NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
JAMES A. FITZPATRICK NUCLEAR POWER PLANT	0 5 0 0 0 3 3 3	1 OF 0 4

TITLE (4)

HIGH PRESSURE COOLANT INJECTION SYSTEM VALVE FAILURE DUE TO PROCEDURAL INADEQUACY

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
										0 5 0 0 0
0 9	0 3	8 6	8 6	— 0 1 4	— 0 0	1 0	0 3	8 6		0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
ROBERT BAKER, MAINTENANCE SUPERINTENDENT	3 1 5 3 4 2 - 3 8 4 0

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
D	B J	I S V	L 2 0 0	Y							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On September 3, 1986 while at 100% power, the circuit breaker for the High Pressure Coolant Injection (HPCI) Torus Suction Valve Operator, 23 MOV-58, tripped on an open signal from the control room, thus, rendering HPCI inoperable. An investigation revealed that the actuator's motor had failed due to overheating attributed to excessive stroking during a plant surveillance test entitled, HPCI Subsystem Logic System Functional Test, "F-ST-4E". The motor was replaced under the plant's modification program and HPCI restored to service.

Corrective actions include: a) a review of surveillance tests to identify other DC motor operated valves that could be subjected to overstroking, b) an analysis to confirm operator size, configuration, and switch settings is adequate, and c) the examination of a similar valve which underwent the same cycling frequency during the identified surveillance test.

NRC Form 366
(9-83)

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
JAMES A. FITZPATRICK NUCLEAR POWER PLANT	0 5 0 0 0 3 3 3	8 6	— 0 1 4	— 0 0	0 2 OF 0 4

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

On September 3, 1986 the James A. FitzPatrick Nuclear Power Plant was operating at full power.

At approximately 2200, the Reactor Core Isolation Cooling (RCIC) System was declared inoperable due to oscillating readings from a RCIC high steam flow sensor (see LER 86-015). As a result, the surveillance test entitled, High Pressure Coolant Injection (HPCI) Flow Rate/HPCI Pump Operability/HPCI Valve Operability Test "F-ST-4B", was initiated to verify HPCI operability. At 2205, the circuit breaker for the valve HPCI Torus Suction to HPCI, 23MOV-58, tripped when given an open signal from the control room. A second attempt to open the valve, after resetting the breaker, was unsuccessful. The HPCI system was declared inoperable and the plant entered a 24 hour limiting condition of operation (LCO) due to the inoperability of the HPCI and RCIC systems.

An investigation into the valve inoperability was commenced by the Maintenance Department. Concurrently, the RCIC system high steam flow sensor was replaced. RCIC operability tests were completed at 0916 on September 4, 1986 and RCIC was declared operable. The plant was now in a seven day LCO due to the HPCI inoperability.

Disassembly of the valve actuator and motor revealed a motor insulation failure due to overheating. There was no evidence of other mechanical or electrical problems in either the motor or actuator.

The motor was replaced under James A. FitzPatrick's Modification M1-86-100 and tested satisfactorily. HPCI operability testing was completed at 0415 on September 5, 1986 and HPCI declared operable. The modification format was utilized because the replacement motor had a slightly higher output torque, and an engineering review was judged necessary. An investigation into the root cause of the motor failure was initiated.

Earlier on September 3, 1986, at 1355, a semi-annual surveillance test entitled, "HPCI Subsystem Logic System Functional Test" was completed. Valve 23MOV-58 had been cycled as part of this test. Examination of the procedure details revealed that due to a combination of direct stroking and

stroking due to the operation of associated relaying, the valve stroked eight times within a 20 to 30 minute period. (Stroking refers to an open or a close operation. Cycling refers to an open and a close operation.) The surveillance test requires 3 close operations and 3 open operations during its performance, for a total of six strokes. During the last valve stroking of the surveillance test, the breaker tripped. The valve was then cycled, after resetting the breaker, to verify operability. This breaker trip is now judged to have been an indication of motor degradation.

The failed motor was a 125 volt, 7.5 foot-lb torque, 0.5 horsepower DC motor with a 5 minute (intermittent) duty rating. The stroke time for this valve is approximately 60 seconds. Discussions with the actuator's manufacturer, Limitorque, revealed that this type of motor can be continuously stroked three to four times without danger of overheating. Stroking beyond this would lead to insulation degradation, and eventual failure of the motor. It was judged, based on these discussions, that a direct correlation between the number of excess strokes that the valve was subjected to, and the actual time of motor failure, could not be made. However, insulation degradation, once begun, would lead to premature motor failure.

A review of this valve's maintenance history revealed three previous motor failures of a cyclic nature (approximately 18 months apart) that can be attributed to overheating. These previous failures and the current one are believed to have the same root cause, that is, the number of cycling operations conducted in a short time.

It is noted that these motors have not failed every time the surveillance test, "F-ST-4E", has been performed. This is evidence that the number of strokes performed do not lead to a catastrophic motor failure but rather a long term insulation degradation leading to motor failure. It is also noted that the valve duty while performing this surveillance test is more severe than the duty required while performing its safety function. The normal source of water to the HPCI pump is from the condensate storage tanks. Upon low level in these tanks, the source of water to the HPCI pump is taken from the suppression pool. Valve 23MOV-58, closed when the condensate storage tanks are being utilized, would open when using the suppression pool as a supply. This service is considerably less severe than during the surveillance test, and it is judged that a motor design problem does not exist.

The following corrective actions are being performed:

1) An engineering analysis is being made to confirm that the operator's size, configuration and switch settings are adequate.

2) Operations is reviewing surveillance tests to identify other DC motor operated valves subject to similar excessive stroking. Potential problems identified by this review will be resolved by procedural change or engineering review, as appropriate.

3) Valve 23MOV-57, another similar HPCI System valve/actuator, was also subject to the same surveillance test "F-ST-4E". The valve was stroked several times to verify operability; however, the actuator shall be disassembled and examined during the next scheduled outage.

There have not been any similar LERs in which procedural inadequacy has resulted in the overheating and failure of motor operated valves.

James A. FitzPatrick
Nuclear Power Plant
P.O. Box 41
Lycoming, New York 13093
315 342.3840

Radford J. Converse
Resident Manager

New York Power Authority

October 3, 1986
JAFP 86-0836

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

REFERENCE: DOCKET NO. 50-333
LICENSEE EVENT REPORT: 86-014-00

Dear Sir:

Enclosed please find referenced Licensee Event Report in accordance with 10CFR50.73.

If there are any questions concerning this report, please contact Mr. Robert Baker at 315-342-3840, extension 220.

Very truly yours,

RADFORD J. CONVERSE

RJC:RB:PJS:nan

CC: USNRC, Region I (1)
INPO Records Center, Atlanta, Ga. (1)
American Nuclear Insurers (1)
Internal Power Authority Distribution
NRC Resident Inspector
Document Control Center
LER/OR File

IE22
1/1