out of service during the period of July 29, 1999 through October 10, 1999.

- Turbine Building Vent Normal Range Noble Gas Effluent Monitor was out of service during the period of February 18, 1999 through October 22, 1999.

The inspector noted that the unavailability of the above-listed RMS was due to poor support from the manufacturers. Most RMS installed in the Oyster Creek plant were olds and repair parts were not readily available. For example, the licensee will not receive a repair part for the Turbine Building Sump No.1-5 Radiation Monitor from the manufacturer until February 2000.

The licensee took noble gas grab samples from the turbine building vent and analyzed them as required by the TS/ODCM during the period of February 18, 1999 through October 22, 1999. The inspector reviewed these results and determined that the licensee continued to meet the TS/ODCM requirements during the unavailability of the turbine building vent normal range noble gas monitor.

c. Conclusions

The licensee implemented an adequate RMS calibration program and improved the calibration methodology for the radioactive liquid and gaseous effluent radiation monitors. However, improvements are needed in the purchasing program for repair parts in order to shorten the out-of-service period.

R2.2 Surveillance Tests for Air Cleaning and Ventilation Systems

a. Inspection Scope (84750)

The inspector reviewed the most recent surveillance test results for the following air cleaning systems:

- Standby Gas Treatment System,
- New Radwaste Building Ventilation Systems, and
- Off gas Building Ventilation System.

The inspector also reviewed the response to the NRC Generic Letter 99-02, Laboratory Testing of Nuclear-Grade Activated Charcoal.

b. Observations and Findings

All surveillance results were within the TS/administrative acceptance criteria. The licensee had tested the standby gas treatment system charcoals using ASTM D3803-1989 methodologies on December 23, 1999, to comply with the NRC Generic Letter 99-02.

c. Conclusions

The licensee maintained and implemented an effective routine surveillance test program for effluent air cleaning systems.

R7 Quality Assurance (QA) in RP&C Activities

a. Inspection Scope (84750)

The inspection consisted of:

(1) review of the 1999 QA audit (S-OC-99-02); and
(2) review of the implementation of the radioactivity measurement laboratory quality control (QC) program.

b. Observations and Findings

The 1999 QA Surveillance Audits identified minor weaknesses in the area of radioactive liquid and gaseous effluent control programs. None of the findings were assessed to have regulatory or safety significance. Scope and depth of the QA Surveillance Audits were effective.

The QC program for effluent control was appropriately implemented. The QC program for the radioactive liquid and gaseous effluent control to validate analytical results was effective. No significant discrepancies were evident in QC data for interlaboratory comparisons. When discrepancies were found, effective resolutions were determined and implemented.

The QC program consisted of measurements of interlaboratory comparison samples and measurement equipment controls. The inspector stated that measurements of blind

duplicate, spike, and split samples would enhance the validity of effluent samples. The licensee will evaluate the current practice and will incorporate more QC samples, as necessary.

c. Conclusions

The QA Surveillance Audit program for effluent control was effectively implemented. The QC program for radioactive liquid and gaseous effluent control to validate analytical results was appropriate.

P1 Conduct of EP Activities

P1.1 Annual Post Accident Sampling Team Observation

a. Inspection Scope (71750)

The inspector observed the performance of the licensee's post accident sampling system (PASS) drill.

b. Observations and Findings

On January 5, 2000, the licensee performed a PASS drill to demonstrate their post accident sampling capabilities and analysis methods. A brief table top scenario discussion was held to establish initial radiological and plant condition. The team then proceeded to the sampling area and began the drill. The inspector noted good self checking techniques as the technicians implemented procedure 831.10, "Operation of the G.E. Post Accident Sampling System." Good communication and thorough analysis methods were observed.

c. Conclusions

Overall the post accident sampling system drill was conducted satisfactorily with no issues identified.

S1 Conduct of Security and Safeguards Activities

S1.1 General Observations (71750)

During routine tours, the inspectors noted that security controlled vital and protected area access in accordance with the security plan, properly manned security posts, locked or guarded protected area gates, and maintained isolation zones free of obstructions.

S3 Security Program Plans

a. Inspection Scope (81700)

The area inspected was Security Program Plans.

b. Observations and Findings

Security Program Plans. An in-office review was conducted of changes to the Oyster Creek Security Plan, identified as Revision 39, submitted to the NRC on March 24, 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 is required, in accordance with 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

The inspectors provided a verbal summary of preliminary findings to senior licensee management at an exit meeting on March 3, 2000. During the inspection period, inspectors periodically discussed preliminary findings with licensee management. The inspectors did not provide any written inspection material to the licensee. The licensee did not indicate that any of the information presented at the exit meeting was proprietary.

INSPECTION PROCEDURES USED

Procedure No.	Title
37551	Onsite Engineering
61726	Surveillance Observation
62707	Maintenance Observation
71707	Plant Operations
71750	Plant Support
81700	Physical Security Program for Power Reactors
84750	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
90712	Inoffice Review of Written Reports of Power Reactor Facilities

ITEMS OPENED AND CLOSED

Opened\Closed

Number	Type	Description
05000219/2000001-01	NCV	Failure to follow TS surveillance procedure (Section O1.1)
05000219/2000001-02	NCV	Multiple examples of a failure to follow procedure (Section O2.1)
05000219/5000001-03	NCV	Failure to implement maintenance procedure requirements regarding replacement of security barrier (Section M4.1)

Closed

Number	Type	Description
05000219/1999004-01	LER	Spent Fuel Pool Cooling Piping Supports (Section E8.1)

LIST OF ACRONYMS USED

CAP	Corrective Action Process
CFR	Code of Federal Regulations
CRO	Control Room Operator
DPS	Demand Position System
DPRS	Digital Protection Relay System
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
FAP	Field Application Panel
FRV	Feed water regulating valve
GPUN	General Public Utilities (GPU) Nuclear
HEPA	High Efficiency Particulate
I&C	Instrumentation and Control
IST	In-Service Test
JO	Job Order
LCRO	Lead Control Room Operator
LER	Licensee Event Report
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NSIC	Nuclear Safety Information Center
OCNGS	Oyster Creek Nuclear Generating Station
ODCM	Offsite Dose Calculation Manual
PASS	Post Accident Sampling System
PDR	Public Document Room
PM	Preventive Maintenance
QA	Quality Assurance
QC	Quality Control
RAGEMS	Radioactive Gaseous Effluent Monitoring System
RCA	Radiologically Controlled Area
RDR	Receipt Deficiency Report
RMS	Radiation Monitoring System
RP&C	Radiological Protection and Chemistry
RWP	Radiation Work Permit
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report