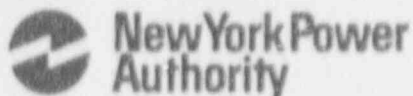


James A. FitzPatrick  
Nuclear Power Plant  
P.O. Box 41  
Lycoming, New York 13093  
315 342-3840



William Fernandez II  
Resident Manager

June 6, 1991  
JAFF-91-0341

United States Nuclear Regulatory Commission  
Document Control Desk  
Mail Station P1-137  
Washington, D.C. 20555

SUBJECT: DOCKET NO. 50-333  
LICENSEE EVENT REPORT: 91-006-00  
Manual Reactor Shutdown/Both RHR Loops  
Inoperable

Dear Sir:

This report is submitted in accordance with 10CFR50.73(a)(2)(i)(A),  
completion of a shutdown required by Technical Specifications.

Questions concerning this report may be addressed to Mr. Hamilton Fish at  
(315) 349-6013.

Very truly yours,

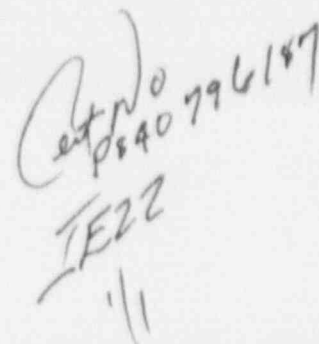
  
WILLIAM FERNANDEZ

WF:HCF:lar

Enclosure

cc: USNRC, Region I  
USNRC Resident Inspector  
INPO Records Center  
American Nuclear Insurers

9106120094 910606  
FDR ADOCK 05000330  
S FDR

  
CEP No  
PS40796/87  
JE22  
11



## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>JAMES A. FITZPATRICK NUCLEAR POWER PLANT</b>										DOCKET NUMBER (2) <b>0 5 0 0 0 3 3 3 1</b>										PAGE (3) <b>1 OF 6</b>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104  
EXPIRED 8/31/85

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TEXT (If more space is required, use additional NRC Form 305A's) (17)

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Description

The reactor was operating at full power. In accordance with Technical Specifications, a scheduled monthly surveillance test was performed on 5/7/91. Two motor operated primary containment isolation valves failed to meet the operability test acceptance criteria. Each of these valves is located in a separate and redundant low pressure coolant injection (LPCI) [BO] subsystem of the residual heat removal (RHR) [BO] system which provides emergency core cooling (ECCS). The RHR system is divided into two redundant loops. Each of the two loops contained one of the two valves that were not operable. Therefore, both RHR-LPCI loops were inoperable. The reactor was shutdown within 24 hours in accordance with Technical Specification Requirement 3.5.A.6.

In each of the two RHR system loops, two pumps discharge through a 24-inch diameter common header to the discharge piping of the reactor water recirculation system [AD] piping. The isolation protection for the penetration of the primary containment for each loop is provided by three valves. An air operated testable check valve is used inside containment. This check valve is permitted to have a higher leak rate than other containment isolation valves. Therefore, primary containment isolation capability outside of the drywell is provided by two motor operated valves. Closest (inboard) to containment is a gate valve, 10MOV-25. Next outboard is an angle globe valve, 10MOV-27, which may also be used for throttling RHR flow.

Technical Specification surveillance requirement Section 4.5.A.3 requires testing of the RHR-LPCI subsystem as specified in Section 4.5.A.1.d which requires a monthly operability test of motor operated valves (MOVs). The test on May 7, 1991 was conducted in accordance with Operations Department surveillance test procedure ST-2B, "RHR Pump and MOV Operability and Keep Full Level Switch Functional Test". To open the normally closed inboard valve 10MOV-25, the differential pressure across the gate disc is first equalized by pressurizing the space between 10MOV-25 and outboard valve 10MOV-27. During the performance of ST-2B at 4:05 A.M. on May 7, 1991, operators were unable to obtain this equalization pressure across the closed 10MOV-25A valve. RHR header pressure upstream of 10MOV-27A increased when the space between 10MOV-27A and 10MOV-25A was pressurized. These observations indicated that outboard angle globe valve 10MOV-27A was leaking at an undetermined rate. The valve (10MOV-27A) was therefore not able to perform the primary containment isolation function and was declared to be inoperable. This placed the plant in a seven-day Limiting Condition for Operation (LCO) as specified in Technical Specification Section 3.5.A.3.a. Performance of ST-2B on the RHR LPCI loop A was necessarily suspended.



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/86

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TEXT (If more space is required, use additional NRC Form 206A's) (17)

At 4:45 A.M., while performing ST-2B on the RHR LPCI B loop, the normally closed LPCI inboard injection gate valve 10MOV-25B failed to open fully and then failed to fully close. The motor operator torque switch tripped the power supply to the operator motor prior to completion of attempts to both open and close the valve. Operators were also unable to operate the valve using the manual handwheel because the motor operator could not be manually declutched.

Both the A and B loops of the LPCI mode of the RHR system were now in an inoperable condition due to one inoperable valve in each loop. Technical Specification 3.5.A.6 requires that the reactor be placed in a cold condition within 24 hours whenever both LPCI subsystems are inoperable.

At 12:37 P.M. a reactor shutdown to the cold condition was started. The emergency plan was initiated at the Unusual Event level. The NRC was notified by use of the emergency notification system (ENS) at 12:55 P.M. The main generator was disconnected from the electrical transmission system (line) at 5:45 P.M. In accordance with procedures, the reactor was manually scrammed at 6:20 P.M. from approximately 15 percent power. RHR system A was placed in service in the shutdown cooling mode at 2:56 A.M. on May 8, 1991. A reactor coolant temperature of less than 212 degrees fahrenheit (cold condition) was achieved at 3:30 A.M. The Unusual Event was formally terminated at 4:00 A.M.

At 9:55 A.M. a test determined that the rate of leakage past the seat of angle globe valve 10MOV-27A was approximately 5,100 gallons per minute (gpm). The RHR A loop continued to be used for shutdown cooling to remove decay heat. A damaged stem nut was found on 10MOV-25B. On May 12th at 1041 the repairs and post-work testing of LPCI inboard injection gate valve 10MOV-25B were completed.

Shutdown cooling was then transferred from the RHR A loop to the RHR B loop at 1410 to permit investigation of the seat leakage in RHR A loop valve 10MOV-27A. Inspection of the internals of angle globe valve 10MOV-27A found fracture of the valve stem and severe damage to the seat, disc, and disc guide ribs. It was necessary to remove the valve from the system to facilitate internal machining and welding repairs. As of the date of this report, the plant remains shutdown while valve repairs are in progress.

Cause

Valve 10MOV-25B failed to fully open or close due to the excessive force required to move the valve stem which in turn tripped the motor torque switch. This switch then interrupted the motor power supply in accordance with design. The cause of the excessive torque was excessive friction between the mating acme screw threads of the fixed stem nut and the moving valve stem. Inspection of the internal thread



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U.S. NUCLEAR REGULATORY COMMISSION

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

of the stem nut found severe wear and missing, broken, and jammed pieces of the thread. The stem nut is machined from soft (relative to steel) bronze. The valve stem is machined from stainless steel. The moving stem mechanism had been lubricated on a regular basis. The stem nut had not been replaced since manufacture of the valve. Determination of the cause of the wear and ultimate failure of the stem nut is currently in progress.

Investigation and determination of the cause of the failure of the valve stem and damage to the disc guide ribs, disc, and seat of the angle globe valve 10MOV-27A is currently in progress.

#### Analysis - Reportability

One primary containment isolation valve in each of the two redundant ECCS RHR systems was inoperable. Therefore, both trains of the RHR LPCI subsystem were inoperable. Technical Specification 3.5.A.6 requires reactor shutdown to the cold condition within 24 hours if both LPCI subsystems are inoperable. Accordingly, this event is reported under the provisions of 10CFR50.73(a)(1)(A) as a completion of a reactor shutdown required by Technical Specifications.

#### Analysis - Containment Isolation

Technical Specification Table 3.7-1, "Primary Containment Isolation Valves", lists three valves in each RHR LPCI subsystem to maintain isolation of the primary containment if it is required. Air operated testable check valve (10AOV-68) is designated inside the primary containment. To reduce maintenance and associated personnel radiation exposure, Technical Specification Amendment 40 in 1978 increased the permitted pneumatic leak rate for this valve to 11 cfm. The valves are tested to this criteria in accordance with Technical Specification Section 4.7.A.d.(1). This leak rate is on the order of 100 times the leak rate permitted for other containment isolation valves of a similar size. To compensate for this increase in the permitted leak rate, an additional valve (10MOV-27) was added to the list of designated primary containment isolation valves. Both (one in each loop) of the air operated testable check valves inside primary containment were operable. Outside the containment two motor operated valves (10MOV-25 and -27) are designated in each loop. One of these two valves remained operable in each of the two loops. Therefore, a double valve primary containment isolation function was always available and operable.

#### Analysis - Removal of Residual Heat

The operation of the B loop was impaired by the inability to fully open gate valve 10MOV-25B. Subsequent testing did demonstrate that the valve could be fully opened (if required) by momentarily bypassing the torque switch and thermal overload protection. The fully



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TEXT (If more space is required, use additional NRC Form 305A's) (17)

redundant A loop was always available for operation. This was demonstrated by actual use of the A loop to remove reactor decay heat over a period of more than four days until the B loop was restored to operation.

Corrective Action

1. The reactor was shutdown to cold condition within 24 hours.
2. The stem nut on the isolation gate valve 10MOV-25B was replaced and the valve returned to service within 5 days of discovery of the inoperability.
3. The throttle globe angle valve 10MOV-27A has been removed from the system for repair. Repairs are in progress as of the date of the report. Upon completion of repairs, the valve will be reinstalled in the system.
4. A root cause investigation for both valve failures is in progress. Findings resulting from these investigations will be reported in a supplemental (revised) LER.

Additional Information

1. Component: Motor Operator  
Component Identification: 10MOV-25B  
System: RHR B LPCI  
Function: Inboard Injection & Primary Containment Isolation  
IEEE Function Codes: 84  
NPRDS Component Code: VALVOP  
Manufacturer: Limitorque  
NPRDS Vendor Code: L200  
Model: SMB-4T  
Old Style with Thrust Adaptor  
Pre-1967 Design No Longer Manufactured  
Size: 4  
Power Ratio: 32.8 HP  
Design Current: 35.8 Amps  
Voltage: 575 Volts  
Closing Time: 24 Seconds
2. Component: Globe Angle Valve, Motor Operated  
Component Identification: 10MOV-27A  
System: RHR A LPCI  
Function: Outboard Throttle Injection & Primary Containment Isolation  
IEEE Function: INV & ISV  
NPRDS Component Code: VALVE  
Manufacturer: Powell



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO 3150-0104  
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TEXT (If more space is required, use additional NRC Form 305A's) (17)

NPRDS Vendor Code: P305  
Model: 19053  
Type: Globe Angle  
Size: 18 Inch  
Pressure: 900 psig  
Motor Operator Type: Limitorque SMB-4T  
Old Style with Thrust Adaptor  
Pre-1967 Design No Longer Manufactured