

PHONE: _____

SUPPLEMENTARY INFORMATION TO
LER 83-126/01 X-3

Mississippi Power & Light Company
Grand Gulf Nuclear Station - Unit 1
Docket No. 50-416

Technical Specification Involved: N/A
Reported Under Technical Specification: 6.9.1.12.1

Event Narrative:

On September 4, 1983, at 0610 hours, Diesel Generator 11 was started for maintenance operation. The engine was manually stopped at 1436 hours and the outside fresh air fans were secured when a fire was reported at the engine. Approximately 8 personnel were inside the room when the fire occurred. The room was evacuated and the fire brigade was assembled. The fire brigade responded to the scene with water hoses and necessary equipment. It was noted that the automatic fire water deluge valve had not opened. The manual release was pulled to no avail. A mechanic was able to open the valve by removing the actuator enclosure box cover and striking the top of the weight. The fire was reported to be extinguished at 1501 hours. An unusual event was declared and remained in effect from 1447 hours until 1559 hours. The diesel failure is considered invalid in accordance with Regulatory Position C.2.e(3) of Regulatory Guide 1.108.

I. Diesel Generator Fuel Oil Line Failure

A. Diesel Generator Investigation:

The initial inspection of the diesel engine revealed that the main fuel supply tubing which delivers fuel oil from the Engine Driven Fuel Oil Booster Pump to the left and right bank fuel headers had separated at a tee connection. The separation resulted in fuel oil spraying on a hot exhaust manifold entering the left bank turbo-charger and igniting. The fuel oil flow continued to feed the fire until the engine reached a complete stop. The separation was caused by a crack in the tubing that occurred at the ferrule of the fitting used to connect the tubing to the header tee.

A metallurgical evaluation of the failed tubing indicates that the failure resulted from very high cycle fatigue. The high cycle fatigue resulted because a vendor supplied tubing support, immediately downstream of the fitting, was not installed.

Representatives from Middle South Services and MP&L Plant Staff performed a thorough examination of the area affected by the fire to delineate the fire affected areas. The examination revealed three fire affected areas.

1. Under the left bank turbocharger,
2. The top of the lube oil tank under the left bank turbocharger, and
3. Under the lube oil cooler, approximately in the middle of the cooler.

The metal parts of the engine and pressure vessel exposed to the highest heat were visually examined. No areas of discolored metal, indicating excessive heat, were found. Based on this finding, it was determined that the pressure vessels and engine parts exposed to the highest heat were acceptable for further service. The engine and skid mounted equipment located in the fire areas received varying amounts of damage, depending on the amount of exposure to heat, smoke, and water. The wiring, instruments and tubing located on the front of the engine also experienced heat, smoke, and water damage in varying amounts.

B. Action Taken:

A support bracket was added to the Division 1 and 2 Diesel Generator fuel oil headers. Components which were located in the fire area were replaced since the ability to carry out their design function was in question. Other components which may have been subjected to heat or water damage were inspected and either replaced or reworked, depending on the as found condition. Any item whose condition could not be accurately evaluated was replaced. Maintenance Work Orders were generated to perform all work or replacement of the diesel generator equipment. Appendix "A" to this report lists the items which were replaced. When rework or replacement of the affected items was completed, the diesel generator was subjected to a maintenance run to verify all components were functioning normally.

After all work had been completed, the diesel generator was subjected to a "maintenance" run. This type of engine operation allowed monitoring of engine operating parameters at different power levels, and uncovered items which warranted further attention. During the maintenance run, the engine was instrumented for vibratory analysis. The preliminary results of the vibratory analysis revealed that the engine exhibited vibrations that were well within the acceptable limits for this type of machinery, therefore, no additional vibration related failures are anticipated.

After the successful completion of the maintenance run, the unit was turned over to Operations for operational testing. Following the operational retesting, the unit successfully completed a seven day reliability run.

II. Deluge Valve Failure

A. Deluge Valve Investigation:

The failed fire water deluge valve was a 6 inch Model C, serial number S10774, manufactured by Automatic Sprinkler Corporation of America. Although a trip signal was received from the local control panel, the valve failed to open. The valve and the release mechanism were tested and components were removed and examined. No significant abnormal conditions were noted. Some excessive friction was noted between the weight and weight guide rod, however, the valve operated properly during subsequent testing.

Automatic Sprinkler Corporation of America (ASCOA) conducted laboratory tests on a six inch Model C deluge valve and produced a similar failure which was attributed to poor surface finish on the mating surfaces between the clapper nose and latch. Once the mating surfaces were smoothed with 220 grit sandpaper and crocus cloth, a major improvement in the valves' performance was noted.

On December 5, 1983, deluge valve N1P64F77U, which protects Diesel Generator 12, failed to open during performance of a scheduled test. The valve was inspected and exceptional roughness found on the faces was sanded and refinished until smooth in accordance with ASCOA's recommendations. The valve was then reassembled and tested satisfactorily under normal operating pressure.

Based upon further investigation and research data, it is concluded that the failures of September 4 and December 5 were due to the condition of the mating surfaces between the clapper nose and latch.

B. Corrective Actions Taken:

1. The Model C deluge valves protecting the three emergency diesel generators were corrected using crocus cloth and sandpaper per ASCOA's recommendations. The valves were tested under operating pressure and were found to trip with much more sensitivity.
2. All other Model C deluge valves were refinished and tested satisfactorily under normal operating pressure.
3. The surveillance procedure was revised to visually verify that the clapper has lifted and locked open following the test under normal system pressure.
4. The testing frequency for Division 1, 2 and 3 Diesel Generator Room deluge valves has been temporarily increased to establish reliability data.
5. ASCOA revised their technical information bulletins to address the condition of the mating surfaces and to ensure functional tests are performed with pressure on the clapper.

This is submitted as a final report on the Diesel Generator fuel line failure and on the deluge valve failure. The fuel line failure was also reported under 10 CFR 21 as PRD 83/17.

APPENDIX A

The items listed below were replaced after the diesel generator fire. These items either experienced fire or water damage, or were considered suspect since their condition could not be accurately evaluated. Those considered suspect were replaced to support the current schedule.

I. Engine Mounted Equipment

- Left Bank Air Intake Butterfly Valve
- Front Left Bank Air Start Solenoid Valve
- #1, #2, #3 LB Crankcase Relief Valves
- Right Bank Turbocharger
- Right Bank Exhaust Adapter
- Right Bank Exhaust Expansion Joint
- Right Bank Intake Adapter
- Left Bank Turbocharger
- Left Bank Exhaust Adapter
- Left Bank Exhaust Expansion Joint
- Left Bank Intake Adapter
- Left Bank Intercooler
- Left Bank Intercooler Inlet Adapter
- Left Bank Intercooler Outlet Adapter
- Engine Governor
- Engine Driven Fuel Oil Booster Pump
- Overspeed Trip Device
- #1, #2 LB Air Start Manifold Elbows
- Various Fuel Oil Piping
- Various Lube Oil Piping
- Control System Tubing
- #1 LB Air Intake Manifold Elbow
- Shutdown Cylinder
- Fuel Oil Switching Valve
- Fuel Oil Filter
- Fuel Oil Strainer
- #1, #2 LB High Pressure Fuel Injection Lines
- Fuel Oil Return Lines on #5 LB and #1 RB
- Engine Oil Sump to Lube Oil Tank Connector
- #1 LB, #2 LB, #8 LB, #1 RB Fuel Injection Pumps
- Lube Oil Check Valves F059, F094, F045, F080
- Lube Oil Thermostatic Control Valve
- Lube Oil Filter Elements

II. Engine Mounted Instrumentation

- Engine tachometer sensor N073A
- Engine tachometer sensor N073C
- Lube Oil Sump Tank Level Switch N026A
- Engine Vibration Switch N164A
- Shutdown Cylinder Control Air 3-way Valve
- Lube Oil Temperature Element N027A
- Lube Oil Temperature Switch N163A
- Control Air Pressure Regulator
- Overspeed Trip Control Air 3-way Valve
- Shutdown Cylinder Shuttle Valve

Engine Mounted Instrumentation (Continued)

Air Start System Timer Control
Control Air Tubing
Crankcase Pressure Switch N160A
Crankcase Pressure Switch N160B
Crankcase Pressure Switch N160C
Lube Oil Pump Pressure Switch N076A
Turbocharger Lube Oil Pressure Switch N168C
Jacket Water Temperature Switch N162A
Turbocharger Lube Oil Pressure Switch N168A
Fuel Oil Strainer Differential Pressure Switch N027A
Turbocharger Vibration Switch N165A
Lube Oil Outlet Temperature Thermocouple N029A
Lube Oil Pump Pressure Switch N075A
Fuel Oil Pump Pressure Switch N019A

III. Engine Mounted Electrical Equipment

Flex Conduit on C007A Lube Oil Pump
Motor on C009A Lube Oil Heater Pump
Governor to Terminal Box Wiring
Magnetic Pick-Up to Terminal Box Wiring
Sealtight from Terminal Box #4 to Condulet
S.O. Cord from Terminal Box #4 to Governor
Conduit and Sealtight from F507B to Terminal Box #1
Sealtight from Terminal Box #2 to N073A and N073C
All Sealtight Straps
Sealtight and wiring from Lube Oil Level switch to Terminal Box
Sealtight and wiring from Lube Oil pressure switches to Terminal Box
Sealtight and wiring from crankcase pressure switches to Terminal Box
Bearing on Right Bank Crankcase fan motor
Generator Brushes
Lube Oil Heater

IV. Miscellaneous Items

Fire Damper Fuseable Links
HVAC & Piping Insulation
Engine Lubrication Oil
Division I D/G Room Sprinkler Heads
Gauges on Valve P71F543
Temperature Switch X77N010
Aftercooler Temperature Switch N011A
Fire Detectors in Division I D/G Room
Fire Detector 802A and 802E
Sealtight on C013A Air Compressor
Bus Bar on X31E001A Overhead Crane
Overhead Lighting
Emergency Lighting
Intake Air Filter Oil
Lubrication Oil in Air Compressors



MISSISSIPPI POWER & LIGHT COMPANY

Helping Build Mississippi

P. O. BOX 1840, JACKSON, MISSISSIPPI 39205

March 8, 1984

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NUCLEAR PRODUCTION DEPARTMENT

U. S. Nuclear Regulatory Commission
Region II
101 Marietta St., N.W., Suite 2900
Atlanta, Georgia 30303

Attention: Mr. J. P. O'Reilly, Regional Administrator

Dear Mr. O'Reilly:

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-13
File 0260/L-835.0
Update Report - Division 1
Diesel Generator Fire,
Failure of Fire Protection
Deluge Valve to Open
LER 83-126/01 X-3
AECM-84/0137

This letter submits an update to previous reports submitted on September 16, 1983, October 20, 1983, and December 30, 1983. The event for which the report was submitted occurred on September 4, 1983, when a Division 1 Diesel Generator fuel line ruptured resulting in a fire near the left bank turbocharger. The engine was secured and an unusual event was declared from 1447 hours to 1559 hours. Personnel responding to the fire noted that the fire protection deluge valve failed to open. The valve was manually opened. The fire was extinguished approximately 25 minutes after starting. The event was reported pursuant to Technical Specification 6.9.1.12.1.

Our investigation into the cause of the fuel line failure and corrective action associated with the Division 1 and 2 Diesel Generators is complete. Our investigation into the cause of the deluge valve failure and corrective action associated with the deluge valves protecting the three emergency diesel generators is complete. This is a final report. Attached is LER 83-126/01 X-3 with Supplementary Information.

Yours truly,

L. F. Dale
Manager of Nuclear Services

EBS/SHH:sad
Attachment

cc: (See Next Page)

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MISSISSIPPI POWER & LIGHT COMPANY

AECM-4/0137

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cc: Mr. J. E. Richard (w/a)
Mr. R. B. McGehee (w/o)
Mr. T. B. Conner (w/o)
Mr. G. B. Taylor (w/o)

Mr. Richard C. DeYoung, Director (w/a)
Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Document Control Desk (w/a)
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555