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September 21, 1973

Z-098-2

Mr. K. V. Soyfrit, Director
Office of Inspection and Enforcement
Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 100
Arlington, Texas 76012

Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
10CFR50.55(e) Significant Deficiency
Low Pressure Safety Injection Pump
Motor Failure
(File: 2-0520)

Gentlemen:

The subject motor failure was originally evaluated by our organization and determined not to be reportable as a significant deficiency. However, after consultation with the Region IV Office of Inspection and Enforcement, it was determined that it was in the best interest of all parties to report this item as a significant deficiency.

Sincerely,

Daniel H. Williams
Manager, Licensing

DHW:CSP:vb

cc: Mr. W. D. MacDonald, Director
Office of Management Information
and Program Control
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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MEMBER NORTH SOUTH UTILITIES SYSTEM

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Significant Deficiency Report

Low Pressure Safety Injection (LPSI) Pump Motor 2PM60B

Description of Deficiency

On August 16, 1978, while in the shutdown cooling mode, breaker trip of the vertically mounted 4000 volt, 450 H.P. "R" LPSI pump motor was indicated. An operator immediately investigated and upon reaching the pump area on elevation 317' observed the motor on fire. The fire was extinguished using both water hoses and CO₂ extinguishers.

The pump and motor were then removed with the motor being sent to Fagan Company in Little Rock for disassembly.

Disassembly of the pump at the plant revealed minor damage to the impeller however no damage to the pump casing was noted.

A representative of Siemens Allis (new name of motor supplier Allis-Chalmers) was requested to make a determination of the cause of failure. After noting the significant distance the rotor had to move in the vertical direction to cause damage to the fan, the upper bearing assembly was inspected.

The upper bearing assembly consists of duplex bearings mounted on a bearing thrust block. For applications in which the pump will experience only downward thrust these two bearings are mounted in tandem. If both downward and upward thrusts are experienced, as is the case here, the bearings are mounted back-to-back to properly resist the thrusts. However, due to incorrect assembly the bearings were not installed back-to-back but in tandem. Therefore, when upward thrust was experienced, the rotor was allowed to rise sufficient distance to cause the failure because greatly increased radial movement was allowed due to bearing design.

Damage to the motor was extensive. The rotor had come into contact with the stator causing irreparable damage to the rotor. Both upper bearings showed evidence of high temperature while the lower bearing was heavily damaged.

The contact of the rotor with the stator was the probable cause of the bearing oil fire.

Correct installation of the bearings can be assured either by the letters DB (for duplex, back-to-back) contained in the bearing number designation or by the diagrams in the instruction manual.

It has been determined that the bearing was installed incorrectly during a previous maintenance inspection.

Safety Implications

- Fuel in the core with no decay heat present (actual conditions).
No safety consequences of such a failure during these conditions.
- Reactor at power during normal operation. The reactor could be shutdown and cooled by using emergency feedwater and steam jump. No danger to the public would result.

- Accident conditions (LOCA)

The LPSI system is relied upon in safety analysis for emergency core cooling. Accommodation of a single failure was a design basis for this system, so the deficiency did not result in any danger to the public or result in any adverse impact on the environment.

Corrective Action

A replacement motor was obtained to replace the destroyed LPSI motor. The replacement motor is slightly larger and heavier 500 H.P. machine. Since the original ANO-2 impeller will be installed in the pump no system characteristics will be changed. Present power cables are sufficient and breaker settings will be revised to correspond to the new motor. Seismic analysis review reveals no support problems due to the increase in weight from 4500 pounds to 5000 pounds.

The replacement motor and the Pump Motor 2PM60A were inspected for proper bearing installation. The bearings were found to be installed properly. As this problem was an isolated incident, we do not feel that any additional corrective action is required.