



SUPPLEMENTARY INFORMATION TO  
LER 83-126/01 X-2

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.

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 turbocharger 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.

#### Action Taken:

A support bracket was added to the Division 1 Diesel Generator fuel oil header. A support bracket is scheduled to be installed on the Division 2 Diesel Generator prior to January 30, 1984. 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 "I" 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. It may be concluded from the testing performed subsequent to the engine rework that the unit has been returned to a satisfactory operating condition.

#### 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.

However, examination revealed the following:

1. Buckling was discovered in the weight guide rod, maximum deflection was 0.005 inches.

2. Evidence of scoring was found on the rod surface in two distinct locations.
3. The weight's upper guide collar had an inside diameter of 0.637 inches rather than the 0.647 inch minimum recommended by the manufacturer.
4. Scoring was noted on the enclosing box along the path the weight guide bushing traces during actuation.

Actions Taken:

Corrective actions were:

1. The guide rod was trued and sanded.
2. The weight's upper collar guide was reworked to an inside diameter of 0.640 inches with a tolerance of .005 inches.
3. The rod, latch hinge pin, and clapper hinge pins were lubricated. The enclosed box along the path of the weight guide bushings was also lubricated.
4. The testing frequency for Division 1, 2, and 3 diesel generator room deluge valves has been temporarily increased to establish reliability data.
5. The surveillance procedure has been revised to visually verify that the clapper has lifted and locked open following the test under normal system pressure.

Investigation Update and Future Actions:

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 was found on the mating surfaces where the valve's latch and clapper meet. The surfaces were sanded and refinished until smooth. The valve was then reassembled and tested satisfactorily.

Division 1 and 3 valves will be removed, tested, inspected and refinished likewise. It is suspected that this was the cause of the Division 1 valve failure but no conclusions can be reached until further investigation. The next update is expected to be submitted by January 30, 1984.

## 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 1640, JACKSON, MISSISSIPPI 39205

December 30, 1983

84 JAN 4 AM 11:16

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-2  
AECM-83/0800

This letter submits an update to previous reports submitted on September 16, 1983, and October 20, 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 Diesel Generator is complete. A support bracket for the Division 2 Diesel Generator fuel oil header is scheduled to be installed prior to January 30, 1984. Exceptional roughness found on the mating surfaces where the deluge valve's latch and clapper meet is suspected as the cause of deluge valve failure. Further investigations are being conducted to support this conclusion. The next update is expected to be submitted by January 30, 1984. Attached is interim LER 83-126/01 X-2 with Supplementary Information.

Yours truly,

L. F. Dale  
Manager of Nuclear Services

EBS/SHH:sap  
Attachment

cc: (See Next Page)

Member Middle South Utilities System

OFFICIAL COPY  
JF22  
11

MISSISSIPPI POWER & LIGHT COMPANY

AECM-83/0800

Page 2

cc: Mr. J. B. 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