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U.S. Nuclear Regulatory Commission
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PLANT HATCH - UNIT 1
NRC DOCKET 50-321
OPERATING LICENSE DPR-57
LICENSEE EVENT REPORT
HPCI SYSTEM INOPERABLE DUE TO
LESS THAN ADEQUATE PROCEDURES

Gentlemen:

In accordance with the requirements of 10 CFR 50.73 (a)(2)(v), Georgia Power Company is submitting the enclosed Licensee Event Report (LER) concerning the High Pressure Coolant Injection (HPCI) system being declared inoperable due to flow instability. The root cause of the instability was determined to be less than adequate maintenance procedures. This event occurred at Plant Hatch - Unit 1.

Sincerely,

W. G. Hairston, III

SRM/cr

Enclosure: LER 50-321/1992-006

cc: (See next page.)

IE22

cc: Georgia Power Company
Mr. H. L. Sumner, General Manager - Nuclear Plant
NORMS

U.S. Nuclear Regulatory Commission, Washington, D.C.
Mr. K. Jabbour, Licensing Project Manager - Hatch

U.S. Nuclear Regulatory Commission, Region II
Mr. S. D. Ebneter, Regional Administrator
Mr. L. D. Wert, Senior Resident Inspector - Hatch

NRC Form 366 (6-89) | U.S. NUCLEAR REGULATORY COMMISSION | APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): PLANT HATCH, UNIT 1

DOCKET NUMBER (2): 0 5 0 0 0 3 2 1

PAGE (3): 1 OF 5

TITLE (4): HIGH PRESSURE COOLANT INJECTION SYSTEM INOPERABLE DUE TO A LESS THAN ADEQUATE PROCEDURE

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQ NUM	REV	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
										0 5 0 0 0
0 2	2 6	9 2	9 2	0 0 6	0 0	0 3	2 5	9 2		0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL: 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11)

[ ] 20.402(b)	[ ] 20.405(c)	[ ] 50.73(a)(2)(iv)	[ ] 73.71(b)
[ ] 20.405(a)(1)(i)	[ ] 50.36(c)(1)	[X] 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)
[ ] 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 AREA CODE	
STEVEN B. TIPPS, MANAGER NUCLEAR SAFETY AND COMPLIANCE, HATCH	912	367-7851

COMPLETE ONE LINE FOR EACH FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

[ ] YES (If yes, complete EXPECTED SUBMISSION DATE) [X] NO

EXPECTED SUBMISSION DATE (15): MONTH | DAY | YEAR

ABSTRACT (16)

On 2/26/92, at 1215 CST, Unit 1 was in the Run mode at 2436 CMWT (100 percent of rated thermal power). At that time, the High Pressure Coolant Injection (HPCI) system was declared inoperable due to it failing to achieve stable flow and pressure at rated conditions (greater than or equal to 4250 gpm at a pump discharge pressure of greater than or equal to 1080 psig) during testing. Specifically, upon manual initiation of the system, it achieved rated conditions and then became unstable with flow oscillating from 3000 to 5000 gpm. The flow controller was then transferred from the automatic mode to the manual mode; at that time, system flow stabilized at rated conditions. The system was secured and declared inoperable. The appropriate Technical Specifications limiting condition for operation was implemented. The HPCI flow control system control settings were adjusted to increase the stability of the system. The HPCI system was subsequently satisfactorily tested, experiencing no unusual flow oscillations in the automatic mode, and returned to operable status at 0445 CST, on 2/28/92.

The cause of the event was less than adequate maintenance procedures. Specifically, procedures did not address tuning the flow control system following maintenance on the system. Consequently, the tuning of the system was not adequate, resulting in instability in the flow control system.

Corrective actions included adjusting the flow control system to increase stability, performing testing on th system, and revising procedures to include tuning the flow control system.

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor
Energy Industry Identification System codes are identified in the text as (EIIS Code XX).

DESCRIPTION OF EVENT

On 2/26/92, at 1215 CST, Unit 1 was in the Run mode at an appropriate power level of 2436 CMWT (100 percent of rated thermal power). A response time test of the High Pressure Coolant Injection (HPCI, EIIS Code BJ) system was in progress. This test is normally performed once per quarter to demonstrate the system's ability to achieve rated flow and pressure within 25 seconds as specified in the Unit 1 Final Safety Analysis Report. The test is performed in accordance with procedure 34SV-E41-002-1S, "HPCI Pump Operability." At 1215 CST, the system was initiated. It reached rated conditions (greater than or equal to 4250 gpm at a pump discharge pressure of greater than or equal to 1080 psig) and then flow began oscillating between 3000 and 5000 gpm while the pump discharge pressure oscillated between 600 and 1500 psig. The flow control system was then transferred from the automatic mode to the manual mode, at which time the oscillations ceased. The system was subsequently secured and declared inoperable. Limiting Condition for Operation (LCO) 1-92-127 was initiated in accordance with Unit 1 Technical Specifications section 3.5.D.2 and a notification was made to the NRC pursuant to 10 CFR 50.72(b)(2)(iii).

A review of the performance monitoring system recorder trace of the flow control system output showed that the output was undamped, i.e., the output signal oscillations would not converge to a stable signal. It was suspected that this condition was caused by the flow control system being out of calibration. Thus, the flow control system instrumentation was calibrated in accordance with procedure 57CP-CAL-044-1S, "GE Type 547-01, 547-12, and 543-03 Self Synchro Control Loop." However, no problems were found. A test of the HPCI system had been performed on the previous day. That test, also performed per procedure 34SV-E41-002-1S, was used to satisfy quarterly inservice test requirements and to set the position of the test valve for the response time test which would follow the next day. During the test, system flow and pressure exhibited no unusual oscillations. However, a review of the performance monitoring recorder traces showed that the flow control system output was slightly underdamped.

Based on the review of the two traces and the results of the calibration check, it was decided to decrease the gain and reset on the flow control system self synchronizing flow control unit, 1E41-K615 to provide proper dampening or stability to the system. Since the Unit 2 HPCI flow control system was properly damped, the Unit 1 flow control unit settings were set similar to that of Unit 2. The adjustments were made to the control unit, and, on 2/28/92, at 0230 CST, the HPCI system response time test was started. Upon initiation of the system, the pump reached rated conditions within 25 seconds and then stabilized. No abnormal oscillations were noted during the test. The system was secured and placed in the standby mode. At 0410 CST, the HPCI system operability test was started. By 0445 CST, the test had been satisfactorily completed. The system was then returned to the standby mode and LCO 1-92-127 was terminated.

CAUSE OF EVENT

The cause of the event was less than adequate maintenance procedures for the HPCI flow control system. Specifically, procedures did not address tuning the flow control system to provide optimum stability. Procedure 57CP-CAL-044-1S required the Instrument and Controls (I&C) technician to record the as found settings of the control unit prior to calibration of the system. After the system was calibrated, the technician would then adjust the controls to the as found settings. However, this was not effective in ensuring that the system was properly tuned. Procedures should have specified a check of the stability of the system at rated conditions and after varying the system flow. Such a check would be used to evaluate the affects of maintenance activities on the control system and ensure that the system was properly tuned. As a consequence of the less than adequate procedures, the HPCI flow control system was not properly tuned resulting in an unstable system, further resulting in significant flow oscillations during the 2/26/91 response time test.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This report is required pursuant to 10 CFR 50.73(a)(2)(v) because a single train safety system was incapable of performing its intended function. Specifically, the HPCI system did not achieve stable rated conditions while in automatic control during response time testing.

The HPCI system is designed to automatically provide adequate cooling to the reactor vessel to limit fuel-clad temperature in the event of a break in the nuclear steam supply system that does not result in rapid depressurization of the reactor vessel. The Automatic Depressurization System (ADS, EIIS Code JE) is the backup for the HPCI system and is initiated on a low reactor water level condition coincident with a high Primary Containment pressure condition. Upon initiation of ADS, the reactor is depressurized to a point where either the Low Pressure Coolant Injection (LPCI, EIIS Code BO) system or the Core Spray (CS, EIIS Code BM) system can operate to provide adequate core cooling.

In this event, excessive system flow and pressure oscillations compromised the ability of the HPCI system to adequately perform its intended safety function in the automatic control mode. However, the system maintained rated flow at rated pressure in the manual control mode. Consequently, had a small break loss of coolant accident occurred at the time of the event, the system could have been transferred to manual control resulting in the system stabilizing at rated conditions. Additionally, at the time of the event, ADS, the LPCI system, and the Core Spray system were operable. Consequently, these systems were available to provide adequate cooling to the core to limit fuel-clad temperatures.

Based on the above information, it was concluded that this event had no adverse impact on nuclear safety. This analysis applies to all operating conditions.

CORRECTIVE ACTIONS

The flow control system instrumentation was calibrated in accordance with 57CP-CAL-044-1S. No problems were found.

The flow control settings on the self synchronizing flow control unit 1E41-K615 were adjusted to provide more stability to the flow control system.

A response time test and an operability test of the HPCI system were performed and satisfactorily completed on 2/28/92. HPCI was declared operable and LCO 1-92-127 was terminated at 0445 CST.

The Unit 2 HPCI system maintenance procedures and the Unit 1 and Unit 2 Reactor Core Isolation Cooling (RCIC, EIIS Code BN) system maintenance procedures were found to be similarly inadequate. A review of the performance of the Unit 2 HPCI system and the Unit 1 and 2 RCIC systems was performed. It was concluded that the systems were operable.

Procedure revisions have been developed to address tuning of the Unit 1 and Unit 2 HPCI flow control systems to achieve optimal stability in these systems. The Unit 1 and Unit 2 HPCI flow control systems were tuned using the procedures on March 14, 1992 and March 17, 1992, respectively.

Procedure revisions have been developed for tuning the Unit 1 and Unit 2 RCIC flow control systems. The tuning of these flow control systems will be checked using the procedures by April 15, 1992.

ADDITIONAL INFORMATION:

No systems other than the Unit 1 HPCI system was affected by this event.

Two events have been reported in the past two years involving erratic operation of the HPCI system. Those events were addressed in the following reports:

50-321/91-001, dated 02/11/91
50-321/91-033, dated 01/27/92

Investigations following each event identified causes for the erratic behavior which included a failed HPCI EGM (electronic governor - magnetic pickup) and failed transfer relays in the HPCI system flow controller. Corrective actions for these events included replacing the EGM and the transfer relays.

In addition, during three other events involving a reactor scram, the Unit 1 HPCI system exhibited less than optimal stability during actual injection to the reactor pressure vessel until the controller was placed in manual. In each of these events the system initiated and injected at rated flow with the controller in automatic mode and, thus, the system was considered to be operable. The scram events were reported in the following LER's:

50-321/90-13, dated 07/16/90
50-321/91-07, dated 03/27/91
50-321/91-17, dated 10/09/91

TEXT

As a result of the problems seen with the HPCI flow control system during 1990 and early 1991, several corrective actions were taken. Specifically,

- The recommendations of GE Service Information Letter (SIL) 480, "HPCI System Startup Transient Improvement," were implemented in order to better control the HPCI turbine startup transient.

- A performance monitoring system was installed that provides monitoring capability of the flow control system and the turbine control system. A number of traces have been made since the system has been installed and are being used, as in this event, to assist in performing root cause analyses.

- The HPCI system test procedures have been changed to better approximate a cold quick start of the system. This provides more reliable data for evaluating system performance.

These corrective actions have helped in increasing the reliability and performance of the HPCI system. However, in retrospect, it is apparent that a lack of periodic tuning of the HPCI flow control system may have contributed to these events.