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*Designated Original
Per John Basba*

Fred Dacimo
Site Vice President
Administration

July 5, 2005
Indian Point Unit No. 3
Docket Nos. 50-286
NL-05-078

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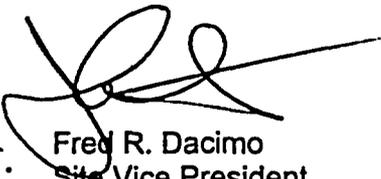
Subject: Licensee Event Report # 2005-002-00, "Automatic Reactor Trip Due to 32 Steam Generator Steam Flow/Feedwater Flow Mismatch Caused by Low Feedwater Flow Due to Inadvertent Condensate Polisher Post Filter Bypass Valve Closure."

Dear Sir:

The attached Licensee Event Report (LER) 2005-002-00 is the follow-up written report submitted in accordance with 10 CFR 50.73. This event is of the type defined in 10 CFR 50.73(a)(2)(iv)(A) for an event recorded in the Entergy corrective action process as Condition Report CR-IP3-2005-02478.

There are no commitments contained in this letter. Should you or your staff have any questions regarding this matter, please contact Mr. Patric W. Conroy, Manager, Licensing, Indian Point Energy Center at (914) 734-6668.

Sincerely,

Far. 

Fred R. Dacimo
Site Vice President
Indian Point Energy Center

IE22

Attachment: LER-2005-002-00

cc:

Mr. Samuel J. Collins
Regional Administrator – Region I
U.S. Nuclear Regulatory Commission

U.S. Nuclear Regulatory Commission
Resident Inspector's Office
Resident Inspector Indian Point Unit 3

Mr. Paul Eddy
State of New York Public Service Commission

INPO Record Center

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollect@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME INDIAN POINT 3	2. DOCKET NUMBER 05000-286	3. PAGE 1 OF 6
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4. TITLE Automatic Reactor Trip Due to 32 Steam Generator Steam Flow/Feedwater Flow Mismatch Caused by Low Feedwater Flow Due to Inadvertent Condensate Polisher Post Filter Bypass Valve Closure

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV. NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	06	2005	2005	002	00	07	05	05		05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: <i>(Check all that apply)</i>									
10. POWER LEVEL 100%	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER						
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(A)(2)(I)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

12. LICENSEE CONTACT FOR THIS LER	
NAME Steve Davis, Superintendent Nuclear Training	TELEPHONE NUMBER <i>(Include Area Code)</i> (914) 788-2633

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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

16. ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced type written lines)*

On May 6, 2005, at approximately 10:32 hours, an automatic reactor trip was initiated due to a 32 steam generator (SG) steam flow/feedwater flow mismatch with low SG level trip during Instrumentation & Control (I&C) troubleshooting of the condensate system (CS). All control rods fully inserted and all required safety systems functioned properly. The plant was stabilized in hot standby with decay heat being removed by the main condenser. There was no radiation release. The Emergency Diesel Generators did not start as offsite power remained available. The Auxiliary FW system automatically started as expected due to a SG low level. The cause of the event was personnel error due to poor work practices during troubleshooting of the CS. The control switch for the condensate polisher (CP) post filter bypass valve was in auto when a wire was disconnected from a relay of a seal-in circuit causing the post filter bypass valve to close. The post filter bypass valve closure caused inadequate feedwater flow that resulted in the mismatch and low SG level. Operations and I&C personnel failed to verify and recognize the required switch position for the condition due to overconfidence. Corrective actions include counseling operations and I&C personnel and applicable plant staff on management expectations for a questioning attitude, pre-job briefs, peer checking, and use of the formal work process. The CP system operating procedure was revised for proper CP valve control switch position and seal-in circuit clearance. The work control procedure will be revised to define when work becomes troubleshooting and decide the level of risk assessment to be performed. The event had no effect on public health and safety.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Indian Point Unit 3	05000-286	2005	002	00	2 OF 6

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

Note: The Energy Industry Identification System Codes are identified within brackets ()

DESCRIPTION OF EVENT

On May 6, 2005, at approximately 10:32 hours, while at 100% steady state reactor power, an automatic reactor trip (RT) (JC) was initiated due to a 32 steam generator (SG) (AB) steam flow/feedwater flow mismatch coincident with low SG level trip during Instrumentation & Control (I&C) troubleshooting of the condensate system (SD). All control rods fully inserted and all required safety systems functioned properly. The plant was stabilized in hot standby with decay heat being removed by the main condenser (SD). There was no radiation release. The Emergency Diesel Generators (EK) did not start as offsite power remained available. The Auxiliary Feedwater System (AFW) (BA) automatically started as expected due to a SG low level. On May 6, 2005, at 1310 hours, a 4-hour non-emergency notification was made to the NRC for an actuation of the reactor protection system (JC) while critical under 10CFR50.72(b)(2)(iv)(B) and a valid actuation of the AFW System under 10CFR50.72(b)(3)(iv)(A) (8-hour), Event Log # 41673. The event was recorded in the IPEC corrective action program (CAP) as CR-IP3-2005-02478.

On April 8, 2005, during power ascension from refueling outage cycle 13, with the condensate polisher (CP) (SF) in service, the CP post filter bypass valve CD-AOV-521 was unexpectedly found open, bypassing the CP vessels (mixed bed demineralizers). At the time it was decided to leave the CP bypassed. Water chemistry was within specification and using the CP was not necessary therefore, the CP vessels were not placed back in service. It is believed this is how bypass valve CD-AOV-521 was open with its control switch left in AUTO. On May 6, 2005, during the midnight shift, operations attempted to "bump" the 33 condensate polisher booster pump (CPBP) for a monthly equipment rotation. When the pump control switch was placed in STANDBY, the 33 CPBP started. Operations concluded the low pressure auto start "seal-in" circuit had not been reset and was locked in. The low pressure seal-in circuit sends an automatic start signal to the CPBP as well as an open signal to the CP post filter bypass valve CD-AOV-521. The condensate system operating procedure (3-SOP-C-002) provides guidance to clear the CPBP auto start signal by closing post filter bypass valve CD-AOV-521. This direction was inadequate for the plant condition since closing post filter bypass valve CD-AOV-521 would interrupt suction flow to the Main Boiler FW Pumps (MBFP). At approximately 07:15 hours, the Control Room Supervisor (CRS) directly requested assistance from the I&C supervisor in investigating the issue. The I&C Supervisor reviewed the circuit and directed technicians to verify the state of relay 95Z in the low pressure auto start seal-in circuit. The relay was verified energized as suspected. To reset the circuit and remove the auto start signal for the CPBPs, it would be necessary to de-energize relay 95Z. De-energizing relay 95Z could be accomplished in one of two ways; the fuse of the control circuit could be removed or a wire that attaches directly to the coil of relay 95Z could be lifted. Relay 95Z is an interposing relay that when energized sends a start signal to the CPBPs.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Indian Point Unit 3	05000-286	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 6
		2005	002	00	

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

When relay 95Z is de-energized, the relays open contacts close, and with the CP post filter bypass valve's control switch in the AUTO position, will cause post filter bypass valve CD-AOV-521 to close. The I&C supervisor briefed the CRS and noted that post filter bypass valve CD-AOV-521 fails open upon loss of power. The CRS understood this and believed that lifting of a wire or removal of a fuse would remove power to the circuit and since this was a fail open valve, there would be no effect on the open position of post filter bypass valve CD-AOV-521. The I&C supervisor provided an informal briefing for the technicians performing the work. Prior to performing any work, the I&C technicians field verified the circuit wiring and found a second circuit coming off the fuse whose function was unknown. The technicians reported their finding to the I&C supervisor and recommended lifting the wire to the 95Z relay coil. The I&C supervisor and the CRS concurred with the technicians for lifting the wire to the coil of relay 95Z. Upon verbally receiving permission from the I&C supervisor, the I&C technicians lifted the lead to the coil of relay 95Z at approximately 10:30 hours. When the wire for the seal-in contact was lifted, relay 95Z became de-energized. With relay 95Z de-energized and the control switch for the CP post filter bypass valve AOV-521 in AUTO, SOV-521 becomes energized to cause the post filter bypass valve AOV-521 to close. With all main condensate going through post filter bypass valve CD-AOV-521, its closure resulted in inadequate FW flow to the SGs. During this event the three position switch (open, auto, close) for the CP post filter bypass valve CD-AOV-521, was in the AUTO position. The position of the switch was not checked by the CRS nor the I&C supervisor prior to the event. The I&C supervisor believed that for the plant condition, the CP post filter bypass valve control switch was in the OPEN position and therefore would maintain post filter bypass valve CD-AOV-521 open while resetting the seal-in circuit. The CRS believed that since the valve failed open, the open/AUTO positioning choice was not an issue. However, with the switch in the AUTO position, a loss of control power to relay 95Z applied power to the solenoid operated valve (SOV) for post filter bypass valve CD-AOV-521 causing the valve to close. It is true that CP post filter bypass valve CD-AOV-521 fails open on a loss of power to its SOV, but it is not true when power is removed from interposing relay 95Z with the control switch in the AUTO position.

CAUSE OF EVENT

The cause of the reactor trip was a 32 SG steam flow/FW flow mismatch with a low SG level trip due to a loss of FW flow. The direct cause of the event was personnel error as a result of poor work practices during troubleshooting. Operations and I&C personnel failed to verify that the three position control switch for the condensate polisher post filter bypass valve CD-AOV-521 was in the OPEN position. During the attempt to clear the MBFP Low Suction Pressure seal-in circuit with the post filter bypass valve control switch in AUTO, the circuit design results in energizing the solenoid operated valve (SOV) for post filter bypass valve CD-AOV-521 causing the valve to close.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Indian Point Unit 3	05000-286	2005	002	00	4 of 6

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

The root causes were; 1) Operations and I&C personnel failure to verify and recognize the required switch position for the condition due to overconfidence, and 2) Operations misunderstanding whether the activity constituted operational maintenance or troubleshooting allowing I&C to work outside the normal work process. Significant contributing causes (CC) were as follows: (CC-1) Poor communication; Pre-job briefs between the Control Room Supervisor (CRS) and I&C Supervisor and between the CRS and Reactor Operators (ROs) were inadequate and not formal. Technicians only received verbal guidance. There was no written plan or work package. (CC-2) Inadequate procedures; The CP System Operating Procedure (3-SOP-C-002) only required the valve to open. The SOP did not specify the bypass valve's control switch position as a function of plant condition. The work control process procedure IP-SMM-WM-100 and the troubleshooting procedure IP-SMM-MA-103 do not have a clear interface. Troubleshooting appears to be a subset of the different types of work described in the work control process. The troubleshooting procedure was not utilized for this event because I&C believed they were performing operational maintenance. (CC-3) Poor use of Human Performance tools, lack of a questioning attitude, (CC-4) Knowledge/Training; Operator's knowledge of how the bypass valve worked in AUTO. The CRS authorizing the work misunderstood what work control procedure governed the work being performed. There are no Licensed Operator Requalification tasks associated with the CP.

CORRECTIVE ACTIONS

The following corrective actions have been or will be performed under the CAP to address the causes of this event.

- Operations, I&C, Planning Scheduling & Outage (PS&O), Maintenance, and Engineering were briefed on management's expectation concerning a questioning attitude, pre-job briefs, peer checking, and the use of the IPEC formal work process. These expectations for I&C and Operations will be strengthened through training and/or alignment meetings.
- Operations and I&C individuals involved in this event were counseled.
- Procedure 3-SOP-C-002, "Condensate System Operation," was revised to ensure proper CP configuration for system post filter bypass and seal-in circuit clearance.
- Procedure IP-SMM-WM-100, "Work Control Process" will be revised to define when work becomes troubleshooting and decide the level of risk assessment to be performed for operational maintenance, investigative work and emergency work. Procedure revision is scheduled to be completed July 29, 2005.
- Formally review this event with all operating crews. Completion is scheduled for July 31, 2005.
- The operator training program will be evaluated and determined if it needs to be revised for condensate polisher operations. Completion is scheduled for July 31, 2005.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Indian Point Unit 3	05000-286	2005	002	00	5 of 6

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

- An evaluation will be performed to determine the need for training in applying the work control process and for the appropriate use of troubleshooting/operational maintenance. Completion is scheduled for July 31, 2005.

EVENT ANALYSIS

The event is reportable under 10CFR50.73(a)(2)(iv)(A). The licensee shall report any event or condition that resulted in manual or automatic actuation of any of the systems listed under 10CFR50.73(a)(2)(iv)(B). Systems to which the requirements of 10CFR50.73(a)(2)(iv)(A) apply for this event include the reactor protection system (RPS) including reactor trip, and AFWS.

This event meets the reporting criteria because the RPS was actuated by a Steam Flow/Feedwater Flow mismatch with low SG level trip and the AFWS was actuated on a low steam generator level due to low FW flow and in response to the RT as a result of SG shrink which occurs after a RT from full power.

PAST SIMILAR EVENTS

A review of the past two years of Licensee Event Reports (LERs) for events that involved a RT caused by inadequate FW flow as a result of secondary system malfunctions identified no LERs. LER-2003-002 reported a manual reactor trip as a result of high differential pressure between condenser sections caused by malfunction of a circulating water pump. That reported event was not applicable as a similar event because it did not result in inadequate FW flow and it had a different cause.

SAFETY SIGNIFICANCE

This event had no effect on the health and safety of the public. There were no actual safety consequences for this event because it was an uncomplicated reactor trip with no other transients or accidents. Required safety systems performed as designed when the RT was initiated. There were no risk related components out of service at the time of the RT. The AFWS actuation was an expected result from low SG water level due to the low FW flow and a result of SG void fraction (shrink), which is expected to occur after automatic RT from full load.

There were no significant potential safety consequences of this event under reasonable and credible alternative conditions. The inadvertent closure of the condensate polisher post filter bypass valve causing a reduction in FW flow and a subsequent reduction in SG level is a credible alternative condition for which the plant is analyzed.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Indian Point Unit 3	05000-286	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	6 of 6
		2005	002	00	

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

This event was bounded by the analyzed event described in FSAR Section 14.1.9, Loss of Normal Feedwater. A Low-Low water level in any one SG initiates actuation of two motor-driven AFW pumps and one steam driven AFW pump. The AFW System has adequate redundancy to provide the minimum required flow assuming a single failure. The analysis of a loss of normal FW shows that following a loss of normal FW, the AFWS is capable of removing the stored and residual heat plus reactor coolant pump waste heat thereby preventing either over pressurization of the RCS or loss of water from the reactor. For this event, rod control was in automatic and the reactor scrammed immediately upon receiving the reactor trip signal. The AFWS actuated and provided required FW flow to the SGs. RCS pressure remained below the set point for pressurizer PORV or code safety valve operation and above the set point for automatic safety injection actuation. Following the RT, the plant was stabilized in hot standby.