ENCLOSURE

REVIEW OF
IN-SITU OPERATIONAL TEST REPORT
ON
HPCS SERVICE WATER PUMP AT
GRAND GULF NUCLEAR POWER STATION

1. Purpose: To review the in-situ test report on High Pressure Core Spray Service Water Pump at the Grand Gulf Nuclear Power Station.

2. Introduction: The Nuclear Regulatory Commission (NRC) was concerned about the effect of mechanical and flow induced vibration under normal operating condition on the High Pressure Core Spray (HPCS) Pump installed at the Grand Gulf Nuclear Power Station. The pump is a three stage Gould Vertical Pump (model no. VITX-SD-10X14 JHC) located in the Standby Service Water Pump House on basin A. To address the NRC concerns, the utility, Mississippi Power & Light (MP&L) Company agreed to perform in-situ test on the pump. It was mutually decided that the following parameters would be monitored during normal pump operation: (1) outlet pressure variation, (2) shaft deflections, and (3) pump housing deflections (if feasible). The test was performed in June 1983 by Nutech Engineers, Inc., and Nutech Testing Corporation for Mississippi Power and Light Company. The details are in the report titled: In-situ Operational Testing of the Grand Gulf HPCS Service Water Pump Mississippi Power and Light, dated June 23, 1983.

3. Discussion: Operability characteristics were evaluated by monitoring three parameters during the operation of the pump. They are: (1) the dynamic discharge pressure at the pump dicharge at an existing "tee" of the discharge line, (2) the response of the pump housing using an accelerometer positioned perpendicular to the axis the pump and 20 feet below the floor level, and (3) the relative displacement of the pump-motor shaft to the motor housing.

   It was hypothesized that if the flow induced pressure oscillations show a pink noise characteristic (decays to low levels at higher frequencies), and the mechanical response of the pump at higher frequencies is also low, it might be concluded that the flow induced vibration would not impair pump operation. The power spectral density plot of the discharge pressure exhibits a pink noise characteristic with energy starting to decline at about 27 Hz. Power spectral density plot of the mechanical response of the pump housing acceleration during normal operation shows an energy peak at 30 Hz. This small peak (less than 0.02 g) has been attributed to the normal rotating equipment imbalance in the pump. Resulting pump-housing displacement is less than 0.0004 inch. The contribution from flow induced vibration is about a factor of 10 less than from the machine imbalance.

4. Conclusion: Based upon the review of the test report, it is concluded that the vibration levels of the HPCS service water pump during normal operation is quite small and within acceptable limits. The small vibrations detected are predominantly due to equipment imbalance. The part attributed to flow induced vibration is not significant enough to excite any resonant modes of the pump to any significant level.