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SOUTHERN COMPANY
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February 26, 1998

Docket No. 50-366

HL-5578

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

Edwin I. Hatch Nuclear Plant - Unit 2
Licensee Event Report
High Pressure Coolant Injection System
Inoperable During Maintenance Investigation

Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(v), Southern Nuclear Operating Company is submitting the enclosed Licensee Event Report (LER) concerning the high pressure coolant injection system being inoperable during a maintenance investigation.

Sincerely,

Lewis Sumner

H. L. Sumner, Jr.

IE22

IFL/eb

Enclosure: LER 50-366/1998-001

cc: *Southern Nuclear Operating Company*
Mr. P. H. Wells, Nuclear Plant General Manager
NORMS

U.S. Nuclear Regulatory Commission, Washington, D.C.
Mr. L. N. Olshan, Project Manager - Hatch

U.S. Nuclear Regulatory Commission, Region II
Mr. L. A. Reyes, Regional Administrator
Mr. B. L. Holbrook, Senior Resident Inspector - Hatch

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104 EXPIRES: 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB7714), 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.

LICENSEE EVENT REPORT (LER)

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TITLE (4)
High Pressure Coolant Injection System Inoperable During Maintenance Investigation

EVENT DATE (5) MONTH	DAY	YEAR	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	REPORT DATE (7) MONTH	DAY	YEAR	OTHER FACILITIES INVOLVED (8) FACILITY NAME	DOCKET NUMBER(S)
01	27	98	98	001	00	02	26	98		05000
										05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

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)	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 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 (include area code)
Steven B. Tipps, Nuclear Safety and Compliance Manager, Hatch	912 367-7851

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

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-space typewritten lines) (16)

On 1/27/98 at approximately 1000 EST, Unit 2 was in the Run mode at a power level of 2558 CMWT (100 percent rated thermal power). At that time, the high pressure coolant injection (HPCI) system was undergoing surveillance testing. This testing requires an actual HPCI pump start with flow being taken from the condensate storage tank (CST) and returned there. During this test, a transient signal was received indicating high water level in the suppression pool. This resulted in the discharge test valve to the CST going closed and the HPCI suction source automatically shifting from the CST to the suppression pool. Operators then placed the HPCI flow controller in manual, reduced flow demand, and secured the system per procedure. With the flow controller in manual, HPCI was inoperable. The system was left in this configuration for 68 minutes during troubleshooting, after which time it was returned to its normal, standby status with suction aligned to the suppression pool. This event was caused solely by the HPCI system controller being placed in the manual mode to facilitate a maintenance investigation into reasons for the unexpected re-alignment of the suction source. Corrective actions for this event included backfilling instrument lines and recalibrating an instrument loop, re-performing the HPCI surveillance, and revising the surveillance procedure to require suppression pool water level to be reduced before performing testing. In addition, the feasibility of moderating suppression pool level instrument response time will be investigated.

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

PLANT AND SYSTEM IDENTIFICATION

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

DESCRIPTION OF EVENT

On 1/27/98 at approximately 1000 EST, Unit 2 was in the Run mode at a power level of 2558 CMWT (100 percent rated thermal power). At that time, the high pressure coolant injection (HPCI, EIIS Code BJ) system was undergoing routine surveillance testing. Normally, the HPCI system is configured to draw water from the condensate storage tank (CST, EIIS Code KA) and inject it into the reactor vessel. Alternatively, the system can be aligned to draw water from the suppression pool if level is high in the pool or low in the CST. When the HPCI system is being tested, the pump takes suction from the CST and returns it there via a throttled test valve. The HPCI steam turbine exhausts to the suppression pool where the steam is quenched.

In this event, the HPCI system was being tested as described above when the annunciator "Torus Water Level High" flashed in green, indicating a momentary signal was received on high water level in the suppression pool. This occurred twice with no equipment actuations. Upon receipt of a third, momentary signal, the HPCI test valve to the CST closed automatically, and the suction source automatically re-aligned to the suppression pool per design. The HPCI system is *operable* in this configuration.

The closure of the HPCI system test valve terminated the surveillance. Therefore, operators secured the system per test procedure requirements by placing the flow controller in the manual mode and reducing flow demand. In this condition, the HPCI system is not operable because it requires operator intervention to reach rated flow and pressure following an initiation signal. At the request of maintenance and engineering personnel, operators intentionally left the system in the manual mode for 68 minutes to assist in troubleshooting. At the end of this time, the controller was returned to the automatic mode. HPCI was then operable with its suction source aligned to the suppression pool. Therefore, the HPCI system was inoperable for a period of about 68 minutes.

CAUSE OF EVENT

The HPCI system was inoperable only because its controller was intentionally placed in the manual mode to facilitate troubleshooting. The decision to do so was a conscious one and was appropriate for the plant condition in view of the need to leave the HPCI system undisturbed for troubleshooting and prompt return to service. The apparent problem in the suction source logic, which resulted in the automatic shift of the suction source from the CST to the suppression pool, did *not* render the HPCI system inoperable. HPCI is designed to operate with suction being taken from the suppression pool, so the automatic system re-alignment had no impact on HPCI system operability. As soon as the controller was returned to the automatic mode, the HPCI system was operable.

The automatic realignment of the HPCI suction source is believed to have resulted from a confluence of several different factors: 1) slight instrument calibration drift or air in the sensing line, 2) wave action in the suppression pool arising from the quenching of HPCI turbine exhaust steam, 3) use of relatively fast-acting suppression pool level instruments, and 4) normal suppression pool water level increase experienced any time the HPCI system is run.

One of the differential pressure instruments which supplies a trip signal to the logic controlling the suction source, 2E41-N062D, was found to have drifted to the low end of its acceptance band. Since this was opposite the expected result, a problem with the instrument sensing lines was suspected, such as an air bubble which could cause erratic operation. Technicians then backfilled the sensing lines and calibrated the instrument again. Thereafter, the instrument agreed to within approximately a half inch of all other suppression pool water level instruments.

The HPCI system exhausts steam to the suppression pool when its steam turbine is running, resulting in an addition of water to the suppression pool at a rate equivalent to about 18,000 gallons per hour, or approximately 3 inches of suppression pool level per hour. The action of this large volume of steam flowing into the suppression pool and being quenched creates waves in the water.

Suppression pool level is monitored by two sets of instruments; one set is displayed on a control room strip chart recorder, and the other set, which is not displayed, supplies a signal to the HPCI system logic for the automatic change of suction source. The instruments which supply this signal are Rosemount Model 1154 Alphaline range 5 pressure transmitters. They have a response time of about one second. Therefore, these instruments are capable of responding to a wave in the suppression pool and giving a trip signal to the logic. When a trip signal is received, the logic closes the HPCI system test valve to prevent suppression pool water from reaching the CST, and re-aligns the HPCI suction source to the suppression pool. The instruments supplying the signal for the strip chart recorder are similar to the others, but are of a range 3, which is a much slower acting instrument with a response time of around 35 seconds. This slower response time allows the recorder to show an average suppression pool level with the effect of waves filtered out by the instrument hysteresis.

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

It is believed that all of these factors converged to produce the automatic re-alignment of the HPCI suction source. Air in the sensing line of a suppression pool level instrument made its response less predictable given the normal disturbances in suppression pool level during HPCI system testing. These disturbances became more significant as pool level increased. The fact that the instruments are faster-acting than previously installed instruments is believed to have led them to trip under circumstances when other instruments would not have.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This event is reportable per 10 CFR 50.73 (a)(2)(v) because a single train safety system was inoperable for reasons other than planned maintenance.

The HPCI system is an emergency core cooling system (ECCS) designed to provide coolant to the reactor in the event of small break loss of coolant accident (LOCA) which does not result in rapid depressurization of the reactor vessel. The system consists of a steam driven turbine pump unit, piping, and valves to transfer water from the suction source to the core via the feed water system (EIIS Code SJ) piping as well as piping and valves to supply steam to the turbine and route the exhaust to the suppression pool. Suction piping is provided from two sources, the CST and the suppression pool. Normally, the suction source is aligned to the CST to minimize the injection of impure suppression pool water into the reactor vessel. However, no credit is taken in safety analyses for the CST. Therefore, if the CST experiences low level, or if the suppression pool experiences high level, the flow path automatically aligns to take suction from the suppression pool.

The backups for the HPCI system are the Automatic Depressurization System (ADS, EIIS Code JE) and two low pressure ECCSs. The low pressure ECCSs are the Low Pressure Coolant Injection (LPCI, EIIS Code BO) system and the Core Spray (CS, EIIS Code BM) system. In the event of a failure of the HPCI system, the ADS actuates safety/relief valves to reduce reactor vessel pressure to the point where these low pressure pumps can inject to the vessel.

In this event, the HPCI system controller was left in the manual mode after the system was manually shut down. During this time, the HPCI system was capable of starting upon receiving an initiation signal, but would have required operator intervention to reach rated flow and pressure. Therefore, it was considered inoperable. However, during this time, the backup systems for HPCI remained operable and fully capable of cooling the core in the event of a LOCA. Also, in the event that a HPCI system injection were required, in a few seconds, operators could have returned the controller to the automatic mode and adjusted the setpoint to achieve rated flow and pressure.

Based on this analysis, it is concluded that this event had no adverse impact on nuclear safety. This analysis bounds all operating conditions.

CORRECTIVE ACTIONS

1. Instrument and Control technicians backfilled the suppression pool water level instrument sensing lines on differential pressure transmitters which supply the signal to the HPCI suction source logic, and also recalibrated the instrument loop. This action is complete.

2. The HPCI system surveillance was performed successfully on 1/29/98. This action is complete.

3. As an interim action, the HPCI surveillance procedure has been revised to require suppression pool level to be reduced to the lower end of its acceptance band prior to beginning the test.

4. As a long term action, the feasibility of moderating the instrument response time, including, for example, replacing the fast-acting differential pressure transmitters with those of a similar, but slower-acting model, will be investigated. This action will be completed by June 30, 1998.

ADDITIONAL INFORMATION

1. Other Systems Affected: No systems other than those already mentioned in this report were affected by this event.

2. Failed Components Information: No failed components either contributed to or resulted from this event.

3. Commitments: No permanent commitments are created as a result of this report.

4. Previous Similar Events: No Licensee Event Reports have been submitted in the past two years in which a similar combination of causes resulted in an emergency core cooling system being removed from service.