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POWER BUILDING
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TELEPHONE: AREA 704
373-4083

September 8, 1981

Mr. James P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Re: McGuire Nuclear Station Unit 1
Docket No. 50-369

Dear Mr. O'Reilly:

Please find attached Reportable Occurrence Report RO-369/81-136. This report concerns T.S. 3.3.2, "The engineered safety feature actuation system (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be operable..." This incident was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

William O. Parker, Jr.

PBN/php
Attachment

cc: Director
Office of Management and Program Analysis
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Ms. M. J. Graham
Resident Inspector-NRC
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McGUIRE NUCLEAR STATION

REPORTABLE OCCURRENCE

REPORT NUMBER: 81-136

REPORT DATE: September 8, 1981

OCCURRENCE DATE: August 25, 1981

FACILITY: McGuire Unit 1; Cornelius, N.C.

IDENTIFICATION OF OCCURRENCE: During a test of the turbine driven auxiliary feedwater pump (TDAFWP), the suction piping was overpressurized when the pump was tripped.

CONDITION PRIOR TO OCCURRENCE: Mode 2, Start-up.

DESCRIPTION OF OCCURRENCE: The TDAFWP is equipped with the following active and passive valves which affect pump operation:

A swing check valve in the pump suction piping approximately 36 feet from the pump.

A stop check valve in the pump discharge piping about 8 feet from the pump. This valve is mounted in a horizontal pipe with the cylinder in a horizontal position so that closure is not aided by gravity.

The miniflow valve is located in the pump discharge piping downstream of the stop check valve. This valve discharges to the Upper Surge Tank (UST), which is the normal suction source for the pump during testing.

Four swing check valves separate the pump discharge from the steam generators (S/G). These valves are located in the dog houses, one for each S/G, and are over 100 feet from the pump.

The miniflow valve is normally controlled by a flow transmitter located on the suction side of the TDAFWP. The transmitter opens the valve when flow drops below 175 GPM and closes it when flow increases to 400 GPM. On a safety signal the valve control is disabled and the valve remains closed. On August 25, 1981 during the preparation to run a section of the Auxiliary Feedwater System Functional Test, the miniflow valve control was found to be malfunctioning. It was decided that the test could be run by controlling the miniflow valve manually. After the pump was started and flow established to the S/G's, the miniflow valve was closed by isolating the control air supply to the valve. When the test section had been completed, the pump was running at approximately 3000 RPM and was feeding the S/G's at about 851 GPM against a S/G pressure of about 1100 PSIG. Since the miniflow valve was designed to protect the pump from operation under low flow conditions, it was left closed when the pump was tripped. Shortly after the pump was

tripped, water started leaking from the TDAFWP suction isolation valve, and some of the instruments located on the suction of the TDAFWP. The leaks were from packing and gaskets on the valve, and from ruptured internals and tubing fittings on the instruments. In order to stop the leaks the pump was isolated and subsequently declared inoperable on August 25, 1981.

APPARENT CAUSE OF OCCURRENCE: When the TDAFWP was tripped, pressure in the pump discharge pipe between the pump and the S/G check valves backed up through the pump and pressurized the suction piping. Pressure in the suction piping could not be relieved back to the Upper Surge Tank because of the swing check valve in the pump suction piping. The relative closing speeds of the S/G check valves and the suction piping swing check valve may have contributed to the problem. The stop check valve on the discharge of the TDAFWP requires some backflow to close and probably did little to protect the pump.

ANALYSIS OF OCCURRENCE: No pressure protection was provided for the auxiliary feedwater pump suction piping because it was thought that the S/G swing check valves would prevent any backflow or back pressure. A combination of backflow through the S/G swing check valves while they were closing and the isolation of TDAFWP suction from the UST by the suction piping swing check valve apparently caused the overpressurization. When the pump was run in the past with the miniflow valve operable, the valve would open whenever the pump was tripped and flow dropped below 175 GPM. This might have relieved any back flow or pressure to the Upper Surge Tank until the check valves were closed. With a small amount of backflow even the stop check valve would close and protect the pump.

SAFETY ANALYSIS: The two motor driven auxiliary feedwater pumps were operable throughout the incident and could have provided adequate feedwater for reactor cooldown if the main feedwater pumps had been lost. Analysis has determined that even with the leaks caused by the overpressurization, the TDAFWP could still have provided adequate feedwater for reactor cooldown if it had been needed. Since the Auxiliary Feedwater System retained the capability to cool down the reactor throughout the incident, the safe operation of the plant and the health and safety of the public were not affected.

CORRECTIVE ACTION: The instruments that were damaged and/or exposed to the excessive pressure were checked, recalibrated, and/or repaired as necessary by August 27, 1981. The miniflow control system was repaired along with the other instruments. Valves that showed evidence of leaks were repaired and other valves that were exposed to the excessive pressure are being checked as time and plant conditions allow. Relief valves have been installed on the suction piping of all three auxiliary feedwater pumps to prevent overpressure incidents in the future. All of the repair and modification work was completed by August 27, 1981. The pump was satisfactorily tested

and declared operable on that date.

Duke Power Company is currently evaluating the effects of the overpressurization on piping, flanges, valves, and instruments involved in the event. Results of the analysis will be documented, and additional action dictated by the results of the analysis will be taken when the report is completed.