U.S. NUCLEAR REGULATORY COMMISSION
Region I

Report No. 86-18

Docket No. 50-219

License No. DPR-16 Priority -- Category C

Licensee: GPU Nuclear Corporation

Post Office Box 338

Forked River, New Jersey 08731

Facility Name: Oyster Creek Nuclear Generating Station

Inspection At: Oyster Creek

Inspection Conducted: June 24-27, 1986

Inspector: c/a for C. Woodard 7/15/86
C. H. Woodard, Reactor Engineer date

Approved By: C J Anderson 7/15/86
C. J. Anderson, Chief, Plant Systems Section, Engineering Branch, DRS date

Inspection Summary: Inspection June 24-27, 1986 (Report No. 50-219/86-18)

Areas Inspected: Special announced inspection of the activities related to the outage modifications of the emergency diesel generator systems and equipment. The inspection focused upon the licensee's authorization and planning, documentation, the physical modification, quality assurance, records, and training in the performance of the modification.

Results: No violations or deviations were identified.

8607240051 860716
PDR ADOCK 05000219
Q PDR

DETAILS

1.0 Persons Contacted

GPU Nuclear Corporation

* P. Fiedler, Vice President and Director of Operations
* J. Sullivan, Director of Plant Operations
* W. Smith, Director of Plant Engineering
* B. Hoffman, Licensing Representative
* D. Jones, Manager, Plant Engineering
  M. Radvansky, Manager, Technical Services
  M. Badaj, Manager, Plans and Programs
  W. Garvey, Assistant to the Director of Operations
  H. Carpenter, Supervisor, Electrical Instrumentation
  D. Burgess, Electrical Maintenance Supervisor
  D. Hammer, Electrical Supervisor
  C. Sola, Mechanical Planning Supervisor

United States Nuclear Regulatory Commission

  J. Wechselberger, Resident Inspector
* W. Baunack, Project Manager

*Denotes those present at exit meeting on June 27, 1986.

2.0 Scope of Inspection

2.1 Inspection Objective

This inspection was made to assure that the outage modifications to the Class 1E Emergency Diesel Generators were in accordance with the plans and objectives cited by the licensee in response to NRC Circular 79-12, Generic Letter 84-15, NRC Systematic Evaluation Program Report Topic Item III-2, NUREG/CR-0660, NUREG/CR-2989, and to General Motors Modernization Recommendations MI 9644 for the enhancement and improvement in diesel generator reliability.

2.2 Inspection Coverage

Inspection was made of modifications made by the licensee including 1) replacement of the turbochargers to provide better starting performance; 2) additional pre-lubrication capability to enhance both engine and turbocharger pre-lubrication; 3) underfrequency relays for diesel generator protection; 4) generator high reactive and high reverse power bypass circuitry to keep the units on line in the event of an accident; and 5) maintenance modifications to the generators.

3.0 Inspection

3.1 Inspection Organization

The inspection was organized into five distinct phases as follows:

1. A review of the licensee's plan, program, authorization and schedule for the work to be performed.

2. A review of the licensee's documentation required to perform the modifications from initial authorization and approval to final walkdown/turnover to operations.

3. Physical inspection of the modification work in progress and of completed work including quality assurance, inspection, tests and verifications.

4. A review of the operational procedures and training for instructing the operators relative to the modification.

5. A review of plant record drawings and documents to ascertain that key drawings reflecting the modification are in the control room and are on file for troubleshooting and maintenance.

3.1.1 Phase I - Planning and Programming

The licensee's plan, program and schedule for this outage modification work of the emergency diesel generators was reviewed. Included in this review are documents listed in Section 3.1.2 which cover the following areas:

- -- Project Description
- -- Work Authorization and Approvals
- -- Schedule
- -- Safety Evaluation Reports
- -- Environmental Impact Statements
- -- Installation Specifications
- -- Modification Procedures
- -- Fire Hazards Input Status Report
- -- Operator Procedures and Training
- -- Quality Assurance/Quality Inspection Program
- -- Procurement, Receipt, Storage and Handling Programs

Review of the documentation did not disclose any problem areas in the planning, programming, descriptions, reports, procedures, programs and overall management control of the outage modifications of the emergency diesel generator equipments and systems.

3.1.2 Documents Reviewed by the Inspector Appropriate to the Modifications

-- Safety Evaluation SE 402775-001 - Diesel Generator Lube Oil Modification

-- Environmental Impact Evaluation 402775-001 - Diesel Generator Lube Oil Modification

-- Plant Review Group Review of Modifications, Technical Specifications, and Safety Evaluations for Diesel Generator Lube Oil Modifications, Review 86-034, SE 402775-001

-- GPU Nuclear Turnover Notification SUT-131 for Diesel Generator Lube Oil Modifications

-- Diesel Generator Lube Oil Modification Control Checklist (Review and Approvals)

-- Oyster Creek Nuclear Generating Station Procedure 636.4.003, Diesel Generator Load Test

-- Oyster Creek Nuclear Generating Station Procedure 341, Standby Diesel Generator Operation

-- Oyster Creek Nuclear Generating Station 4160 Volt Station Power EDG 1, Procedure 2000-RAP-3024.02 Alarm Response Procedure

-- Voltage Profile Calculation C-1302-741-5350-001 for 1E 4160 and 460 Volt Busses (Reflecting the additional Lube Oil Pump Load)

-- Power Supply Report 3731-033 for Emergency Diesel Generators Lube Oil Circulating Pump System

-- Diesel Generators Lube Oil Modifications Report BA:402775

-- GPU Nuclear M&C Work Management System Work Authorization MCT Work Order No. A15A-30775-01

-- GPU Nuclear Fire Hazards Analysis Input and Status Report OC-402775-001

-- GPU QAP 7210.03-11 In Process Control Hold/Witness Point Checklist for Emergency Diesel Generators Lube Oil Modification

-- GPU Structural and Pipe Weld Records, QC Acceptance Sheets for Emergency Diesel Generator Lube Oil Modifications

-- OCNGS Functional Test Procedure Diesel Generator Lube Oil Upgrade Functional Test TP 227/1 and Startup and Test Briefing Checklist

-- GPU Nuclear P&ID Emergency Diesel Generator Lube Oil System 3D-861-21-1001 and 3D-861-21-1002

-- GPU Nuclear Installation Specification OCIS-402775-001 for Oyster Creek Emergency Diesel Lube Oil Modification

-- GPU Work Authorization MC-ITS-629, WA A15A-52710 - Replace Two (2) Diesel Generator Turbochargers

-- GPU Station Procedure A15A-52710 Diesel Generator Turbocharger Replacement

-- GPU QAP-7210.03-11 - In-Process Control Hold/Witness Point Checklist for Diesel Generator Turbocharger Replacement

-- GPU Nuclear Authorization and Approval for the Emergency Diesel Generators Underfrequency and Protective Interlocks

-- GPU Safety Evaluation 402765-001 for Diesel Generator UF Trip and Protective Interlocks

-- GPU Installation Specification OC-IS-402765-001 for UF Trip and Protective Interlocks

-- GPU Station Procedure A15A-30765 for Diesel Generator UF Trip/Protection Interlock

-- GPU MCF Work Order A151-30765 to Install UF Relays/ Protective Interlocks

-- GPU Modification In-Process, Control Hold/Witness Checklist and Approval for Diesel Generator UF Relays/ Protective Interlocks

-- GPU Nuclear Functional Test Procedure TP 427/1 for Diesel Generator Underfrequency Trip and Protective Interlock Test

3.1.3 Physical Inspection of the EDG Modifications

The inspector observed both the replacement turbocharger and generator modifications of EDG Unit 2 including lift from the shipping skids to fit-up and bolt-up onto the emergency diesel generator skid. These lifts, and installations were made in accordance with the referenced licensee's procedures. Quality Assurance hold, test, witness, measure and check points were observed by the inspector.

The installation of the completed additional pre-lubrication capability to the turbocharger and modifications in the engine prelube pumping, piping and valving was inspected on EDG Unit #1. This modification was made in accordance with recommendations made in the following documents to enhance turbocharger and engine reliability by means of a superior pre-lubrication system:

-- NRC Circular 79-12, June 28, 1979

-- Reliability of Emergency AC Power Systems NUREG/CR-2989, June 1983

-- Enhancement of On-Site Emergency Diesel Generators Reliability NUREG/CR-0660, February 1979

-- NRC Generic Letter 84-15, July 2, 1984 Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability

-- MI.9644 - General Motors, Electromotive Division "Modernization Recommendations"

-- NSAE/79 - A Limited Performance Review of Fairbanks-Morse and General Motors Diesel Generators at Nuclear Plants, April 1984

-- INPO SOER 83-1, March 3, 1983

-- GPUNC Memo MC-2169/0118N December 19, 1983

Since the pre-lube modification required an additional 3/4 horsepower a-c motor driven pump with a ½ horsepower d-c motor driven backup pump, the inspector reviewed the electrical design and installation drawing and physically inspected the electrical installation for the Unit 1 EDG.

No unsatisfactory conditions were observed in the modifications of the EDG including the installation of the new turbocharger, the modified pre-lube system, and the refurbished electrical generator. The inspector also reviewed the licensee's revised Class 1E electrical load profile calculations which include the additional pre-lube motor loads. These additional loads are within the diesel generators rated load capability and the most severe Loss of Coolant Accident loading conditions.

The inspector reviewed two modifications made in the 1E 4160 volt switchgear control for each diesel generator. The first modification was to provide the bus with an underfrequency relay to protect the diesel generator from potential overload damage when operating the unit in parallel with the grid during surveillance testing. The underfrequency relay will drop out the diesel generator circuit breaker if the electrical grid frequency decays such that the diesel generator would attempt to power the grid with the possibility of causing damage to both the diesel engine and/or the generator. The underfrequency relay is bypassed during loss of offsite power when the diesel generators would be required to supply emergency power.

The second modification is made in response to NRC Systematic Evaluation Program Topic III-2 requirements. It provides for bypass of two diesel generator circuit breaker trips during accident conditions such that the units remain on-line. The two trips bypassed are reverse power and high reactive (VAR) power. Inspection was made of the protective underfrequency relay installations in the Unit #1 EDG panels. Interior panel wiring identification, terminations, support and separations were observed. The inspector also confirmed that the licensee had seismic qualifications for the additional protective relays. No discrepancies were observed between the modifications as approved and installed nor were there any observations of deviations from codes and standards to which the licensee is committed in the referenced outage modification documents of Section 3.1.2.

3.1.4 Quality Assurance and Quality Control of the Modification

The inspector reviewed a sampling of the completed work orders and functional test procedures in order to verify that the work was performed in accordance with the plans and procedures cited in 3.1.2 and to confirm that the systems in which the modifications are installed function as specified.

-- TP 427/1 Diesel Generator #1 Underfrequency Trip and Protective Interlocks Test

-- MCF Work Order Number A15A-30765 Install Underfrequency Relays in Electrical Cabinets in DG Rooms and Protective Interlocks

-- QC Procedure A15A-30765 In-Process Control Hold/Witness Point Checklists for UF and Interlocks

-- QC Procedure A15A-5271 In-Process Control Hold/Witness Point Checklist for EDG #1 Generator Refurbishment

-- MCF Work order Number A15A-52710 Replace Diesel Generator Turbochargers

-- QC Procedure A15A-52710 In-Process Control Hold/Witness Point Checklist for Turbocharger Replacement

-- TP 227/1 Diesel Generator Lube Oil Upgrade Functional Test

The inspector did not identify any discrepancies in the quality assurance/quality control verification of the modifications and their functions.

3.1.5 Operator Training and Procedures

The inspector reviewed the following documents which instruct the operators in the proper use of the modified equipment and systems:

-- Alarm Response Procedure 2000-RAP-3024.02

-- Standby Diesel Generator Operation - GPU Station Procedure 341

-- Diesel Generator Load Tests Procedure 636.4.003

-- Standby Diesel Generator Operating Procedures A15A-30765 and A15A-52710

The inspector found no discrepancies in the instructive procedures and training provided to the operators for these modifications.

3.1.6 Record Drawings

The inspector reviewed the record drawing system in use for translating plant modifications into record working drawings.

The licensee maintains a "Control Room Drawing" list which includes safety-related P&IDs and one line diagrams. Upon turnover of a plant modification, the control room drawing must be updated to reflect the modification prior to the turnover. Prior to drawing revision, drawings other than critical control room drawings are keyed with field modification numbers such that if they are needed, the field modifications which are appropriate are flagged to the drawing and can be secured. Based upon an INPO critique, the licensee embarked upon an aggressive current drawing program approximately 2 years ago. The objectives of this program to keep drawings current are projected by the licensee to be met by year end.

The inspector found that the P&IDs and one line drawings for the turbocharger and engine lube oil modifications and for the underfrequency relay and bypass circuitry were updated and in the control room. Lower tier drawings were found to be retrievable with the field change notices keyed in the upper right corner of the drawings such that these changes could be retrieved if needed prior to the time the drawings are fully updated.

4.0 Overall Inspection Findings

The inspector did not observe any discrepancies, deviations, or violations by the licensee in the implementation of the EDG outage modification program over the entire scope of the program from its initial planning and procurement documents to its final check-out test and operator training.

5.0 Review of IE Bulletins

Licensee action taken to address closure of the following bulletin was reviewed during the inspection:

-- IE Bulletins 85-02: Undervoltage Trip Attachments of Westinghouse DB-50 Type Reactor Trip Breakers

Oyster Creek does not use reactor trip breakers to trip the plant, therefore, this bulletin does not apply. This item is closed.

6.0 Exit Meeting

The inspector met with licensee and construction representatives (denoted in paragraph 1.0) at the conclusion of the inspection on June 27, 1985 at the construction site.

The inspector summarized the scope of the inspection, the inspection findings and confirmed with the licensee that the documents reviewed by the team did not contain any proprietary information. The licensee agreed that the inspection report may be placed in the Public Document Room without prior licensee review for proprietary information (10 CFR 2.790).

At no time during this inspection was written material provided to the licensee by the team.