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)
INDIAN POINT, UNIT 2	0 5 0 0 0 2 4 7	1 OF 0 4

TITLE (4)

MAIN BOILER FEEDWATER PUMP TRIP/REACTOR TRIP

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 4	1 6	8 5	8 5	0 0 6	0 0	0 5	1 6	8 5		0 5 0 0 0
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OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
		20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	1 0 0	20.405(a)(1)(i)	50.36(c)(1)	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
JOHN R. ELLWANGER	AREA CODE 9 1 4 5 2 6 - 5 1 8 2

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
B	S J	X C	I 0 7 5	Y	B	B A	V	C 6 3 6	Y
B	E A	R L Y	W 1 2 0	Y	B	B A	I Q	I 2 0 6	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 April 16, 1985 at 12:20 a.m., while the plant was at full power, the loss of one of the two Main Boiler Feedwater Pumps, #22 initiated a sequence of events leading to a reactor trip.

The event occurred when the operator reduced load. The level in all four (4) steam generators fell and the reactor trip occurred on a low-low level signal from steam generator #24.

There was no impact on plant safety. The reactor protection system functioned in accordance with the design. The cause of the Main Boiler Feedwater Pump trip was subsequently determined to be a malfunction in the control oil system.

IE22
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Plant and System Identification:

Westinghouse 4-Loop Pressurized Water Reactor - 900 MWe.

Identification of Occurrence:

Actuation of Reactor Protection System (Reactor Trip) due to a low-low steam generator level signal.

Event Date:

April 16, 1985

Report Due Date:

May 16, 1985
This report was initiated by Significant Occurrence Report 84-146.

Description of Occurrence:

On April 16, 1985 while the unit was at full power, #22 Main Boiler Feedwater Pump tripped. The operators rapidly reduced power in an attempt to continue operation at a reduced power level consistent with the capacity of the remaining Main Boiler Feedwater Pump. The level in all four steam generators dropped continuously despite the runback in power until the reactor automatically tripped. The reactor trip was caused by actuation of the Reactor Protection System due to a low-low water level signal from Steam Generator #24.

A preliminary analysis of the occurrence indicated the initiating event to be related to the control oil system on #22 Main Boiler Feedwater Pump. Other equipment malfunctions which occurred were the failure of a non-safety related 6.9 K.V. relay to transfer power from an off-site source to a bus normally supplied by "house" power (which was lost in connection with the reactor trip), sluggish response of the auxiliary feedwater regulating valves, and an auxiliary feedwater pump flow switch auxiliary relay failure.

In case of the 6.9 K.V. relay failure, the diesel generators automatically started due to a related undervlotage condition on the affected 480 volt bus and came to the idle condition. Upon manual closure of the 6.9 K.V. station supply breaker, the diesels were secured. In the instance of

the auxiliary feedwater regulating valves, minimum flow was achieved to satisfy nuclear safety; however, the valves did not respond rapidly enough when an attempt to increase flow rate was made.

Both motor driven auxiliary feedwater pumps started, but a flow switch auxiliary relay continued to trip out #23 pump. Minimum flow was maintained via the alternate steam driven auxiliary feedwater pump, #22 and the remaining motor driven auxiliary feedwater pump, #21.

It was decided to return the unit to reduced power level operation consistent with the capacity of the remaining Main Boiler Feedwater Pump. Each feedwater pump is nominally rated at 60% of full flow. While the plant remained at reduced power level it was also decided that the oil system on both pumps would be completely overhauled. This decision was made based upon previous problems with the Main Boiler Feedwater Pumps and related reactor trips (LER 85-005). The plant was restored to reduced power operation on April 17, 1985.

Apparent Cause of Occurrence:

The cause of the trip of Main Boiler Feedwater Pump #22 was a reduction in auto-stop oil pressure. During the overhaul of the pump three observations were noted, any one of which could have resulted in a reduction of Auto-Stop oil pressure:

1. Vacuum Trip Mechanism.
   A flange of a bellows was found to be leaking oil, allowing the vacuum cavity to fill with oil.

2. Overspeed, Manual and Bearing Oil Failure Trip Mechanism.
   Excessive oil leakage from bearing oil failure trip mechanism was found.

3. Multiple Orifice and check valve assembly.
   Dirt and rust particles were found in the Control Oil system orifice block. Small particles of rust were found in the servomotor and stop valve control oil orifices.

Analyses of Occurrence:

The actions taken by the operators were correct; however, the characteristics of the transient prevented a reactor trip from being averted. The reactor trip was the result of an actuation of the Reactor Protection System due to the low-low steam generator level signal. This action is in accord with the design of the Reactor Protection System.

The 6.9 K.V. relay which failed was non-safety related. The consequent undervlotage condition on the 480 volt bus properly actuated the diesel generators to the idle condition.

The motor driven Auxiliary Feedwater pumps started, however a flow switch auxiliary relay continued to trip pump #23 out of service. Minimum auxiliary flow, as required for nuclear safety, was maintained by the steam driven auxiliary feedwater pump and the remaining motor driven auxiliary feedwater pump. The malfunction of the auxiliary feedwater regulating valves did not interfere with maintaining minimum required flow.

Thus, minimum safeguards were maintained throughout the incident and there was no impact upon the health and safety of the public.

Corrective Action:

The control oil systems for both Main Boiler Feedwater pumps were completely overhauled with the assistance of the vendor, Westinghouse. The deficiencies previously identified with the vacuum trip mechanism; overspeed, manual and bearing oil failure trip mechanism; and multiple orifice and check valve assembly were corrected. The presence of rust particles is attributed to a period of time when the oil-moisture separator was not operable; this problem was previously corrected.

The substandard performance of the Auxiliary Feedwater Regulating Valves was found to be due to the presence of water in the air supply to the air operator. This was immediately corrected by draining the instrument air lines. Long term corrective action includes the planned installation of new larger capacity air dryers for the entire instrument air during the next refueling outage.

The flow switch auxiliary relay was replaced and the failure is being reviewed by the Failure Analysis Engineer.

Other measures being adopted are limiting the amount of turbine runback to 30% of full power to minimize steam generator level decrease and manual actuation of the third condensate pump in the event of the loss of a main feedwater pump. Operators are being trained in the above procedure changes and consideration is being given to incorporating these changes as automatic actions.

Murray Selman
Vice President

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May 16, 1985

Re: Indian Point Unit No. 2
Docket No. 50-247
LER-85-006

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

Dear Sirs:

The attached Licensee Event Report LER-85-006-00 is hereby submitted in accordance with the requirements of 10 CFR Part 50.73.

Very truly yours,

for John G. Bemis
Murray Selman
Vice President, Nuclear Power

attachment

cc: Dr. Thomas E. Murley,
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