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

January 7, 1982

NUCLEAR PRODUCTION DEPARTMENT

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Mr. Denton:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416 and 50-417
File 0260/L-334.0/L-350.0
MTEB Concerns on Turbine Disc
Integrity, SSER 1.11(27)
AECM-82/20

In accordance with your request for additional information in support of the Grand Gulf Nuclear Station Safety Evaluation Report, NUREG-0831 (SER), Mississippi Power & Light Company is submitting the enclosed information pertaining to Turbine Disc Integrity, SSER 1.11(27).

Answers to informal MTEB questions are provided in the attachment. If you have any questions or require additional information please contact this office.

Yours truly,

L. F. Dale
Manager of Nuclear Services

RFP/JGC/JDR:ph
Attachment

cc: Mr. N. L. Stampley
Mr. R. B. McGehee
Mr. T. B. Conner
Mr. G. B. Taylor

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

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ADDITIONAL INFORMATION REQUEST

MATERIALS ENGINEERING BRANCH
DIVISION OF ENGINEERING

We have reviewed Section 10.2.3 of the Final Safety Analysis Report submitted by the applicant. Our evaluation cannot be completed without additional information from the applicant relating to the design, assembly and operating conditions of the low pressure turbine discs. Past experience with similar equipment in the United Kingdom and more recently with Westinghouse turbines in the United States has revealed a propensity for stress corrosion cracking in discs which was not predictable. In order for the staff to assess the potential for stress corrosion cracking in the applicant's plant, the following information will be required.

A - What lubricant was used in the hub area of the discs for assembly.

B - What are the similarities/differences between the discs in the Grand Gulf turbines and those used by Westinghouse.

C - What are the operating temperatures in the bore area of the discs.

D - Which disc or discs are exposed to a moisture level during operation that approximates the level of moisture present in cases of cracking.

E - What are the calculated critical crack sizes and what is the method used to calculate that size.

F - What capability for volumetric inspection of the disc hub areas is available to Grand Gulf.

Response

Grand Gulf utilizes the Allis-Chalmers Power System, Inc. (ACPSI) low pressure turbine.

A. The lubricant used in the hub area for disc assembly is MITTAL DAG 156. This is a lubricant acceptable for nuclear systems containing a graphite base with an isopropyl-alcohol binder.

B. Westinghouse turbines have revealed propensity for keyway cracking at the point where the discs attach to the turbine shaft. For the Allis-Chalmers turbine, the highest stressed location in the shrunk on disc is the locking pin dead end hole. The Allis-Chalmers design includes a radial groove to minimize local stress concentrations in this area. A more detailed comparison cannot be performed since the Westinghouse turbine information is not available to Grand Gulf. Refer to FSAR, Volume 16, Section 10A. In Section 10A, ER 504 gives details of shrink fit assembly of the disc to the rotor. Allis-Chalmers drawings NM4.02 and MA4.05 give detail on the locking pins and the last stage disc, respectively.

C. At rated conditions, the following disc metal temperatures can be expected:

DISK	ADMISSION SIDE (°F)	EXHAUST SIDE (°F)
1	333	257
2	257	210
3	210	176
4	176	145
5	145	156

D. ACPSI has not experienced any disc cracking on nuclear steam turbine low pressure rotors. Based on the experience of other suppliers, Allis-Chalmers would consider discs 2 and 3 as the discs operating under the worst corrosion conditions.

E. ACPSI is currently preparing a critical crack report for the Grand Gulf Nuclear Station turbine discs. The estimated completion date for this report is January, 1982. A summary of this report will be provided for review following report completion.

F. ACPSI is presently developing a technique to perform ultrasonic testing inspection of the hub area and disc without removing the disc from the shaft. This procedure is currently under development by ACPSI. Implementation of that procedure will be based on the recommendations and guidance provided by ACPSI and on the MP&L evaluation of that procedure. Additional information will be provided regarding this issue following the MP&L evaluation of this procedure. We expect this evaluation to be completed prior to the first regularly scheduled refueling outage.