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U.S. NUCLEAR REGULATORY COMMISSION

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Licensee Event Report (RO 50-289/77-18/3L) on 6/29/77 concerning Nuclear Services river water pump shaft failing.....

PLANT NAME:

Three Mile Island Unit No. 1

RJL 8/3/77 (3-P) (1-P)

NOTE: IF PERSONNEL EXPOSURE IS INVOLVED SEND DIRECTLY TO KREGER/J. COLLINS

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July 27, 1977
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Regulatory

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AUG 3, 1977
U.S. NUCLEAR REGULATORY COMMISSION
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Mr. B. H. Grier, Director
Office of Inspections and Enforcement, Region 1
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Sir:

Docket No. 50-289
Operating License No. DPR-50

In accordance with the Technical Specifications of our Three Mile Island Nuclear Station Unit 1 (TMI-1), we are reporting the following reportable occurrence.

(1) Report Number: 77-18/3L

(2a) Required Report Date: 7/29/77

(2b) Date of Occurrence: 6/29/77

(3) Facility: Three Mile Island Nuclear Station - Unit 1

(4) Identification of Occurrence:

Title: Nuclear Services River Water Pump Shaft failed.

Type: A reportable occurrence as defined by Technical Specification 6.9.2.B(2) in that Nuclear Services River Water Pump (NR-P1C) shaft failed while operating thus leading to operation in a degraded mode permitted by a limiting condition for operation as defined by Technical Specification 3.3.2.

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(5) Conditions Prior to Occurrence:

| | | |
|---|---|---|
| Power: | Core: | 2517 MWt |
| | Elec: | 810 MWe gross |
| RC Flow: | | $145 \times 10^6$ lb/hr |
| RC Pressure: | | 2168 psig |
| RC Temp: | | $579^{\circ}$ |
| PRZR Level: | | 226 inches |
| PRZR Temp: | | $648^{\circ}$F |

(6) Description of Occurrence:

An Auxiliary Operator, while performing routine preven .ve maintenance in the Intake Pump and Screen House, investigated an unusual noise. He discovered that the motor and pump coupling for NSRW pump (NR-P1C) were rotating but that the pump shaft was not. Subsequent disassembly of the pump coupling revealed that the pump shaft had sheared. As all three (3) NSRW pumps were operating at the time, no effect on closed cooling water temperatures were observed. NR-P1C was selected for ES operation at the time of failure.

(7) Apparent Cause of Occurrence:

The cause of this occurrence has been determined to be due to both mechanical and procedural problems. The pump shaft had shown increased pump shaft vibration levels ( 9 to 14 mils) on routine weekly vibration readings since March 24, 1977, and was scheduled by Maintenance to be the next pump for overhaul. The recommendation to restrict operation of the pump until the overhaul could be completed was never effectively communicated to the Operation Department and the pump continued to be operated for at least three (3) weeks prior to its failure.

Lack of procedural requirements to insure proper reporting of degraded equipment conditions to the proper management personnel was the major cause of this occurrence. Visual inspection of the failed pump shaft indicated cyclic fatigue as the mode of failure.

(8) Analysis of Occurrence:

It has been determined that this occurrence did not constitute a threat to the health and safety of the public in that there was no increase in closed cooling water temperatures resulting from the failure, and no adverse effect on normal plant operation was realized. If an accident requiring ES actuation had occurred, the redundant NSRW pump (NR-P1A) would have been available to supply the necessary cooling water requirements.

(9) Corrective Action:

Immediate:

1) NR-P1B was lined up and selected for ES operation within four (4) hours. This shift in pump line-up was done in a controlled manner to minimize the effect on Mechanical Draft Cooling Tower temperature.

2) All river water pump vibration readings were reviewed and no safety related pumps were found to be unacceptable for long term operation.

Long Term:

1) NR-P1C is being overhauled to restore its full operability. All defective parts, including the top pump shaft section, will be replaced.

2) Necessary changes to the preventive maintenance and operating procedures will be made to minimize the potential for similar in-service failures in the future.

The Plant Operations Review Committee and Unit Superintendent have reviewed and approved the above corrective action and have taken steps to assure its completion.

(10) Failure Date:

Vertical Turbine Pump, Peerless Pump Division (FMC Corporation) 1 stage, 1185 rpm, 24 HxB bowl.

Similar Occurrences: 75-14

Sincerely,

J. G. Herbein
Vice President

JGH:DGM:rk
Attachment: Licensee Event Report

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