MISSISSIPPI POWER & LIGHT COMPANY
Helping Build Mississippi
P. O. BOX 1640, JACKSON, MISSISSIPPI 39205

June 1, 1983

JAMES P. McGAUGHY, JR.
VICE PRESIDENT

Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, N.W.
Suite 3100
Atlanta, Georgia 30303

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

Dear Mr. O'Reilly:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
License No. NPF-13
Docket Nos. 50-416/417
File 0260/15525/15526
PRD-82/14, Interim Report No. 6,
Sheared Bolts on Diesel
Generator Rear Crankcase Cover
AECM-83/0321

References: AECM-82/176, 4/21/82
AECM-82/288, 6/25/82
AECM-82/380, 9/7/82
AECM-82/521, 11/8/82
AECM-83/0070, 1/31/83

On March 22, 1982, Mississippi Power & Light Company notified Mr. R. Butcher, of your office, of a Potentially Reportable Deficiency (PRD) at the Grand Gulf Nuclear Station (GGNS) construction site. The deficiency concerns sheared bolts on the rear crankcase cover of the Delaval diesel generators.

As previously reported, MP&L has evaluated this deficiency and determined that it was reportable under the provisions of 10CFR50.55(e) and 10CFR21 for Unit 1, and 10CFR50.55(e) for Unit 2. This evaluation and determination was made utilizing all of the available information MP&L had at the time. However, further investigation has revealed that this deficiency, at this time, should only be reportable under the provisions of 10CFR50.55(e) and 10CFR21 for the Unit 1, Division II diesel generator. It remains indeterminate as to whether this deficiency is applicable to the Unit 1, Division I diesel generator and/or the Unit 2, Division I and II diesel generators.

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Our attached Interim Report includes details of the investigation conducted to date. MP&L expects to submit a Final Report by September 9, 1983.

Yours truly,

J. P. McGaughy, Jr.

ACP:dr

cc: Mr. J. B. Richard
Mr. R. B. McGehee
Mr. T. B. Conner

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

Mr. G. B. Taylor
South Miss. Electric Power Association
P. O. Box 1589
Hattiesburg, MS 39401

INTERIM REPORT NO. 6 FOR PRD-82/14

1. Name and address of the individual informing the commission:

   J. P. McGaughy, Jr.
   Vice-President, Nuclear Production
   P.O. Box 1640
   Jackson, Mississippi 39205

2. Identification of the facility which contains a deficiency:

   Grand Gulf Nuclear Station (GGNS) Unit 1
   Port Gibson, Mississippi 39150

   NOTE: 10CFR21 is not applicable for Unit 2 as the diesel generators have not been turned over to MP&L.

3. Identification of the firm supplying the basic component which contains a deficiency:

   The Diesel Generators were manufactured by Transamerica Delaval, Inc., Oakland, California and supplied to Grand Gulf by Bechtel Power Corporation, Gaithersburg, Maryland.

4. Nature of the deficiency and the safety hazard which could be created by such a deficiency:

   A. Description of the Deficiency

   During the performance of a 24 hour run test, the Unit 1, Division II diesel generator manufactured by Transamerica Delaval, Inc. tripped on a "Generator Differential" which was accompanied by an observed electrical arcing flash inside the generator. In a subsequent inspection of the generator, it was found that the stator insulation had been damaged and that a 15/16" bolt head from a 5/8 NC X 1-3/4" long bolt was embedded in the stator. The degraded stator insulation resulted in a phase to phase short in the stator that damaged the generator. It was determined that the bolt head was from a bolt on the diesel's rear crankcase cover. The bolt had sheared off and entered the generator through the air gap on the end of the generator.

   All rear crankcase cover bolts from the Unit 1, Division I and II diesels were replaced with new bolts. An analyses of 42 bolts, that were replaced, was performed and a review of the results produced the conclusion that the failure mode was due to a low-stress fatigue front expanding from an initial small crack. The initial crack appeared to have been initiated by overtorquing or undertorquing the capscrew. The capscrew was then subjected to low level vibrational fatigue stresses from the crankcase cover which caused the expansion of the microcracks across the section and the subsequent failure of the bolt.

While performing maintenance on the Unit 1, Division II generator it was discovered that one (1) of the new bolts had also undergone shearing. An additional investigation was initiated to determine the cause of the failure of this bolt.

It was believed that the cause of this failure was fatigue stresses that were transmitted to the capscrew from the reciprocating motion of the diesel engine. These fatigue stresses induced a crack in the capscrew material, which progressed through the capscrew shank.

B. Analysis of Safety Implications

Failure of the rear crankcase cover bolts could result in the nonavailability of the diesel generator. The diesel generators supply power to systems that are required to shutdown and cool the reactor and to maintain the reactor in this condition during a loss of off-site power.

5. The date on which the information of such deficiency was obtained.

Mississippi Power and Light received information of the deficiency on March 15, 1982. We reported this as a potentially reportable deficiency to Mr. R. Butcher, of your office, on March 22, 1982. Since that date MP&L has filed six (6) Interim Reports to inform the Commission of the progress and status of this deficiency. An evaluation for Part 21 has been completed for Unit 1 and the MP&L "Responsible Officer," Mr. J. P. McGaughy, Jr., has been notified.

6. In the case of the basic component the number and location of all such components.

MP&L does not have knowledge of the location of other diesel generators besides the four (4) (two (2) for each Unit) located at Grand Gulf.

7. The corrective action which has been taken, the name of the individual responsible for the action, and the length of time that has been taken to complete the action.

A. Corrective Actions Taken

1. The Unit 1, Division II generator was replaced with a generator from Unit 2.

2. A design change (DCP-82/0039) has been initiated to install protective caging on the generator air gaps.

3. The damaged generator has been dispositioned to be returned to the vendor.

4. All bolts removed from the Unit 1, Divisions I and II, diesel's rear crankcase covers were sent to an independent laboratory for failure analysis.

5. A program was developed to instrument the Unit 1, Divison II diesel generator and collect data during a test run. Delaval had indicated that the cause of the bolt failures was vibration of the cover plate induced by the firing of the rear cylinder.

6. A design change (DCP-82/4183) was issued on 12/7/82 and higher strength, SA-540, Grade B24 (4340-Mod) capscrews were installed in the crankcase cover of the Division I and II diesel generators. The design change specified 100 ft.-lb. torque for the capscrews, as per Delaval's suggested disposition; however, a preliminary review of the test data in 5. above did not indicate a need for the higher torque value and Change Notice P75-5 to DCP-82/4183 Rev. 0, was issued on May 16, 1983, reducing the torque value to 60 ft.-lb.

7. Our Architect/Engineer has issued QAR-F-397 to track this deficiency for the Unit 2 diesel generators.

B. Responsible Individual

Unit 1	Unit 2
C. K. McCoy	T. H. Cloninger
Nuclear Plant Manager	Unit 2 Project Manager
Mississippi Power & Light Co.	Mississippi Power & Light Co.
Port Gibson, Mississippi	Port Gibson, Mississippi

C. Length of Time to Complete Actions

A test run has been completed and data collected for the Unit 1, Division II diesel generator. The data is presently being analyzed and possible further corrective actions will be considered when the test results are received.

At this writing, the cause of the failure of the bolts remains indeterminate. The bolt failures have only occurred on the Unit 1, Division II diesel generator. Therefore, it remains indeterminate as to whether this deficiency is applicable to the Unit 1, Division I diesel generator and/or the Unit 2, Division I and II diesel generators.

When the cause of this deficiency has been determined, MP&L will take the necessary steps to inform our Architect/Engineer of the corrective actions to be performed for the Unit 2 diesel generators.

8. Any advice related to the deficiency that has been, is being, or will be given to purchasers or licensees:

As the deficiency did not originate with MP&L, we have no advice to offer.