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DESCRIPTION:

A/O # 75-24, on 7-16 concerning Failure of a Nuclear Services Rever Water Pump Discharge Valve.....

(Rec'd 1 cy Ltr.)

PLANT NAME: Three Mile Island # 1

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Director
Division of Reactor Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

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

In accordance with the Technical Specifications for our Three Mile Island Nuclear Station Unit 1 (TMI-1), we are reporting the following abnormal occurrence. Please note that the resistance to ground referred to in our telegram of July 18, 1975, is in error, in that the resistance to ground was not low, rather two of the valve motor phases exhibited high resistance.

(1) Report Number: AO 50-289/75-24

(2a) Report Date: July 25, 1975

(2b) Occurrence Date: July 16, 1975

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

(4) Identification of Occurrence:

Title: Failure of a Nuclear Services River Water Pump Discharge Valve.

Type: An abnormal occurrence as defined by the Technical Specifications, paragraph 1.8d, in that failure of a Nuclear Services River Water Pump discharge valve constituted failure of one component of an engineered safety feature that threatened to cause the feature to be incapable of performing its intended function.

(5) Conditions Prior to Occurrence:

Power: Core: 100%
Elect.: 833 MWe gross

RC Flow: 138 x 10^6 lb/hr

RC Press.: 2155 psig

RC Temp.: 579°F

PRZR Level: 240 inches

PRZR Temp.: 650°F

(6) Description of Occurrence:

At 1200 hours on July 16, 1975, while removing Nuclear Services River Water Pump, NR-P1B, from service for routine maintenance, its discharge valve, NR-V1B, failed to close when the operator attempted to close it using the remote control pushbutton at the control room console. The valve was closed part way using the handwheel on the valve operator. Again the operator attempted to close the valve using the remote pushbuttons and the valve failed to close. Next the discharge valve was manually closed and would not open when the pump (NR-P1B) was started indicating valve motor failure. Investigation revealed that the valve motor had been overheated and two phases exhibited high resistance.

Immediately, NR-P1C and its respective discharge valve, NR-V1C, were verified operable. When the failed motor was found, NR-P1A was selected as the Engineered Safeguards Pump for the A channel. The failed motor was replaced and an investigation made into the cause for the failure. The investigation included (1) checking the thermal overload setpoint (2) measuring of the running current with the new motor installed to check for mechanical binding of the valve or operator, and (3) checking of the limit switches to assure that they were operating properly. The valve test was satisfactory and the motor running current was acceptable.

(7) Designation of Apparent Cause of Occurrence:

The apparent cause of this occurrence is material. The motor appears to have experienced an open phase on one winding, resulting in single phasing of the other two windings. The severe heating of the motor indicated by the melted varnish from the windings, is believed to have resulted from ineffective overload protection. The overload devices were oversized to assure valve travel during an Engineered Safeguards condition and do not provide protection for overload conditions.

The thermal overload device was tested and found to trip in a longer time than required at the test valve. The overload tripped at 50 seconds while the acceptable range is 17 to 38 seconds. The out of specification overload device did not significantly contribute to the motor damage as the overload range (0.92 to 1.00 amps) is significantly above the motor full load current (0.45 amps).

The only other discrepancy found with the valve operator or control circuit was a control power fuse not adequately engaged by the fuse

clip. The poor engagement was found after pulling and checking the fuse and may have resulted from bending the fuse clip while pulling the fuse. The poor connection at the fuse is not believed to have contributed to the motor failure.

(8) Analysis of Occurrence:

It has been determined that the failure of NR-V1B did not represent a threat to the health and safety of the public in that:

a. One Nuclear Services River Water Pump is sufficient to supply emergency cooling water in the event of a loss of coolant accident.

b. The redundant Engineered Safety (ES) selected pump, NR-P1C and its respective valve NR-V1C were operable.

c. The valve was failed in its ES position (Failed Safe).

d. The NR-P1A pump was available for operation if required.

(9) Corrective Actions:

In addition to the immediate corrective actions listed above, long term corrective actions will be taken as follows:

An investigation will be made to attempt to determine the cause for the motor failure by vendor or lab inspection of the motor. The thermal overload time setting for the NR-V1A and NR-V1C valves will be tested. The phase resistance and megger readings for the above two motors will be checked to assure that they are acceptable.

The Plant Operations Review Committee and Station Superintendent have reviewed and approved the above corrective actions and have taken steps to ensure their completion.

(10) Failure Data:

Reliance Motor
No. 447164 - DU
Type P Frame K48 3 Phase
850 RPM 60 hz 230/460 volts
.9/.45 amps
Start Torque 2 lb. ft.
Run Torque 0.4 lb. ft.

Similar Occurrences: None

Sincerely,

R. C. Arnold
Vice President

RCA:CWS:cas
cc: Office of Inspection and Enforcement, Region 1
File: 20.1.1/7.7.3.5.1