U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No.	50-219/91-01
Docket No.	50-219
License No.	DPR-16
Licensee:	GPU Nuclear Corporation 1 Upper Pond Road Parsippany, New Jersey 07054
Facility Name:	Oyster Creek Nuclear Generating Station
Inspection Period:	January 1, 1991 - February 2, 1991
Inspectors:	M. Banerjee, Resident Inspector E. Collins, Senior Resident Inspector J. Nakoski, Resident Inspector

Approved By: W. H. Ruland — 2/13/91
W. H. Ruland, Chief — Date
Reactor Projects Section 4B

Inspection Summary: This inspection report documents routine and reactive inspections conducted during day shift and backshift hours of station activities including: plant operations; radiation protection; maintenance and surveillance; engineering and technical support; emergency preparedness; security; and safety assessment/quality verification.

Results: Overall, GPUN operated the facility in a safe manner. A notice of violation is being issued for unqualified electrical splices (paragraph 4.1). A notice of violation is being issued for not following radiological procedures (paragraph 2.2). An unresolved item addressing the cause for emergency diesel generator fan belt failure is opened (paragraph 4.2).

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The NRC inspection manual inspection procedure (IP) or temporary instruction (TI) that was used as inspection guidance is listed for each applicable report section.

Executive Summary
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Plant Operations

Overall, the plant was operated in a safe manner. Control room operators' decision not to declare an Unusual Event for an onsite fire was in the interest of safety and in accordance with procedures. Walkdowns of site direct current systems identified no deficiencies. Control room operators responded properly to a recirculation pump trip.

Radiological Controls

NRC inspectors observed a worker who was not wearing gloves reach across a radiological boundary. A notice of violation is being issued.

Maintenance/Surveillance

No notable observations were made.

Engineering and Technical Support

Four electrical splices were found to be in an unqualified configuration. GPUN analysis concluded the motors were operable (50-219/90-23). A notice of violation is being issued for the absence of qualification documentation. The cause for the emergency diesel generator fan belt failure is unresolved pending GPUN analysis. GPUN evaluation and corrective actions addressing a leak in the emergency service water piping and emergency diesel generator starter motor pinion problems were acceptable. The evaluation of difficulties in implementing the low voltage backseating procedure for an isolation condenser valve was still in progress at the end of the inspection.

Emergency Preparedness

GPUN's declaration of an Unusual Event for both emergency diesels being declared inoperable was appropriate.

Physical Security

No notable observations were made.

Safety Assessment and Quality Verification

GPUN's evaluations for potential circuit breaker problems, operation of the plant with an isolation condenser vent valve closed, potential corrosion of the diesel fuel oil storage tank, and historic problems with the isolation condenser condensate return valves were found acceptable. Plant drawings were significantly improved and maintained current.

DETAILS

1.0 OPERATIONS (71707,71710,93702)

The inspection period began and ended with the reactor at full power. Overall, the plant was operated in a safe manner.

1.1 Engineered Safety Feature System Walkdown

The NRC inspector conducted a walkdown of the 24 volt dc batteries, fire pump diesel batteries, and emergency diesel generator (EDG) batteries. The inspector reviewed surveillance procedures and technical specifications (T/S); and observed performance of weekly surveillances. The purpose of the walkdown was to independently verify the ability of the batteries to perform their intended function. The fire pump and EDG batteries provide starting power. The 24 volt d.c. batteries provide backup power for area radiation monitors, liquid process radiation monitors, and the neutron monitoring systems.

During the procedure review and observation of surveillances, the inspector referenced the following procedures:

634.2.004, Rev. 6	24 Volt D.C. Battery Weekly Surveillance
634.2.005, Rev. 4	24 Volt D.C. Battery Monthly Surveillance
634.2.006, Rev. 5	24 Volt D.C. Battery Discharge Test
645.2.002, Rev. 14	Fire Pump Diesel Weekly Battery Surveillance
645.2.027, Rev. 2	Fire Pump Diesel Monthly Battery Surveillance
636.2.004, Rev. 18	Diesel Generator Battery Discharge (Load Test) and Low Voltage Annunciator Test
636.2.005, Rev. 12	Diesel Generator Weekly Battery Surveillance
636.2.006, Rev. 10	Diesel Generator Monthly Battery Surveillance

In addition, the inspector reviewed T/S 4.7.B and 4.12.B.3 for surveillance requirements. On January 18, 1991, the inspector observed the weekly surveillance for the fire diesels and DG batteries.

During the review of the procedures, the NRC inspector concluded that the intent of the applicable T/S were being implemented. No significant problems were noted with the procedures. Review of completed surveillances identified no concerns.

The physical walkdown of the batteries and observation of weekly surveillances resulted in no notable findings. Based on the walkdown, procedure review and surveillance observations, the NRC inspector concluded the 24 volt dc batteries, the fire pump diesel batteries and the EDG batteries would perform their intended functions.

1.2 "B" Recirculation Pump Trip

On January 6, 1991, at 1:53 p.m., the "B" recirculation pump tripped. A momentary loss of field to the generator of the pump's motor-generator (MG) set caused the trip. An exciter provides the generator field through a slip ring and brush arrangement. One of the leads for the exciter passes through the outer slip ring to connect to the inner slip ring. This insulated lead had a buildup of carbon which resulted in a momentary short between the two slip rings. The short resulted in the loss of generator field. The carbon buildup was the result of carbon dust accumulation created by the brushes.

GPUN responded to the trip as required by procedure 2000-ABN-3200.02, Rev. 10, "Recirculation Pump Trip." Reactor power was stabilized at about 91% shortly after the trip. Prior to the trip reactor power was about 99%. To prevent excessive backflow through the pump, the "B" recirculation loop was idled by closing the discharge valve. GPUN performed inspections of the MG set. The exciter lead was cleaned and, at about 7:07 p.m. on January 7, 1991, the "B" recirculation pump was returned to service.

The NRC inspector reviewed 2000-ABN-3200.02 and observed the physical arrangement of the MG set. Based on these activities and discussions with GPUN personnel, the NRC inspector determined the licensee's response to the trip was adequate. GPUN plans to add a periodic inspection and cleaning requirement for the exciter lead between the two slip rings. The NRC inspector concluded that control room operator response was in accordance with site procedures and that GPUN's review and corrective actions were appropriate.

1.3 Onsite Fire

On January 28, at 2:37 a.m., a fire was reported by a site security officer in a maintenance building near the northwest corner of the site. The control room and Forked River fire department were notified. The fire was verified by the fire brigade leader and the group operating supervisor (GOS) at 2:50 a.m. At 3:00 a.m., the GOS reported the fire under control by the fire brigade and the Forked River fire department. At 3:10 a.m., the fire was out. Damage was confined to the maintenance building.

NRC inspectors reviewed the group shift supervisor (GSS) rationale for not declaring an Unusual Event. Emergency plan implementing procedure 9473-IMP-1300.01, "Classification of Emergency Conditions," Revision 8, Appendix 1, category Q specifies a valid fire onsite which cannot be controlled by the fire brigade within 10 minutes from the time of verification. For this event, the GSS stated that the fire was judged to be controllable by the fire brigade, and was controlled within 10 minutes. Also, the GSS reasoned that the fire was not in close proximity to safety related systems or structures. NRC inspectors concluded that GPUN followed emergency plan procedures and acted in the interest of plant safety. At the close of the inspection, the cause of the fire had not been determined.

1.4 Control Room Tours

The inspectors conducted routine tours of the control room. The inspectors reviewed:

-- Control Room Operator's and Group Shift Supervisor's Logs;

-- Technical Specification Log;

-- Control Room Operator's and Shift Supervisor's Turnover Check Lists;

-- Reactor Building and Turbine Building Tour Sheets;

-- Equipment Control Logs;

-- Standing Orders; and,

-- Operational Memos and Directives.

No significant observations were made.

1.5 Facility Tours

The inspectors conducted routine plant tours to assess equipment conditions, personnel safety hazards, procedural adherence and compliance with regulatory requirements. The following areas were inspected:

-- Turbine Building

-- Vital Switchgear Rooms

-- Cable Spreading Room

-- Diesel Generator Building

-- Reactor Building

-- New Radwaste Building

-- Old Radwaste Building

-- Intake Structure

The following additional items were observed or verified:

a. Fire Protection:

-- Randomly selected fire extinguishers were accessible and inspected on schedule.

-- Fire doors were unobstructed and in their proper position.

-- Ignition sources and combustible materials were controlled by the licensee's approved procedures.

-- Appropriate fire watches or fire patrols were stationed when fire protection/detection equipment was out of service.

b. Equipment Control:

-- Jumper and equipment mark-ups agreed with technical specification requirements.

-- Conditions requiring the use of jumpers received the prompt attention of the licensee.

c. Vital Instrumentation:

-- Selected instruments appeared functional and demonstrated parameters within Technical Specification Limiting Conditions for Operation.

d. Housekeeping:

-- Plant housekeeping and cleanliness were as directed by licensee programs.

Minor housekeeping deficiencies which were identified were promptly corrected by the licensee. No other unacceptable conditions were identified.

2.0 RADIOLOGICAL CONTROLS (71707)

2.1 General

During entry to and exit from the RCA, the inspectors verified that proper warning signs were posted, personnel entering were wearing proper dosimetry, personnel and materials leaving were properly monitored for radioactive contamination, and monitoring instruments were functional and in calibration. Posted extended Radiation Work permits

(RWPs) and survey status boards were reviewed to verify that they were current and accurate. The inspector observed activities in the RCA and verified that, except as discussed in paragraph 2.2, personnel were complying with the requirements of applicable RWPs and that workers were aware of the radiological conditions in the area.

2.2 Worker Not Following RWP

On January 10, 1991, NRC inspectors observed an instrument and controls (I&C) technician reach across a radiological boundary without gloves. The technician was performing testing on instruments at instrument rack RK03. The rack was posted as a contaminated area.

NRC inspectors contacted a radiological controls technician (RCT) and questioned the I&C technician regarding the practice. The I&C technician stated that he had wiped the instruments prior to touching them with his bare hands. The RCT implemented additional controls to prevent the spread of contamination. Radiological surveys showed that the technician and equipment were not contaminated.

NRC inspectors reviewed radiological work permit RWP 91-008. The technician had signed the RWP on January 2, 1991. The RWP required protective clothing for work in contaminated areas. Partial protective clothing was acceptable as directed by station procedure 9300-ADM-4300.01, "Use of Protective Clothing." Revision 1 of the procedure, paragraph 4.1, stated that protective clothing shall be worn in contamination areas whenever required by signs or Radiological Controls personnel and as required by the RWP. Paragraph 7.1.7 stated that partial sets of protective clothing can be authorized by the Group Radiological Controls Supervisor or RCT if the RWP so states. In this event, the I&C technician was directed by Radiological Controls personnel to wear gloves.

NRC inspectors observed the GPUN critique reviewing this event. At the end of the inspection period, the critique report had not been issued.

Station Procedure 9300-ADM-4000.11, revision 0, "Rules for Conduct of Radiological Work," paragraph 7.2, required that all personnel who enter the radiological controls area (RCA) obey posted, oral and written radiological control instructions, procedures and radiation work permits. In this event, the I&C technician did not wear protective clothing in a posted contaminated area, as required by the RWP. The individual determined, without assistance from radiological controls personnel, that it was not necessary. This is a violation. (50-219/91-01-01)

3.0 MAINTENANCE/SURVEILLANCE (62703,61726)

3.1 "B" Control Rod Drive Pump Maintenance

On January 22, 1991, the inspector observed maintenance technicians draining and flushing the newly installed oil cooler on the "B" control rod drive (CRD) pump. The work was performed under job order No. 0028904 and job specific radiation worker permit (RWP) 91-0089. The pump was declared inoperable on January 21, 1991, due to an oil cooler leak.

The inspector reviewed the work package and verified that appropriate authorization was obtained, that the equipment tagout was adequate to ensure worker safety, and that the radiation work permit (RWP) and the job order requirements were being followed. The inspector reviewed the work package for cleanliness and post-maintenance testing requirements. The inspector concluded that the appropriate cleanliness requirement was implemented. The inspector also verified adequate radiological surveys. No deficient conditions were identified.

3.2 Maintenance on Westinghouse 480V Breaker

On January 24, 1991, the NRC inspector observed performance of maintenance on a Westinghouse 480V motor control center (MCC) breaker (model number MCP-03150R). The breaker was used for the motor operated valve in the isolation condenser condensate return line (V-14-37). The breaker had previously been removed from the MCC and the instantaneous trip setting was being adjusted in preparation to return it to use. During testing, the setpoint of this breaker was not repeatable. Based on this, GPUN obtained a new Westinghouse 480V breaker to install in the motor control center. The instantaneous trip setting was established on the new breaker and the breaker was installed.

The NRC inspector observed the adjustment and testing of the original breaker. The NRC inspector reviewed the completed work package (J.O.# 29010). The inspector noted that sufficient information was recorded to document the failure of the original breaker and the acceptance of the second breaker. During review of the work, the inspector verified that proper authorization had been obtained, that procedural controls were adequate to control the work, and that proper testing was conducted prior to placing the component in service. No problems were identified.

3.3 Backseating Valve V-14-37

On January 24, 1991, the NRC inspector observed the backseating of the isolation condenser condensate return valve V-14-37. The valve was being backseated in an attempt to decrease the amount of unidentified leakage. GPUN has an approved reduced voltage backseating procedure for this valve. Additional discussion on the reduced voltage backseating procedure can be found in paragraph 4.4 of this report. The procedure used was 225.0, Rev. 4, "Backseating and Unbackseating Station Valves."

The NRC inspector observed the installation of the equipment at the 1B21 MCC required to perform the backseating procedure. The inspector verified proper approvals had been obtained prior to starting the procedure. Proper safety precautions were used when interfacing with electrically energized components. Adequate procedural and equipment controls were in place to prevent inadvertent damage to the valve. Following the successful backseating of V-14-37, the NRC inspector noted proper controls were used in removing the installed backseating equipment and restoring the MCC. No problems were identified

3.4 Equipment Storage Pool Removable Coating Application

On January 29, 1991, NRC inspectors observed application of a removable coating to the equipment storage pool liner. This activity was controlled by refueling outage contractor (ROC) procedures.

NRC inspectors reviewed job order 28035. Inspectors verified correct approval to start work, adequate procedural controls and adequate radiological controls. Since the work package had been prepared by a contractor, the inspector verified GPUN management and quality control review and approval. No deficiencies were identified.

3.5 Diesel Generator Load Test Surveillance

On January 9, 1991, the NRC inspector observed the performance of procedure 636.4.003, Rev. 37, "Diesel Generator Load Test," for the number 2 diesel generator. The test was being conducted as part of post maintenance testing. During the performance of the surveillance, the assigned control room operator used the current revision of the procedure, obtained proper approvals for performing the test, and maintained necessary communications with equipment operators assisting in the test. Data required by the procedure was properly recorded and met the acceptance criteria. The control room operator exhibited proper control of the evolution throughout the surveillance. No NRC concerns were raised.

4.0 ENGINEERING AND TECHNICAL SUPPORT (71707,40500)

4.1 Environmental Qualification of Splices

(Closed) Unresolved Item 50-219/90-23-05, "Unqualified Splices in Core Spray and Containment Spray Systems." On December 13,1990, GPUN determined that the motor lead splices for core spray booster pumps P-20-2A, P-20-2C and containment spray pumps P-21-1A, P-21-1B were unqualified. No qualification documentation existed for these splices. The splices were of a configuration different from that reported in the environmental qualification (EQ) reports. The licensee replaced the splices on core spray booster pump P-20-2C with qualified Raychem heat shrink splices and added 3M Scotch tape to containment spray P-21-1A splices. GPUN concluded that the splices were operable. These splices would be replaced with qualified Raychem heat shrink splices during the 13R outage.

GPUN identified that the questionable splice configurations had been known since February 1990. No operability determination was completed and corrective action had not been implemented before December 1990. GPUN began an investigation to determine the cause for this delay. At the end of the inspection, the report was not finished. GPUN information indicated that a deviation report was written in February but was lost.

The NRC inspector reviewed the licensee's operability analysis and found it adequate. To verify the qualification status of other core spray and containment spray pumps, the inspector reviewed the licensee's EQ walkdown sheets and splice photographs for these pumps. No walkdown information was available for the core spray pump P-20-1B motor lead splices. The inspector questioned how the licensee verified they were the original red qualified splices as assumed in the licensee's EQ reports.

GPUN could not find documentation which verified the assumed type and configuration of these splices. GPUN visually inspected the splices for P-20-1B on January 31, 1991, and confirmed that the configuration was qualified.

Unqualified splices in safety related equipment which were required to remain functional in a harsh environment during and following an accident violates the requirements of 10 CFR 50.49. This nonconformance was identified by the licensee. Once attention was given to the issue, adequate corrective action was taken in terms of preparing an operability determination and a schedule for splice replacement. The delay in addressing the issue since February 1990 indicated a potential weakness in the licensee's corrective action process. Due to this, the guidance provided in 10 CFR, Appendix C, Section II.G, regarding exercise of discretion could not be applied, and this violation has been cited. (50-219/91-01-02)

4.2 Emergency Diesel Generator Fan Belt Failure

On January 7, 1991, during a load test, emergency diesel generator No. 2 tripped on high engine temperature. The equipment operator found all eight belts on the diesel cooling fan shaft to be broken. The diesel cooling fan is coupled to the main engine shaft via two grooved pulleys.

GPUN determined that the failed belts had a manufacture date of January 1981. The belts on the other emergency diesel (No. 1) had a manufacture date of June 1980. Both belt sets were installed during the 1984 refueling outage. Preliminary GPUN review did not identify any obvious cause of failure; however, the failed belts were reported to be dried out and at least one belt had five or six cuts about 1/8 inch to 1/4 inch deep. No foreign material was present. The belts on diesel generator No. 1 appeared normal upon visual inspection.

GPUN replaced the belts on both diesel generators. An engineering evaluation was performed to determine the cause of the failure. GPUN concluded that the most probable cause was the failure of a single belt which then got caught between the other belts and the pulley grooves and resulted in stresses beyond the ultimate strength of the material, ultimately resulting in failure of all the belts. To help determine the root cause of this failure, GPUN sent the failed belts to their laboratory for test and analysis.

GPUN indicated that the belts have a shelf life of six years. Service life, however, is application dependent, and the vendor did not provide any specific service life information. GPUN's maintenance program requires visual inspection of the belts during refueling outages. Neither acceptance criteria for a visual inspection nor any periodic replacement schedule were provided. The licensee indicated that the belts would be replaced if visual inspection revealed defects or degradation.

GPUN has started a review to determine if the belts should be periodically replaced. Final root cause analysis was pending availability of laboratory results. The inspector determined that the licensee's immediate corrective action was acceptable, since the replacement belts were new and within the shelf life requirement. A question of acceptability of the licensee's preventive maintenance program for fan belts still remains unanswered pending laboratory test results. This item remained unresolved (50-219/91-01-03).

4.3 Emergency Service Water Piping Hole

During surveillance testing, on January 3, 1991, GPUN identified a through-wall leak in containment spray/emergency service water (ESW) system II piping. The system was secured and declared inoperable. GPUN demonstrated operability of ESW system I.

The leak was identified by an equipment operator (EO). The leak was located in the weld downstream of the heat exchanger outlet isolation valve V-3-87. This valve is normally throttled.

A patch was welded to the pipe to repair the deficiency. This piping was not included in the inservice inspection (ISI) program. GPUN performed a minimum wall thickness calculation using fluid conditions of 250 psi and 85 degrees F for seamless ASTM-AS3 Grade A. The required thickness was 0.145 inches. GPUN stated that the piping was classified as seismic category I. GPUN plans to replace the elbow in the next refueling outage.

GPUN performed ultrasonic testing (UT) on two additional pipe elbows in ESW system II and on three elbows in system I. While not identical, ESW system I configuration was similar to ESW system II. These test results did not identify any metal loss.

NRC inspectors reviewed UT data sheets. The minimum wall calculation (dated January 4, 1991) and GPUN cause analysis (memo dated January 14, 1991). Inspectors verified that UT results met or exceeded the minimum required wall thickness.

GPUN concluded that the localized corrosion was caused by a coating break or a leading edge coating failure. The throttled valve was not considered to have been the cause, but may have accelerated the corrosion/erosion. GPUN was evaluating the need for additional actions due to this occurrence. GPUN was also evaluating the ESW piping downstream of valves V-3-87 and V-3-88 for inclusion into the ISI program.

NRC inspectors concluded GPUN's corrective action to repair the leak and to perform additional ultrasonic testing on other portions of ESW piping ensured the structural integrity of the piping.

4.4 Backseating Isolation Condenser Condensate Return Valves

GPUN has recently backseated both isolation condenser condensate return valves (V-14-36 and V-14-37) in an attempt to decrease the unidentified leak rate. Valve V-14-36 was initially backseated on January 11, 1991, and valve V-14-37 was initially backseated on January 10, 1991. GPUN used a reduced voltage method to electrically backseat these valves. The reduced voltage backseating process was developed in response to valve stem and backseat damage encountered in 1982. After the valves were backseated, the unidentified leak rate decreased.

GPUN implemented the reduced voltage backseating process through procedure 225.0, Rev. 4, "Backseating and Unbackseating Station Valves." To reduce the voltage, a variac was installed between the power supply breaker at the motor control center (MCC) and the limitorque motor operator. The voltage was reduced from a nominal 480 Vac to 325 Vac. The procedure contained requirements for the electricians performing the procedure

to monitor the current to the motor operator and remove power from the motor when locked rotor current was indicated. Additionally, a control unit installed with the variac limited the time that undervoltage power can be provided to the motor operator. These controls and requirements were put in place to prevent damage to the limitorque motor operator when bypassing the 95% open limit switch.

GPUN experienced three occasions when the power supply breaker at the MCC tripped while attempting to backseat valve V-14-37. The first two occasions were on January 16, 1991, after completion of the isolation condenser valve operability and inservice test (IST) surveillance. The third occasion was on January 22, 1991, after the breaker had been replaced. Following each breaker trip, GPUN performed a valve stroke time test to ensure proper operation of the valve under normal conditions. When the breaker tripped after it had been replaced, GPUN performed a current trace for the limitorque motor operator during the stroke test. This current trace was compared to past performance data. No indications of valve binding or excessive motor currents were evident for normal valve operation.

Operability determinations were conducted by the operations department after the two trips on January 16, and the trip on January 22, 1991. GPUN determined that V-14-37 was operable based on the satisfactory valve stroke times, plant engineering's determination that the breaker trips were related to the backseating process, and for the third trip, that the current trace indicated the valve motor operator was working properly under normal conditions.

GPUN reviewed the information relating to the trip settings of the installed breaker and tested the removed breaker to determine the existing setpoints. The breaker setpoints for one phase of each breaker was about 90 to 93 amps. The nominal breaker trip setpoint was 100 $\pm$ 10% amps. GPUN reasoned that, while the trip settings were within the manufacturer's tolerance, it may have been low enough to trip during the backseating process. GPUN made the decision to increase the trip setpoint of the breaker to it's next higher setting of 130 $\pm$ 10% amps. During testing of the removed breaker, GPUN determined that the trip setting of that breaker was not repeatable. A third breaker was obtained, the setting adjusted and shown repeatable, and installed. Once the adjusted breaker was installed, GPUN successfully backseated V-14-37 on January 24, 1991.

The NRC inspector reviewed procedure 225.0, Rev. 4, and the engineering basis for the procedure, technical data report (TDR) 312, Rev. 1, "Evaluation of Valves in the Emergency Condenser, Cleanup and Recirculation Systems." The NRC inspector reviewed motor current traces for the first two breaker trips during backseating, data associated with the motor operator current traces taken during normal valve operations, and observed the backseating of V-14-37 on January 24, 1991. The inspector also discussed the events with plant operations, engineering and maintenance personnel.

Based on these activities, the inspector concluded that the approved electrical backseating procedure for the isolation condenser condensate return valves provided sufficient controls to prevent damage to the valve stems and backseats. The backseating process was shown to have no effect on the valve timing for it's isolation function. The inspector concluded that, for V-14-37, GPUN's operability determination was adequate. GPUN's root cause analysis for the breaker trips was not finalized at the end of the inspection. Based on the successful backseating of V-14-37 on January 22, 1991, the inspector concluded that the cause for the breaker trips was eliminated with the installation of the breaker with the higher trip settings.

4.5 Emergency Diesel Generator Starting Motor Pinion

On January 9, 1991, during surveillance testing, the No. 2 emergency diesel generator (EDG) started, but did not automatically synchronize to the bus and load. An EDG disabled alarm was received in the control room. Locally, a sequence fault was received. After resetting the alarms, the EDG started and functioned normally.

GPUN evaluated this occurrence and concluded that this event was explained by failure of the starter motor pinion to engage the engine bull gear twice, then, a successful engagement occurred on the third attempt. The EDG starting logic accommodates pinion failure by reattempting the engagement, after a two-second time delay, three times. On the third attempt, however, a sequence fault is sensed. Thus, in this event, the EDG started, but because of the sequence fault did not continue with automatic synchronization and loading.

GPUN evaluated this occurrence to be within the design of the system. It is possible for the starter pinion teeth to squarely strike the gear teeth, preventing engagement. This lack of engagement is sensed by a limit switch and the starting logic tries again. GPUN concluded the safety significance of this possibility is low because:

-- The EDG logic will attempt pinion engagement three times, and the automatic synchronization/loading sequence is bypassed on an emergency (Fast) start;

-- There is redundancy with two emergency diesels; and,

-- Historically, the EDG's have demonstrated a reliability of 0.99 and 1.00, thus the probability of occurrence is low.

GPUN plans to review the EDG starting logic for modification to enhance the design.

NRC inspectors reviewed the engineering evaluation and EDG elementary logic diagram. NRC inspectors verified that the automatic synchronizing/loading sequence is bypassed during an emergency start and thus no safety significance exists for this occurrence. Based on past EDG performance, NRC inspectors concluded that GPUN evaluation of the possibility of pinion failure is appropriate.

5.0 EMERGENCY PREPAREDNESS (71707)

5.1 Unusual Event - Both Diesel Generators Inoperable

On January 7, 1991, the No. 2 emergency diesel generator (EDG) was running as part of it's quarterly inspection. Near the end of the one hour run, the "Engine High Temperature" alarm was received, followed by the "No. 2 EDG Disabled" alarm. The equipment operator reported that the cooling water temperature was 225 degrees F. The high temperature alarm was set at 200 degrees F. GPUN determined that the high temperature resulted from the failure of all eight cooling water fan belts. Fan belt failure has been discussed in paragraph 4.2 of this report. GPUN initiated action to restore the No. 2 EDG to an operable status.

With the No. 2 EDG inoperable, No. 1 EDG operability tests were required daily. At 9:49 a.m., on January 9, 1991, the No. 1 EDG started but did not automatically synchronize and load. The "No. 1 EDG Disabled" alarm was received. Locally a sequence fault alarm was received. GPUN declared the No. 1 EDG inoperable. At 10:08 a.m., a second start attempt succeeded in starting and loading the No. 1 EDG. GPUN, however, stopped the load test of the No. 1 EDG to allow load testing of the repaired No. 2 EDG and to evaluate the sequence fault alarm on the No. 1 EDG. GPUN concluded that the pinion of the starting motor had not properly engaged the flywheel of the diesel. EDG starting motor performance has been discussed in paragraph 4.5 of this report.

Technical specification (T/S) 3.7.C.3 required the plant to be placed in a cold shutdown condition with both diesels inoperable. GPUN commenced a shutdown at 10:25 a.m. on January 9, 1991, from full power. Emergency plan implementing procedure 9473-IMP-1300.01, Rev. 8, "Classification of Emergency Conditions" required GPUN to declare an Unusual Event (UE) if there was a loss of both diesel generator capabilities for greater than one hour during power operations. At 10:49 a.m., the group shift supervisor (GSS) declared a UE.

After the repairs and successful testing, GPUN declared the No. 2 EDG operable. GPUN terminated the UE and plant shutdown at 2:15 p.m. on January 9, 1991, with reactor at about 92%.

During the event, NRC inspectors monitored control room activities and diesel generator operations. The apparent safety significance of this event was minimized by the successful starting and loading of the No. 1 EDG following its initial failure and the successful performance of the load test on the No. 2 EDG during the UE. The NRC inspectors concluded GPUN's response to this event was adequate and entry into the Unusual Event was appropriate.

6.0 OBSERVATION OF PHYSICAL SECURITY (71707)

6.1 General

During routine tours, inspectors verified that access controls were in accordance with the Security Plan, security posts were properly manned, protected area gates were locked or guarded and that isolation zones were free of obstructions. Inspectors examined vital area access points to verify that they were properly locked or guarded and that access control was in accordance with the Security Plan. No significant observations were made.

6.2 Empty Beer Bottles Found In the Reactor Building

On January 9, 1991, a Radiological Controls technician discovered two empty beer bottles. The bottles were located on reactor building ventilation ducts on the 95 foot level of the reactor building. The bottles were determined to be uncontaminated.

Security informed the NRC of the bottles on January 10, 1991. They stated the bottles were old. The basis for the determination was the condition of the bottles and their location.

The NRC inspector visually inspected the area where the bottles were found. The NRC inspector identified a third beer bottle. The third bottle was located on the reactor building ventilation duct about 75 feet east of the area where the first bottles were found. The NRC inspector informed security of the third bottle. Two of the bottles have been placed in the custody of security, the third bottle remains unaccessible.

The NRC inspector visually inspected the two bottles. The bottles appeared to be old. They were covered with a thick coating of dust and dirt. Based on a review of the area where the bottles were found and their condition, the NRC inspector concluded that GPUN's review and evaluation were acceptable. The inspector further concluded that no current fitness for duty concerns resulted from the discovery of these bottles.

7.0 SAFETY ASSESSMENT/QUALITY VERIFICATION (71707,40500)

7.1 Molded Case Circuit Breakers

During pre-installation testing on May 7, 1990, five out of seven GE supplied TED molded case circuit breakers failed to trip on C-phase overcurrent. The breakers had an undervoltage (UV) trip device installed on the C-phase. The cause of the failure to trip was determined to be an improperly installed UV device which interfered with the overcurrent trip function on the C-phase. This deficiency was affecting the TED and THED type of breakers fitted with UV devices (see NRC inspection report 50-219/90-09). A GE letter to GPUN dated August 15, 1990, indicated that all BWR owners were notified.

GPUN returned the affected lot of breakers to GE for repair or replacement. After GE repair, GPUN testing indicated that three out of thirty-four breakers failed similarly. Three breakers installed in the plant were successfully tested by the licensee. GPUN's communication with GE resulted in a GE letter to the NRC (Stramback to Naidu, dated November 15, 1990) which indicated successful testing of breakers may not eliminate the potential for subsequent failure of the thermal overcurrent trip function on the C-phase of the breaker.

At Oyster Creek, these molded case circuit breakers were installed in 480V motor control centers (MCC) to control various loads. GPUN documented the potential concern in a material nonconformance report (MNCR), returned the breakers to GE for additional testing and repair, and performed a safety evaluation to justify plant operation till the 13R refueling outage scheduled to begin on February 15, 1991. The MNCR was conditionally released.

GE tested each of the 111 returned circuit breakers 5 times for thermal overcurrent trip on the C-phase without any failure. A drop test was also performed to see if mishandling could affect trip function. The breakers also passed this test. The licensee determined the plant can safely operate until the 13R outage with molded case circuit breakers installed. The basis for this conclusion was as follows:

- GPUN tests each breaker before installation. None of the breakers successfully tested prior to installation has failed to trip due to this problem. The 111 new breakers tested by GE also had no failure to trip on overcurrent at the C-phase. This provided a high degree of assurance that the circuit breakers would perform their intended function in terms of providing the overcurrent trip.

- Based on plant experience, the probability of a ground fault on only the C-phase was extremely small. No C-phase to ground fault has occurred on these breakers since their installation during the 9R refueling outage. The licensee indicated during the last 10 years of operation there was no incidence of a fault on the 480V system.

- During normal operation, failure of a molded case circuit breaker to trip may trip the feeder breaker to the MCC. Considering redundancy of the 480V system such an occurrence was considered as a normal operational transient and was addressed by plant procedures.

- For approximately two months of plant operation before the 13R outage, the licensee's risk analysis indicated the probability of a LOCA with loss of offsite power, one emergency diesel generator failure and failure of an MCC on the other train to be acceptably small.

The inspector reviewed the licensee's justification for continued operation until the 13R outage and did not identify any deficiencies.

7.2 Isolation Condenser Vent Valve Closure Analysis

The NRC inspector reviewed Safety Evaluation number 000211-010 dated December 3, 1990, addressing closure of the "B" Isolation Condenser vent valves for an indefinite period. This was done to minimize the effects of packing leakage from the vent valves (V-14-1 and V-14-19). The inspector reviewed Topical Report (TR) 056 Rev. 1, "Evaluation of Isolation Condenser Performance With Noncondensable Gases in Steam," and FSAR Section 6.3.1.1.2, "Isolation Condenser System Description." During this review, the inspector questioned what effects the installation of the Hydrogen Injection system modification had on the buildup of noncondensables in the isolation condensers. Discussions with GPUN determined the conditions established for the analysis conducted in TR 056 Rev. 1 bounded the conditions that would result from the Hydrogen Injection system modification. GPUN has revised TR 056 to include a discussion regarding the effects of the Hydrogen Injection system modification. The NRC inspector reviewed revision 2 of TR 056. Based on the review of the safety evaluation, Topical Report 056 Rev. 2, and the FSAR, the inspector determined the safety evaluation was adequate.

7.3 Emergency Diesel Generator Fuel Oil Storage Tank

On January 17, 1991, NRC inspectors discussed, with the system engineer, GPUN rationale for a decision to replace the emergency diesel generator (EDG) fuel oil storage tank (FOST) during the upcoming refueling outage. NRC inspectors also discussed GPUN's evaluation of actual and potential corrosion problems associated with the tank.

GPUN evaluated external corrosion concerns by performing ultrasonic testing. These results showed readings exceeding the 1/4 inch nominal tnickness.

GPUN evaluated the possibility of internal corrosion by sampling the tank bottom. Sample results showed normal moisture contents. Tank bottom samples did identify the presence of sludge. The micro-organisms were not culturable, so GPUN concluded there was no microbiological induced corrosion occurring. GPUN concluded the absence of moisture minimized the possibility of internal general corrosion.

Exterior tank condition and tank cubicle condition indicated that water was likely to be present outside the tank. GPUN acknowledged the possibility of water seeping under the tank bottom and causing significant tank bottom corrosion. This possibility formed the basis for GPUN to plan to inspect the tank bottom. Inspection of the tank bottom was operationally difficult and was impossible without draining and lifting the tank.

GPUN summarized the assessment of EDG FOST in GPUN memo 5310-91-024. The conclusions were:

-- External corrosion has not degraded the tank vertical wall;

-- Oil sample results that were essentially free of water minimize the concern for internal tank bottom corrosion;

-- The tank was originally given a protective coating both inside and outside;

-- No corrosion was expected inside the tank based on oil sample results;

-- No oil leaks were known to exist; and,

-- There were no known problems/corrosion damage to the tank.

NRC inspectors reviewed GPUN memorandums 5310-91-024 dated January 30, 1991; MC/85/3503 dated December 27, 1985 (and attached UT results); MC-86-3673 dated March 20, 1986; and, ME-86-800 dated December 1, 1986. NRC inspectors concluded: there was no known deficient condition affecting the ability of the FOST to function; that GPUN plans to inspect the bottom of the tank were prudent; and, that GPUN's decision to replace the tank was based on cost and the ability to implement tank upgrades.

7.4 Isolation Condenser Valve Binding

NRC inspectors reviewed Safety Evaluation 000221-011, Revision 0, addressing the root cause analysis for historic occurrences of isolation condenser condensate return valves failing to open and addressing operational changes to preclude recurrence.

GPUN reviewed the performance and maintenance history of the valves since 1983. A table of distinctions and changes was generated. The operational experiences and facts were evaluated against possible causes.

GPUN concluded that thermal binding best explains past valve performance. To address this concern, GPUN implemented procedure changes to stroke the valves open and closed with every 50 degrees F primary coolant temperature change during plant cooldown. Previous procedure requirement was to cycle the valves every 100 degrees F. The last plant shutdown and cooldown occurred on June 25, 1990. During this, the valves were cycled once every 54 to 79 degrees F while primary coolant temperature was above 212 degrees F. No valve binding occurred. GPUN concluded verification of the cause will be demonstrated by future valve performance.

GPUN concluded the overall safety significance of past occurrences of thermal binding was negligible. This conclusion was based on the following.

-- The isolation condensers removes decay heat in the event of reactor isolation. They provide no function within the design basis envelope to prevent exceeding design pressure or thermal limits for any analyzed event.

-- The safety significance was further minimized by the capability to manually operate the valves. Manual operation was not affected by thermal binding.

-- Thermal binding was not expected for isolation condenser initiation from normal operating conditions, plant cooldown using the isolation condensers, and not for both subsystems at the same time.

NRC inspectors concluded that GPUN evaluation of this condition was detailed and thorough. Possible causes were tested against the problem specification. The increased incidence of thermal binding during plant cooldown in 1989 and 1990 indicated degraded reliability of these valves which the licensee believed to be resolved by increased frequency of valve cycling. The safety significance of these historical occurrences was low. During the occurrences the licensee declared the affected valve inoperable and took appropriate action as required by the plant technical specifications. GPUN is planning to replace these valves during 13R refueling outage with valves known to be not affected by thermal binding.

NRC inspectors reviewed Station Procedures 203.1, Revision 39, "Plant Cooldown from Hot Standby to Cold Shutdown," and 307, Revision 39, "Isolation Condenser System." NRC inspectors verified that the procedure requirements to cycle isolation condenser condensate return valves have been implemented.

7.5 Plant Drawings

On January 22, NRC inspectors determined the status of GPUN initiatives to upgrade Oyster Creek drawings. Approximately 923 electrical elementary and system flow diagrams have been transferred to a computer aided design (CAD) system and have been issued to the field. This includes all control room process and instrumentation drawings. GPUN stated that site quality assurance was monitoring the use of the new drawings.

NRC inspectors assessed the GPUN backlog for updating site drawings by reviewing key electrical drawing revision status (revision priority R2), historical backlog of key electrical drawings requiring revision, and the status of revision priority R1 drawing revisions. NRC inspectors reviewed technical functions procedure 5000-ADM-7312.01 (EP-002), "GPUN Drawings," Revision 4-00, to determine the drawing revision requirements. R1 drawings were targeted for revision within 30 days after the posting of change documents. R2 drawings will be revised when six or more change documents have accumulated.

As of January 15, of 3356 key electrical R2 drawings, none had three or more change documents posted. One hundred and twenty six drawings had one or two change documents posted. The backlog of key electrical R2 drawings with change documents posted has been reduced from about 825 in October 1989 to 126 in January 1991.

As of January 22, of 1419 R1 drawings, eight had unimplemented change documents. Two of these drawings were recently upgraded from R2 and were not yet revised. The other six drawings had change documents posted for 36, 26, 15, 33, 15, and 17 days.

Based on the low number and recent ages of change documents, and on the reduction in total number of R2 drawings with change documents posted, NRC inspectors concluded that GPUN was effectively updating R1 and R2 drawings.

Oyster Creek's plant labeling effort has resulted in field change notices (FCNs) to correct plant drawing errors. NRC inspectors reviewed the seven FCNs submitted from September 1990 through December 1990 due to the plant labeling program. Four of these FCNs documented missing component identification numbers. Two FCNs identified drawings that did not show small valves. One FCN documented an incorrect component identification number. Five of these FCNs were associated with non-safety related systems. Of the remaining two, one was associated with the diesel generator sump waste tank. The other (FCN C083267) documented an instrument root valve, shown on the drawing, that did not exist in the field, and, an inaccurate instrument designation. NRC inspectors reviewed FCN C083267 and concluded that these drawing errors did not adversely affect plant safety.

8.0 REVIEW OF PREVIOUSLY OP ED ITEMS (92701,92702)

(Open) Violation 50-219/89-02-01. This vio tion resulted from NRC inspectors' identification of three Raychem splices in the Limitorque motor operator for valve V-14-30 which did not meet the required seal length.

GPUN's response to the notice of violation indicated the splices were replaced with qualified splices on January 31, 1989. The response also indicated wo of the three splices could have been qualified based upon a Wyle Labs test for Commonwealth Edison on substandard Raychem splices. This test included seal lengths of 1/8 inch and test parameters that exceeded the environmental conditions at Oyster Creek. The other splice was determined operable based on an evaluation that this component would have performed its safety function prior to the environment becoming harsh.

In the response to the notice of violation, GPUN also indicated the deficient splices belonged to an older generation of splices and were of an isolated nature. Since late 1985, training and procedures in Raychem splice work have been strengthened and high quality splices have been achieved. GPUN further noted sample inspections performed on splices have been reasonable and adequate to address this older generation.

The inspector reviewed the licensee's corrective action to avoid further violations. GPUN indicated that they will inspect splices during the course of routine maintenance and surveillance. The inspector reviewed Station Procedure 105.3, Rev. 6, "Maintenance of Oyster Creek Environmental Qualified (EQ) Equipment." Step 6.2.3.2 of this procedure provides guidelines to inspect all Raychem splices within the work boundary and initiate a deviation report to document any deficiencies. The inspector concluded the licensee has programmatically implemented this commitment.

Further review and discussion with various plant personnel, including electrical maintenance, QC, EQ group, and licensing showed that no documentation was available which documented the results of these inspections. The inspector could not verify this procedural guideline was being followed.

This violation remains open pending GPUN's demonstration of the effectiveness of Procedure 105.3 guidelines on inspection of splices during ongoing work.

(Open) Unresolved Item 50-219/90-23-02. On January 24, NRC inspectors reviewed the results from the field calibration check of the battery capacity tester, BCT-1000, performed on December 6, 1990. The inspector verified that the test results satisfied the vendor recommendations as specified in VM-OC-0284, "BCT-1000 Battery Capacity Test System Instruction Manual," Section 5.2.1. No deficiencies were identified.

NRC inspectors also reviewed procedure A100-ADM-3053.01, "Calibration of Maintenance Test and Inspection Tools, Gauges, and Instruments," Revision 2. Section 6.2.1 required that only current calibrated equipment shall be used and all transactions shall be documented on the Test Equipment Usage Record. NRC inspectors reviewed the test equipment usage record for the BCT-1000 and identified that uses of the equipment in September 1990 and November 1990 for emergency diesel generator maintenance were not recorded. This item remains open pending GPUN's implementation of corrective actions for BCT-1000 use, and NRC review.

9.0 INSPECTION HOURS SUMMARY

The inspection consisted of normal, backshift and deep backshift inspection; 23.5 of the direct inspection hours were performed during backshift periods, and 10.5 of the hours were deep backshift hours.

10.0 EXIT MEETING AND UNRESOLVED ITEMS (40500,71707)

10.1 Preliminary Inspection Findings

A verbal summary of preliminary findings was provided to the senior licensee management on January 31, 1991. During the inspection, licensee management was periodically notified verbally of the preliminary findings by the resident inspectors. No written inspection material was provided to the licensee during the inspection. No proprietary information is included in this report.

10.2 Attendance at Management Meetings Conducted by Other NRC Inspectors

On February 1, 1991, the resident inspectors attended the exit meeting for inspection 50-219/91-02. At this meeting, the lead inspector discussed preliminary findings with senior GPUN management.

10.3 Unresolved Items

Unresolved items are matters for which more information is required to ascertain whether they are acceptable, violations or deviations. Unresolved items are discussed in paragraphs 2.2, 4.1, 4.2 and 8.0 of this report.