U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 89-08

Docket No. 50-219

License No. DPR-16 Priority -- Category C

Licensee: GPU Nuclear Corporation
P.O. Box 388
Forked River, New Jersey 08731

Facility Name: Oyster Creek Nuclear Generating Station

Inspection At: Oyster Creek

Inspection Conducted: March 13-17, 1989

Inspector: C J Anderson for 4/26/89
C. H. Woodard, Reactor Engineer date

Approved by: C J Anderson 4/26/89
C. J. Anderson, Chief, Plant Systems Section, Engineering Branch, DRS date

Inspection Summary: Inspection conducted on March 13-17, 1989 (Report No. 50-219/89-08)

Areas Inspected: Routine announced inspection of the licensee's implementation of relief and safety valve position indication sections of NUREG-0737, Clarification of TMI Action Plan Requirements. The inspection addressed licensee's procedures in use for the purchase, receipt, storage, handling and control of emergency diesel generator fuel. The inspection also reviewed selected areas to verify actions taken to resolve previously identified items.

Results: No violations were identified. Several weaknesses were identified in the area of emergency diesel generator fuel control and in the analysis of root cause and corrective actions required in the area of 480 Vac molded case electrical circuit breakers.

DETAILS

1.0 Persons Contacted

GPU Nuclear Corporation

*E. E. Fitzpatrick, Vice President/Director
*D. J. Ranft, Manager, Plant Engineering
*R. Barrett, Director, Plant Operations
*R. Hillman, Manager, Plant Chemistry
*J. Solakiewitz, Manager, Operations Quality Assurance
*B. DeMerchant, Licensing Engineer
D. Jones, Electrical Engineer
K. Barnes, Licensing Engineer

U.S. Nuclear Regulatory Commission

E. Collins, Senior Resident Inspector
*D. Lew, Resident Inspector

*Denotes personnel present at the exit meeting on March 17, 1989.

2.0 Licensee's Actions Taken on Previous Findings

2.1 (Closed) Violation 50-219/88-35-01

A previous inspection (88-35) identified several licensee maintenance procedures in use without appropriate approval signatures that were required by corporate administrative procedures. The licensee had identified this problem several months earlier during a QA review and had stopped the practice of issuing procedures without the approval signatures on the document (but with approval signatures on file for each document). However, actions had not been taken to remove a total of twenty eight unsigned procedures from the system.

The inspector confirmed that all twenty eight of the procedures now have been revised to include the required approval signatures. This item is closed.

2.2 (Closed) Unresolved Item 50-219/88-35-02

A previous inspection (88-35) indentified weaknesses in the licensee's procedures for the control of measuring and test equipment (M&TE). Specific deficiencies were identified in the areas of lost M&TE and in mixing controlled and non-controlled M&TE. The inspector verified that the licensee now has established and implemented procedures to assure the segregation of controlled and non-controlled M&TE and for dispositioning lost M&TE. This item is closed.

3.0 NUREG-0737 TMI Action Plan Item II.D.3 Direct Indication of Relief and Safety Valve Position

This item specifies that reactor coolant system relief and safety valves be provided with postive position indication in the control room which is derived from a reliable valve-position detection device or a reliable indication of flow in the discharge pipe.

Previous NRC inspections confirmed that the licensee had installed an acoustical monitoring system to monitor the positions of the five relief valves (EMRV) and sixteen safety valves. Backup valve position indication was provided by temperature sensors (thermocouples) located on the discharge piping of the relief and safety valves. In addition, both high drywell pressure and temperature would respond to an open relief or safety valve. It was previously determined that the licensee's valve position indication system design meets NRC requirements. However, verification of the adequacy of the installation, the adequacy of components qualification, and the adequacy of procedures for the system were not assessed. This inspection was conducted to verify these items.

Inspection findings are the following:

- The technical specifications impose relief and safety valve position indication operability requirements anytime the reactor mode switch is in the "startup" or "run" position. The inspector verified that surveillance and leakage testing requirements have been established and are now incorporated into station procedures.

- The system and its components have undergone both design and qualification upgrades since the initial system design in 1980. The inspector verified IEEE STD 323 Class 1E qualification by a review of Patel Engineers Environmental Qualification Report PEI-TR-830400-1 dated February 14, 1984 and subsequent 10 CFR 50.59 evaluations. The circuitry, system and components for the sixteen safety valve position indicators are the same as for the five EMRV units.

- The inspector verified the indication read-outs provided and their locations. The acoustic monitors provide for routine individual channel read-out in the control room on panel 1F2F. A common "Safety/EMRV Not Closed" alarm is actuated for any one of the 21 relief or safety valves. Backup indication of the EMRV is provided by two EMRV downcomer thermocouples readings on panel 1F2F. Additional backup thermocouples indication is provided for all valves on panel TE-210 at the 23' elevation in the reactor building. Indication of a large leak is also provided by the drywell pressure and temperature instrumentation in the control room.

- The inspector verified that the technical specification operability of the acoustic monitoring valve position monitoring system is determined monthly in accordance with licensee procedure number 602.3.008 "Main Steam Line Safety/EMRV Acoustic VMS Tests." This procedure requires verifying operability of the 5 EMRV and 16 safety relief valve channels.

- The inspector verified that the technical specification operability of the backup thermocouple valve montioring system is determined monthly in accordance with licensee Procedure Number 602.4.011 "Thermocouple Valve Monitoring System Monthly Channel Check," Rev 5, 1/25/88. This procedure requires verifying the EMRV downcomer thermocouple readings on main control room panel 1F2F and then verifying operability of all 21 of the relief and safety valve thermocouples by taking readings on temperature indicator panel TE-210 in the Reactor Building at the 23' elevation.

Inspection of the acoustic monitor valve position indicators and alarms on the main control panel and on the acoustic monitor panel, and the backup valve position indicators (thermocouple read-outs) both on the main control panel and at the 23' elevation in the reactor building did not reveal any discrepancies or problems with the system, its components, or its surveillance, operating and test procedures. Within the scope of this inspection, the licensee has completed the implementation of this NUREG-0737, Item II.D.3. No deficiencies were identified.

4.0 Emergency Diesel Generators (EDG) Fuel Oil

An inspection was performed to determine the licensee's program for the procurement, receipt, storage, handling, and control of EDG fuel oil to ensure adequate quality. Observations and findings are the following:

- The licensee procures the correct No. 2 diesel fuel oil for the EDG units in accordance with their Specification 1302-38-010. This specification cites the applicable ASTM, ANSI, Federal, and General Motors specifications and standards for the fuel and for tests of the fuel. This specification also invokes the fuel quality program requirements of Regulatory Guide 1.137. Copies of licensee purchase orders were reviewed to confirm their requirements. No discrepancies were observed.

- The licensee's internal documented response to IE Information Notice 87-04 was reviewed. This notice concerns an EDG fuel starvation event at another facility which involved fuel filter clogging sufficient to shut down the EDG. The licensee's engineering evaluation concludes that due to the differences in the fuel systems and the fuel sampling and maintenance procedures that problems such as those contained in IN 87-04 are not problems at Oyster Creek. No deficiencies in the evaluation were noted.

- Assurance of proper quality fuel requires initial receipt and periodic sample analyses. The licensee's fuel oil sampling program includes taking samples from delivery trucks, weekly samples from the main fuel tank and at least monthly samples from the EDG fuel tank (and everytime there is a transfer of fuel from the main fuel tank). Tank samples are taken from the bottom of the tank and are analyzed on site for water and sediment, viscosity, and specific gravity. Tank and delivery truck samples are analyzed offsite for the pertinent remainder of the ASTM D975 fuel parameters utilizing specified ASTM test methods. These offsite analyses now require approximately one month before the test results are known. The licensee is currently taking action to obtain sample analyses in a shorter time to make them more meaningful. The receipt of improper quality fuel has not been a problem.

- During routine bi-weekly operations of the EDG units, fuel pressures and differential pressures are monitored for evidence of fuel or filter fouling. There have been no previous problems with fuel filter fouling or plugging. The filters are replaced with new filters each outage. No deficiencies in the fuel pressure monitoring program were noted.

- The licensee does not utilize a fuel oil tank recirculation system for cleaning/filtering the stored oil. The main fuel receiving/storage tank is a 75,000 gallon tank which is used for auxiliary boiler fuel as well as EDG fuel. Deliveries are scheduled to receive 22,500 gallons of fuel per week into this tank; therefore fuel turn-over is frequent with little chance for fuel degradation or accumulation of particulates. The EDG fuel tank is a 15,000 gallon tank. The tank is neither recirculated nor filtered and gets little turn-over of fuel from the infrequent short runs of the two diesel generators. The inspector expressed a concern that the above practices could lead to a problem. (Refer to the later paragraph on fuel additives which describes the problem).

- The licensee is not committed to clean and inspect the EDG fuel storage tanks at a minimum of 10-year intervals in accordance with Regulatory Guide 1.137 recommendations. Approximately three years ago the main fuel tank was cleaned, inspected and coated. However, the EDG fuel tank has not been cleaned. The licensee stated that there has been no evidence either from cleaning the main tank or from fuel samples taken of a need to clean the EDG fuel tank at the RG 1.137 recommended intervals.

- There are fuel additives which function to increase fuel stability and inhibit oxidation and bacterial growth. The inspector determined that the licensee does not use these fuel additives. Licensee fuel purchase specifications establish a maximum of two milligrams of insoluables per 100 milliliters. While the licensee has not had a problem meeting this specification for the purchased fuel, according to the Quality Assurance Monitoring Report dated June 29, 1987; fuel

oxidation stability exceeded the purchase specification for the stored fuel numerous times during the preceding year. Based upon these findings, the licensee revised their test/analysis procedure to include specification oxidation stability requirements for the fuel in storeage and to provide for appropriate corrective actions.

- EDG fuel oil tank level, fuel pressure and differential pressure alarms are annunciated on the local EDG control panel and also on an EDG fuel common trouble alarm in the main control room.

- The EDG systems at Oyster Creek were procured as commercial grade systems. As such the instruments and controls that function to provide EDG fuel control and alarm functions were not seismically qualified in accordance with IEEE-344-1975, Recommended Practices for Seismic Qualification of Class 1E equipment for Nuclear Generating Stations. However, failure of these controls and alarms would not prevent the EDG from operating since initial operation is with gravity fed fuel from the fuel day tank and the alarm functions do not inhibit EDG operation. Also, the licensee is not committed to IEEE-344-1975 for these instruments and controls.

Conclusions drawn from this inspection of the licensee's program for ensuring EDG fuel quality are the following:

- Procurement specifications ensure that the proper fuel is ordered and fuel sampling frequencies and analysis criteria could ensure the proper fuel. However, fuel analysis lag time provides a time period of approximately one month when critical portions of the analyses test data are unknown and the fuel could be "out of spec." "Out of spec" fuel could cause the EDG's to be inoperable. This is considered to be a weakness in the licensee's program that the licensee is taking action to improve.

- Without a fuel recirculation system and without fuel additives to reduce oxidation and biological growth, fuel insolubles appear to be a problem. The licensee's incorporation of specification requirements for the insolubles in the fuel sampling/analyses procedure appears to be a step which should ensure addressing this apparent weakness.

An inspection was made of the licensee's EDG sampling/inspection program for engine lubricating oil and jacket water. Samples of lubricating oil from the EDG crankcases are taken and analyzed twice yearly for any evidence of oil contaminants including excessive engine wear materials. EDG jacket water is sampled and analyzed twice yearly for control purposes. DREWGARD 4109 is used as a corrosion inhibitor. This inspection did not identify any deficiencies in the licensee's lubricating oil and jacket water control program.

5.0 Emergency Diesel Generators (EDG) LOCA/LOOP Test

On March 13, 1989 during the conduct of the outage simulated LOCA/LOOP test of the EDG units, seventeen out of eighty GE Type TED-136 480volt molded case circuit breakers failed to trip-open to disconnect their loads from their buses prior to the automatic sequencing of required loads onto the EDG units. As a consequence the undesired unshed loads were energized along with the desired loads. The Safety Systems Outage Modifications Inspection (SSOMI) conducted by the NRC during October 1988 identified a concern for the heavily loaded EDG buses with the possibility of overloaded EDG units during an accident condition in which they are required. Because of the SSOMI overloading concerns, the licensee revised EDG Operating Procedure 341 to provide specific operator instructions for loading/unloading of the EDG units to prevent undue overloading. However, the operating procedures do not address the potential for EDG overloading that can occur during a LOCA/LOOP accident if a substantial number of the loads do not shed (trip off) the buses due to circuit breaker undervoltage trip malfunction.

According to the licensee, a number of these circuit breakers have failed to shed their loads during previous outages when the simulated LOOP/LOCA EDG test was run. In all cases the loads not shed were small and the tests were successfully completed with the EDG units sequencing on and carrying all of the required safety loads. The failed breakers in every cases were tagged out for repair/replacement prior to startup. Work was handled on a work request basis without the use of documentation which would require detailed analysis of the event including root cause analysis and corrective actions to prevent recurrence. The inspector reviewed licensee preventive maintenance records for the molded case breakers and found that they normally are scheduled for trip testing on a three year cycle. Since these are safety-related sealed breakers, breakers that fail are replaced.

The inspector reviewed the licensee March 13, 1989 deviation report of the current circuit breakers failures. The report adequately describes the test and the conditions under which the breakers failed to operate. The evaluation portion of the report indicates that the failure was of safety significance, but not reportable since the failure would not prevent the EDG from supplying loads during the loss of power test. The work request generated following these failures required that the breakers be tested and operable or tagged out until they can be determined to be operable prior to restart.

During this inspection, licensee engineering personnel made an evaluation of worst case EDG loading during a LOOP/LOCA accident and concluded that loading would be within the EDG units 2900 KW maximum overload rating even if none of the 480 volt molded case circuit breakers opened. The loads in this case would be 2605 KW base load plus 285 KW extra for Unit 1 and 2677 KW plus 170 KW extra for Unit 2. This could provide operators with time to reduce the loads by manually tripping loads that are not required; however, this approach did not address the problem of frequent breaker failures. As a consequence, the licensee committed to the following actions during this inspection:

- Revising the EDG simulated LOOP/LOCA test procedures to include the FSAR requirement for those breakers which are to shed their loads to trip. This will require the licensee to formally address breaker failures in order to successfully complete this test.

- Revising EDG Operating Procedure 341 to include the manufacturer's 2000 hour, 200 hour and 4 hour ratings and additional load control information.

- Further evaluation of the root cause of this substantial number of circuit breaker failures and assessing corrective actions which are required to prevent recurrence.

The inspector had no further questions.

6.0 Exit Interview

An exit interview was held on March 17, 1989 with members of the licensee staff, denoted in paragraph 1, at the conclusion of the inspection. The inspector summarized the scope and findings of the inspection at that time.

No written material was provided to the licensee.