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New York Power Authority

Michael J. Colomb
Site Executive Officer

March 31, 2000
JAFP-00-0077

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

Subject: **Docket No. 50-333**
LICENSEE EVENT REPORT: LER-99-011-01

High Pressure Coolant Injection System Inoperable Due to Higher Than Normal Turbine Speed

Dear Sir:

This report is submitted in accordance with 10 CFR 50.73 (a) (2) (v) (D), "Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident."

This supplement is being issued to report the results of a completed equipment failure evaluation and subsequent corrective actions taken.

There are no commitments contained in this report.

Questions concerning this report may be addressed to Mr. John Hoddy at (315) 349-6538.

Very truly yours,

MICHAEL J. COLOMB

MJC:JRH:las
Enclosure

cc: USNRC, Region 1
USNRC, Project Directorate
USNRC Resident Inspector
INPO Records Center

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NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not

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TITLE (4)

High Pressure Coolant Injection System Inoperable Due to Higher Than Normal Turbine Speed

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 NAME	DOCKET NUMBER
									N/A	05000
10	27	99	99	011	01	03	31	00	FACILITY NAME: N/A	DOCKET NUMBER: 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	40

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

	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)	X	50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
John R. Hoddy, Sr. Licensing Engineer	315-349-6538

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
D	BG								

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 15 single-spaced typewritten lines) (16)

On October 27, 1999 the plant was operating at approximately 40% power, during power ascension. At 1750 hours, the High Pressure Coolant Injection (HPCI) system was declared inoperable due to an unexplained HPCI turbine speed increase during the previous surveillance test. System engineering and maintenance personnel review of available data determined that a HPCI turbine speed of approximately 4833 RPM was reached. Maximum turbine speed during a normal HPCI startup is expected to be approximately 4300 RPM. Troubleshooting activities of the unexpected HPCI turbine speed increase identified several likely contributors to the anomalous control system response. Several recommendations and repairs were completed to the HPCI control system.

The cause of this event is a HPCI system speed control problem resulting from improperly set (high) HPCI lubricating oil pressure, which caused a higher than normal speed transient upon HPCI pump startup. The improperly set oil pressure was caused by an inadequate procedure. The cause was identified by an Equipment Failure Evaluation and adjunct system performance evaluation. Detailed results of these evaluations are discussed in LER-00-002.

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Event Description

On October 14, 1999, an automatic Main Turbine [TA] trip occurred followed by a Reactor Scram. During the event, the High Pressure Coolant Injection (HPCI) turbine [BJ] tripped on overspeed. During subsequent troubleshooting the most likely cause of the overspeed trip was determined to be the Remote Servo, which was replaced (See LER-99-010 for details). To verify this was the root cause of the overspeed trip, a post-maintenance test plan was developed. The test plan required testing the HPCI turbine at both low and high pressure conditions, which was required by Technical Specifications, during the subsequent plant startup.

On October 25, 1999, at 0242 hours, HPCI was declared operable. This declaration was based on satisfactory results during the low pressure test conducted in the "startup" mode at approximately 150 psig. Based on the satisfactory results, operators continued with a normal plant power ascension into the "run" mode.

A subsequent test of the HPCI system was performed at full operating pressure in the "run" mode. Based on this test, on October 27, 1999, at 0130 hours, the HPCI system was declared operable. The operating crew declared the HPCI system operable based on the HPCI system providing the required system flow at the required pressure with all the surveillance test acceptance criteria being met.

During a subsequent engineering review of the turbine speed data, taken during the full operating pressure surveillance test, the system engineer identified an unexplained HPCI turbine speed of approximately 4833 RPM. Maximum turbine speed during a normal HPCI startup is expected to be approximately 4300 RPM. The HPCI overspeed trip setpoint is set at approximately 5100 RPM.

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

Event Description (cont'd.)

On October 27, 1999, at 1750 hours, with the plant operating in the "run" mode at approximately 40 percent power, the HPCI system was declared inoperable. The Operations crew, based on engineering input, concluded that it would be prudent to declare the HPCI system inoperable until the unexpected HPCI turbine speed could be evaluated and resolved. The NRC Operations Center was informed via the Emergency Notification System at 1953 on October 27, 1999.

The 7 day limiting condition of operation (LCO) was entered in accordance with TS 3.5.C.1.a based on the time of the completion of initial full operating pressure test (i.e. 0130 on October 27, 1999). The anomalous response did not occur during the low pressure (150 psig) test.

A troubleshooting plan was developed including a temporary surveillance test, TST-101, to obtain data for HPCI turbine control loop troubleshooting. Between October 29 and November 1, 1999, five HPCI runs were completed with TST-101. Review of transient data logs from the TST-101 runs for HPCI pressure, flow, and turbine speed, showed that there was no repeat of the unexpected speed response identified in the October 27, 1999 high pressure test.

Troubleshooting activities of the unexpected HPCI turbine speed increase identified several likely contributors to the anomalous control system response. Several recommendations and repairs were completed to the HPCI controls which included: (a) the EG-R governor was replaced; (b) HPCI flow controller was adjusted; (c) HPCI lube oil supply isolation valve 23HPI-316 was repositioned from a partially open to a full close position; (d) turbine speed magnetic pickup was replaced; (e) several pressure instruments were recalibrated; (f) HPCI turbine hydraulic control fluid bypass check valve 23HPI-124 was replaced; (g) balance chamber adjustments to the turbine stop valve 23HOV-1 were made; and (h) linkages on the turbine control valve 23HOV-2 were inspected for freedom of movement.

The quarterly full operating pressure HPCI test was repeated with satisfactory results and HPCI was restored to an operable status at 0423 hours on November 2, 1999. HPCI had been inoperable for a total of approximately 6 days and 2 hours.

Cause of Event

Although the ongoing EFE identified several likely contributors, the cause of the unexpected HPCI turbine speed increase was not conclusively determined. An engineering and maintenance team evaluated the information from the troubleshooting efforts, including the repairs and test data. The only conclusion the team reached after having evaluated all the available evidence was that the repairs completed to the HPCI control system improved performance and prevented recurrence of the overspeed events experienced on October 14, 1999 and October 27, 1999. The team recommended increased frequency (monthly) HPCI surveillance testing for at least 3 months to allow collection of additional test data for further analysis.

On January 31, 2000, the condition recurred during performance of ST-4P being performed in accordance with the increased frequency testing. Transient monitoring instrumentation installed per ST-4P captured the transient data for analysis. Subsequent analysis and evaluation of data obtained from the additional (increased) testing identified the cause as a HPCI system speed control problem resulting from improperly set (high) HPCI lubricating oil pressure, which caused a higher than normal speed transient upon HPCI pump startup. The improperly set oil pressure was caused by a defective procedure [Cause Code D]. This later recurrence and the subsequent analysis are described in detail in LER-00-002. This analysis and subsequent corrective actions are directly applicable to the conditions identified in this report.

Event Analysis

The safety significance of this condition was evaluated as minimal because HPCI was available and achieved the required flow rate in the required time as demonstrated on October 27, 1999.

Since HPCI met the Technical Specification requirements during testing, this condition will not constitute an additional Safety System Functional Failure beyond the LER-99-010 report.

The Automatic Depressurization System (ADS) [SB], Residual Heat Removal (RHR) [BO], and Core Spray (CS) [BM] systems were available as redundant emergency core cooling systems during the duration of the troubleshooting period. The Reactor Core Isolation Cooling (RCIC) [BN] system was available as a source of high pressure injection.

Additional analysis of the condition is contained in LER-00-002.

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Extent of Condition

This condition is limited to the HPCI system. The RCIC System has an electro-mechanical governor which does not use the lubricating oil system as a hydraulic working fluid.

Corrective Actions

1. HPCI system troubleshooting and repairs were completed. Although the root cause of the overspeed events was not conclusively identified, test data indicated that repairs improved performance. **(Completed)**

2. HPCI system testing frequency was increased from quarterly to monthly, with the additional instrumentation obtained used to aid in root cause determination. **(Completed)**

3. An Equipment Failure Evaluation and additional system performance evaluation were performed. These evaluations identified the cause of the speed transient as improperly set (high) lubricating oil pressure for the HPCI system. Detailed results of these evaluations were reported in voluntarily submitted LER-00-002. **(Completed)**

4. See LER-00-002 for additional corrective actions.

Additional Information

Previous Similar Events: LER 99-010