

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Indian Point, Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 2 8 6	PAGE (3) 1 OF 4
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TITLE (4) Reactor Trip, Main Boiler Feed Pump Trip Due to Main Boiler Feed Pump Discharge Valve Limit Switch Actuation Caused by Water Hammer Induced Vibration

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)
03	31	88	88	002	00	04	21	88		05000

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)	X	50.73(a)(2)(iv)	73.71(b)		
	20.405(a)(1)(i)	50.38(c)(1)		50.73(a)(2)(v)	73.71(c)		
	20.405(a)(1)(ii)	50.38(c)(2)		50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)		
	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)(ix)				

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER
NAME Roger Lauricella, Resident Engineer		AREA CODE 914736181046

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFAC. TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC. TURER	REPORTABLE TO NPRDS		
B	SJ	20	C684	Y	X	BA	TC	I204	Y		

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO				

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

On March 31, 1988, with the reactor at 100% power, Main Boiler Feed Pump (MBFP) No.32 tripped. Operators responding to the pump loss took manual control of the plant starting Auxiliary Boiler Feed Pump (ABFP) No.31 and 33 and initiated a turbine runback. Steam Generator levels initially decreased but turned around and started increasing requiring the shutdown of the ABFPs. The operators were subsequently unable to prevent an automatic unit trip due to High Steam Generator Level. All plant systems functioned properly following the unit trip with the exception of the No.33 ABFP recirculation valve which failed to automatically close. The valve was manually closed by the control room operator. It was determined subsequent to the trip that the MBFP had tripped due to a limit switch on its motor operated discharge valve making up. This limit switch movement was caused by "water hammer" vibration. The No.33 ABFP failure was determined to have occurred due to a damaged flow controller which was caused by a broken glass faceplate. No proximate cause was identified and the faceplate was replaced with plexiglas and the controller returned to service. The No.32 MBFP discharge valve limit switch was adjusted to provide less sensitive indication off the open seat and the valve was returned to service. Following the flow controller and discharge valve repairs the reactor was brought critical and synchronized to the bus on April 2, 1988. Full reactor power was reached on April 4, 1988.

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

DESCRIPTION OF EVENT:

At 1411 hours on March 31, 1988, with the plant at 100%, the main boiler feed pump (MBFP) No. 32 tripped. Operators responding to the loss of the No. 32 MBFP took manual control of the plant and started Auxiliary Boiler Feed Pumps (ABFP) No. 31 and 33 and initiated a turbine runback. Steam Generator levels initially decreased but turned around and started increasing requiring the operators to shutdown ABFP's No. 31 and 33. The Operators were subsequently unable to prevent automatic plant trip due to High Steam Generator Level on Steam Generator No. 31 which occurred at 1415 hours on March 31, 1988. All plant systems functioned properly following the unit trip with the exception of the following:

At approximately 1429 hours, while operators were carrying out post trip supplementary actions, the No. 33 ABFP tripped on overcurrent. The recirculation valve for this pump (FCV-1123) was previously closed by operators during this event to improve feed flow to Steam Generator Nos. 33 and 34. When Steam Generator level was satisfied the operators placed the recirculation valve back in auto in preparation for reducing auxiliary feed flow, the valve responded by immediately going to full open; this produced a high flow situation that caused the No. 33 ABFP to trip on overcurrent. The operators placed the recirculation valve back in manual and restarted the pump. The other operating AFP (No. 31) was unaffected by this problem and continued to provide auxiliary feed flow as required. The steam driven AFP (No. 32) was also available throughout this event.

Subsequent investigations revealed that the trip of MBFP No. 32 was due to the limit switch on the motor operated No. 32 MBFP discharge valve (BFD-2-32) (C684) (20) making up electrically thereby indicating to the No. 32 MBFP protection logic that the discharge valve had come off its open seat. The No. 33 ABFP recirculation valve (FCV-1123) failed open due to a broken glass faceplate on the No. 33 ABFP flow controller (FC-1136-S) (I204) (TC) restricting needle movement. This resulted in the No. 33 ABFP tripping on overcurrent due to pump runout.

CAUSE OF EVENT:

The trip of the No. 32 MBFP was due to a "discharge valve not fully open" signal. This signal was generated by movement of the discharge valve (BFD-2-32) (Crane/Teledyne Model T40-80) non-rotor driven limit switch. The limit switch movement was caused by a hydraulic water hammer shock generated by the cycling of the No. 32 MBFP recirc valve (FCV-1116) with its manual isolation valve (BFR-1-32) closed. This water hammer shock (witnessed by plant personnel) occurred due to the pressure drop between FCV-1116 and the manual isolation valve. Cycling of the recirc valve (FCV-1116) was undertaken by the Instrumentation and Controls and Operations Departments while troubleshooting a faulty limit switch on FCV-1116.

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

The trip of the No. 33 ABFP was due to a pump runout condition causing the overcurrent trip of the pump. The pump runout condition was a result of a damaged flow controller (FC-1136-S) (Barton Model #289A) which caused the pump recirc valve (FCV-1123) control circuit to "see" incorrect low suction flow in turn keeping the recirc valve open. The damage in the flow controller was caused by broken glass from the controller face plate becoming lodged under the flow controller needle restricting movement of the controller. The proximate cause for the broken glass cannot be identified.

ANALYSIS OF EVENT:

This event is reportable under 10CFR50.73(a)(2)(iv). An evaluation has determined that this event has been considered under the guidelines of plant FSAR and Technical Specifications and no other safety concerns exist as a result of this event.

The following actions were undertaken as a result of this incident:

- 1) The No. 32 MBFP discharge valve (BFD-2-32) limit switches were adjusted so that when the valve was in the full open position the limit switch was not so close to making up the contacts that give a "valve not fully open trip signal". Upon adjustment of the limit switch the valve was operationally tested satisfactory.
- 2) The No. 33 ABFP recirc valve flow controller (FC-1136-S) was repaired with a plexiglas faceplate installed, controller recalibrated and its environmental seal reinstalled. Operation of the No. 33 ABFP was satisfactory retested upon repair of the controller.
- 3) The DC control circuit for the No. 32 MBFP and FCV-1116 was checked by the I&C Department for circuit continuity, grounds and interaction between the different components. All checks showed satisfactory operation of contacts and signals in that circuit.
- 4) An evaluation is underway to consider the possible replacement of the MBFP discharge valve operators with rotor driven limit switches less sensitive to vibration.

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

On April 2, 1988, following completion of minor maintenance items and work on the Auxiliary Boiler Feed Pump No. 33 flow controller(FC-1136-S) being performed during shutdown, the reactor was brought critical at 1017 hours. The generator was synchronized to the bus on April 2, 1988 at 1700 hours and full reactor power was reached on April 4, 1988 at 0230 hours. No similar events or LERs have occurred or been reported to date.

Indian Point 3
Nuclear Power Plant
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April 21, 1988
IP3-88-030
IP3-88-002R

Docket No. 50-286
License No. DPR-64

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

The attached Licensee Event Report LER 88-002-00 is hereby submitted in accordance with the requirements of 10CFR50.73. This event is of the type defined in Paragraph 50.73 (a) (2) (iv).

Very truly yours,


William A. Josiger
Resident Manager
Indian Point 3 Nuclear Power Plant

RL/rj
Attachment

cc: Mr. William Russell
Regional Administrator
Region 1
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, Pennsylvania 19406

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