

James A. FitzPatrick  
Nuclear Power Plant  
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**New York Power  
Authority**

Harry P. Salmon, Jr.  
Resident Manager

July 06, 1992  
JAFP-92-0516

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

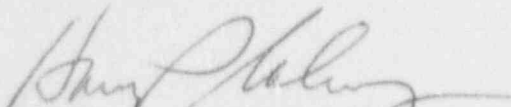
SUBJECT: DOCKET NO. 50-333  
LICENSEE EVENT REPORT: 92-031-00 - HPCI  
Isolation Due to Bowed  
Instrumentation Supports

Dear Sir:

This report is submitted in accordance with 10 CFR  
50.73(a)(2)(iv) and (v).

Questions concerning this report may be addressed to  
Mr. W. Verne Childs at (315) 349-6071.

Very truly yours,



HARRY P. SALMON, JR.

*WVC*  
HPS:WVC:mam

Enclosure

cc: USNRC, Region I  
USNRC Resident Inspector  
INPO Records Center

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) James A. FitzPatrick Nuclear Power Plant DOCKET NUMBER (2) 0 5 0 0 0 3 3 3 1 OF 0 4 PAGE (3)

TITLE (4) False High Area Temperature Isolation of High Pressure Coolant Injection Due to Bowed Printed Circuit Card Supports in Instrumentation Panel

EVENT DATE (6)			LER NUMBER (6)		REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)														
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES													
0	6	0	5	9	2	9	2	0	3	1	0	0	7	0	6	9	2	0	5	0	0	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

OPERATING MODE (9) N	20.402(b)	20.405(c)	X	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0,0,0	20.405(a)(1)(iii)	50.38(c)(1)	X	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(iv)	50.38(c)(2)		50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(v)	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)	
	20.405(a)(1)(vi)	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)	
	20.405(a)(1)(vii)	50.73(a)(2)(iii)		50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)  
NAME: W. Verne Childs, Senior Licensing Engineer  
TELEPHONE NUMBER: 3 1 5 3 4 9 - 6 0 7 1  
AREA CODE: 3 1 5

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
X	J,E	P,L	R 3 6 9	Y					

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

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

IIIS Codes are in []

The plant was shutdown and in the cold condition for maintenance and refuel with all irradiated fuel stored in the Spent Fuel Pool. On June 5, 1992 a false area high temperature signal caused an automatic High Pressure Coolant Injection (HPCI) [BJ] isolation logic signal. No actual valve movement occurred due to the isolation signal because the valves had previously been closed and the HPCI system was not required to be operable by Technical Specifications due to the shutdown plant conditions. The false area high temperature signal was the result of a printed circuit card slipping part way out of the connecting jack in an instrumentation panel. The same problem potentially exists in panels containing most reactor protection system [JC] and emergency core cooling system instrumentation. Straightening of the structural parts has temporarily corrected the problem. Replacement parts (of the same design) have been obtained and will be installed prior to refueling. Potential design changes will also be evaluated. LERs 85-012, 87-020, 90-001, 90-026, 90-028, 91-001, 91-018, 91-022, and 91-029 describe other false engineered safety feature actuation events.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, OR TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) James A. FitzPatrick Nuclear Power Plant	DOCKET NUMBER (2) 0 5 0 0 0 3 3 3	LER NUMBER (6)			PAGE (3)		
		YEAR 9 2	SEQUENTIAL NUMBER - 0 3 1	REVISION NUMBER - 0 0			
					0 2	OF 0 4	

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

EIIS Codes are in []

Description

The plant was shutdown and in the cold condition for maintenance and refuel with all irradiated fuel in the spent fuel pool.

On June 5, 1992, at 0430 hours, the High Pressure Coolant Injection (HPCI) [BJ] steam leak detection system logic [JE] initiated a close signal to HPCI inboard steam supply line primary containment [NH] isolation valve 23MOV-15 and inboard suppression pool (torus) suction line valve 23MOV-58. No valve movement took place because both valves were closed due to the plant conditions that exist during refueling. The NRC was notified of the Engineered Safety Feature Actuation via the Emergency Notification System (ENS) at 0509 hours on June 5, 1992.

The isolation signal was initiated by a momentary false steam leak detection instrumentation trip signal. Operations personnel verified the valves were closed and reset the isolation signal. On June 8, 1992 investigation revealed trip unit 23MTU-294B, which is on a printed circuit board (card), had slipped part way out of the printed circuit card jack (receptacle) and had caused the false trip output signal.

Inspection of the panel containing the trip unit revealed that metal bars, which are a structural part of the instrumentation panel containing 23MTU-294B and a number of other trip units, were bowed and allowed the trip unit printed circuit card to slip part way out of the connecting jack which is mounted on the bars.

The bars have a cross-section of approximately 1/4 x 1 inch, are approximately 22 inches long, and are manufactured of an aluminum alloy. Twelve printed circuit card jacks are mounted on a pair of bars. The bowing (or bending) of the bars is apparently due to the forces which must be exerted to insert the printed circuit cards into the jacks. Typically, these printed circuit cards are removed and reinserted once each operating cycle. The structural details and arrangement of the upper and lower supports for the printed circuit cards are somewhat different and the observed bowing (or bending) is more severe on the upper support bars. Inspection also revealed similar bowing in other portions of instrument panels of the same design.

The printed circuit card containing the trip unit which provided the isolation signal is arranged in a manner so that power to the printed circuit card and the signal input both utilize connections near the upper edge of the card where bowing of the support bars was most severe. As a result of the bowing, power to the card (or the signal input) was interrupted momentarily resulting in a trip output.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 900 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) James A. FitzPatrick Nuclear Power Plant	DOCKET NUMBER (2) 0   5   0   0   0   3   3   3	LER NUMBER (6)			PAGE (8)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9   2	-   0   3   1	-   0   0	0   3	OF (   4

TEXT (If more space is required, use additional NRC Form 388A's) (17)

Bending of the support bars to return them to a position approximately corresponding to the original (design) position and fully inserting the printed circuit card corrected the false trip signal problem on June 8, 1992.

The equipment was installed in 1985. No other problems associated with the bowed support bars have been observed in the eight years since installation. The equipment manufacturer was contacted and the problem discussed. The manufacturer indicated that the problem had not previously been reported by other customers using the same equipment. Replacement bars (of the same design as the original bars) will be installed as an interim corrective action and permanent solutions will be evaluated.

Cause

The event was caused by bowing of the supports bars. The design of the supports bars appears to be deficient because the bars apparently lack the stiffness necessary to resist the bending forces applied each time printed circuit cards are inserted.

Analysis

The initiation of the false engineered safety feature actuation system signal (the isolation signal) is an event which requires a report under 10 CFR 50.73(a)(2)(iv).

The false isolation signal to the closed HPCI steam line and pump suction line valves was not safety significant. The HPCI system was not required to be operable and cannot function when the reactor is in the cold condition due to the absence of steam to drive the HPCI turbine.

The apparent equipment design deficiency results in conditions where false trip signals could be produced at any time, if the support bars are bowed or bent. Equipment of the same design is used for instrumentation which initiates automatic reactor scram, reactor building (secondary containment) [NG] isolation, High Pressure Coolant Injection (HPCI) actuation, Reactor Core Isolation Cooling (RCIC) [BN] actuation, Residual Heat Removal/ Low Pressure Coolant Injection (RHR/LPCI) [BO] actuation, core spray [BM] actuation, primary containment [NH] isolation, and other protection system and Emergency Core Cooling System (ECCS) control functions. As a result, undesirable reactor scram or other actions which result in transients could occur. The potential for these undesirable transient conditions is safety significant. False trips or actuations which result in system performance in a manner different than expected could interfere with the operator's ability to correctly diagnose and respond to abnormal conditions or operational transients.

While the precise nature and timing of the potential false trips or actuations cannot be predicted due to this condition, which is common to most of the instrumentation which controls the Emergency Core Cooling



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) James A. FitzPatrick Nuclear Power Plant	DOCKET NUMBER (2)  0 5 0 0 0 3 3 3	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 2	— 0 3 1	— 0 0	0 4	OF 0 4

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

Systems provided for the mitigation of postulated accidents described in the Final Safety Analysis Report (FSAR), the condition has the potential to prevent the fulfillment of the safety function of systems provided to remove residual heat and/or mitigate the consequences of an accident. Accordingly, the event also requires a report under 10 CFR 50.73(a)(2)(v)(B) and (D).

Corrective Action

- As a temporary measure, the support bars were straightened and the printed circuit card fully inserted to prevent additional false signals.
- Other panels containing the same equipment have been inspected for the presence of bent or bowed supports bars. While bowing of the support bars was evident at other locations, the bowing was not severe enough to cause similar false signals from other instrument channels. Completed June 26, 1992.
- Replacement support bars have been received from the equipment manufacturer and will be installed. Following installation of the new support bars (and reinstallation of the printed circuit cards), the panels will also be inspected to verify that the support bars are not bowed. This is considered to be an interim corrective action which will restore the equipment to the manufacturer's design configuration. To be completed prior to the start of refueling (currently scheduled for July 15, 1992).
- An evaluation of potential redesign or replacement of the support bars, with a design that has adequate stiffness to resist bending or bowing due to the forces exerted when inserting printed circuit cards into the jacks, will be conducted in conjunction with the equipment manufacturer. Scheduled for completion by February 1, 1993. This will allow adequate time for implementation of modifications (if any) during the next refuel outage.

Additional Information

Failed Components: Analog Transmitter Trip System Panels 09-91, 09-92, 09-93, 09-94, 09-95, and 09-96 manufactured by Rosemount, Incorporated (NPRDS Code R369).

Similar Events: No other LERs associated with printed circuit cards being less than fully inserted have been submitted by this facility. LERs 85-012, 87-020, 89-001, 90-026, 90-028, 91-001, 91-018, 91-022, and 91-029 describe other events involving false engineered safety feature actuations.