

**D. R. Madison (Dennis)**  
Vice President - Hatch

**Southern Nuclear  
Operating Company, Inc.**  
Plant Edwin I. Hatch  
11028 Hatch Parkway, North  
Baxley, Georgia 31513

Tel 912.537.5859  
Fax 912.368.2077



July 13, 2007

Docket No.: 50-366

NL-07-1343

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555-0001

Edwin I. Hatch Nuclear Plant – Unit 2  
Licensee Event Report  
High Pressure Coolant Injection System Inoperable from Water Intrusion into Oil System

Ladies and 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 a water intrusion into the High Pressure Coolant Injection (HPCI) system lube oil which rendered the HPCI system inoperable.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

A handwritten signature in black ink, appearing to read "Dennis Madison", is written over a horizontal line.

D. R. Madison  
Vice President – Hatch  
Edwin I. Hatch Nuclear Plant  
11028 Hatch Parkway North  
Baxley, GA 31513

DRM/OCV/daj

Enclosure: LER 2-2007-007

cc: Southern Nuclear Operating Company  
Mr. J. T. Gasser, Executive Vice President  
Mr. D. R. Madison, Vice President – Hatch  
Mr. D. H. Jones, Vice President – Engineering  
RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission  
Dr. W. D. Travers, Regional Administrator  
Mr. R. E. Martin, NRR Project Manager – Hatch  
Mr. J. A. Hickey, Senior Resident Inspector – Hatch

## LICENSEE EVENT REPORT (LER)

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

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 [infocollects@nrc.gov](mailto:infocollects@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.

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4. TITLE High Pressure Coolant Injection System Inoperable Due To Clogged Valve Causing Water Intrusion Into the Oil System
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5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER(S)
05	18	2007	2007	007	00	07	13	2007		05000
									FACILITY NAME	DOCKET NUMBER(S)
										05000

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

12. LICENSEE CONTACT FOR THIS LER	
FACILITY NAME Edwin I. Hatch / Kathy Underwood, Performance Analysis Supervisor	TELEPHONE NUMBER (Include Area Code) 912-537-5931

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		MONTH	DAY	YEAR
YES (If yes, complete 15. EXPECTED SUBMISSION DATE) X NO								

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)
<p>On May 18, 2007 at 17:45 EDT, Unit 2 was in Mode 1 at 2804 CMWT, 100 percent power. While investigating the source of oil on top of the Unit 2 High Pressure Coolant Injection (HPCI) Turbine Skid, Maintenance personnel found water in the HPCI lube oil system. Operations personnel entered the applicable Technical Specification for HPCI inoperable. The water intrusion was attributed to a clogged bracket drain valve which caused water to accumulate in the mechanical seal cavity. The water came from a small leak in the mechanical seal, and apparently entered the oil system by flowing past the thrust bearing oil deflector. The deflector forms one of the seal cavity walls and is not designed to keep standing water out of the bearing housing. The HPCI oil system was drained and flushed; the duplex filter and the Electronic Governor (EGR) were replaced. In addition, the drain valve was removed from the system to prevent future water accumulation. Testing of the HPCI system was performed on May 19, 2007, and the system was declared operable at 19:49 EDT.</p> <p>This event was caused when water backed up in the mechanical seal cavity due to a clogged drain valve, and then migrated into the oil system. The root causes of the water intrusion are: 1) a less than optimal component functional design; 2) an approved modification proposal to remove the valves had not been implemented as of the time of this event; and 3) a corrective action to periodically clean the drain line in order to keep the drain valves from clogging was unsuccessful.</p>

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

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System codes appear in the text as (EIS Code XX).

DESCRIPTION OF EVENT

On May 18, 2007 at 17:45 EDT, Unit 2 was in Mode 1 at 2804 CMWT, 100 percent power. While investigating the source of oil on top of the Unit 2 High Pressure Coolant Injection (HPCI) Turbine Skid, Maintenance personnel found water in the HPCI lube oil system. Consequently, Operations personnel entered the applicable Technical Specifications Limiting Condition of Operation (LCO) for an inoperable HPCI system. The water intrusion was attributed to a clogged bracket drain valve which caused water to accumulate in the mechanical seal cavity. The water came from a small leak in the mechanical seal, and apparently entered the oil system by flowing past the thrust bearing oil deflector. The deflector forms one of the seal cavity walls and is not designed to keep standing water out of the bearing housing. The HPCI oil system was drained and flushed; the duplex filter and the Electronic Governor (EGR) were replaced. In addition, the drain valve was removed from the system to prevent this water accumulation in the future. Testing of the HPCI system was performed on May 19, 2007, and the system was declared operable at 19:49 EDT.

CAUSE OF EVENT

This event was caused when water backed up in the mechanical seal cavity due to a clogged drain valve, and then migrated into the oil system. Following are the root causes of the water intrusion: 1) the component functional design is not optimal in that, according to the vendor, the drain valves are prone to clogging and are not needed; 2) although a modification proposal was approved to remove the valves, they had not been removed as of the time of this event; 3) corrective action to keep the drain line cleared was unsuccessful. The HPCI system inspection and lubrication procedure had been revised to include a section to clear the drain lines and that activity has been performed every 24 months since its inception in 2000. However, the method was inadequate for cleaning the particular type of globe valve in this drain line.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This event is reportable, per 10 CFR 50.73 (a)(2)(v)(D), because an event occurred in which the HPCI system, a single train safety system, was rendered inoperable.

The HPCI system consists of a steam turbine-driven pump and the necessary piping and valves to transfer water from the suppression pool or the condensate storage tank (EIS Code KA) to the reactor vessel. The system is designed to inject water to the reactor vessel over a range of reactor pressures from approximately 160 psig through full-rated pressure. The HPCI system starts and

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

injects, automatically, whenever low reactor water level or high drywell pressure indicates the possibility of an abnormal loss of coolant inventory. The HPCI system is designed to replace lost reactor coolant inventory in cases where a small line break occurs which does not result in full depressurization of the reactor vessel.

The backup for the HPCI system is the Automatic Depressurization System (ADS) together with two low pressure injection systems: The Low Pressure Coolant Injection (LPCI, EIIS Code BO) system and the Core Spray (CS, EIIS Code BM) system. The CS system is composed of two independent, redundant, 100 percent capacity subsystems. Each subsystem consists of a motor-driven pump, its own dedicated spray sparger located above the core, and piping and valves to transfer water from the suppression pool to the sparger. Upon receipt of an initiation signal, the CS pumps in both subsystems start. Once ADS has reduced reactor pressure sufficiently, CS system flow begins.

LPCI is an operating mode of the Residual Heat Removal (EIIS Code BO) system. There are two independent, redundant, 100 percent capacity LPCI subsystems, each consisting of two motor driven pumps and piping and valves to transfer water from the suppression pool to the reactor vessel. Upon receipt of an initiation signal, all four LPCI pumps automatically start. Once ADS has reduced reactor pressure sufficiently, the LPCI flow to the reactor vessel begins.

ADS consists of 7 of the 11 Safety Relief Valves (SRV). It is designed to provide depressurization of the Reactor Coolant System during a small break Loss of Coolant Accident (LOCA), if HPCI fails or is unable to maintain required water level in the Reactor Pressure Vessel (RPV). ADS operation reduces the RPV pressure to within the operating pressure range of the low pressure Emergency Core Cooling System (ECCS) subsystems (CS and LPCI), so that these subsystems can provide coolant inventory makeup.

In this event, the HPCI oil system was found to have water in the oil. As a result, the system was conservatively declared inoperable. During the time the HPCI system was inoperable, the Reactor Core Isolation Cooling (RCIC, EIIS Code BN) system was available to inject high pressure water into the reactor vessel. Although not an ECCS, the RCIC system is designed, maintained, and tested to the same standards and requirements as the HPCI system and, therefore, should reliably inject water into the reactor vessel, when required. If a break exceeded the capacity of the RCIC system (400 gallons per minute), the ADS would be available to depressurize the reactor vessel to the point that either the CS or LPCI systems could have been used. The capacity of one loop of the CS system is equal to that of the HPCI system (4250 gpm each); the capacity of one loop of the LPCI system is approximately three times that of the HPCI system. Therefore, either of the two loops of the LPCI system would have provided sufficient injection capacity for a small break LOCA.

Based on this analysis, it is concluded that this event had no adverse impact on nuclear safety. This analysis is applicable to all power levels and operating modes in which a LOCA is postulated to occur.

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CORRECTIVE ACTIONS

Maintenance replaced the oil in the HPCI Turbine and reservoir.

The Duplex Filters and the EGR were replaced.

The drain valves were removed from the system, pursuant to an approved modification request. The design of the plant's Unit 1 HPCI system was verified to not have valves on the pump drain lines.

The approved modification proposal for removing the drain valves was closed prior to being implemented. An Engineering Fix-it-Now (EFIN) work request was supposed to have been initiated to remove the drain valves. However, no such work request was generated. A review of closed modification proposals is being performed in accordance with the plant's Corrective Action Program. This review is to ensure that there are not any other cases where modification proposals were closed, cancelled, deferred, etc. without expected alternate resolutions being performed.

ADDITIONAL INFORMATION

Other Systems Affected: None

Failed Components Information: None

Commitment Information: This report does not create any permanent licensing commitments.

Previous Similar Events:

LER 2-2007-005 identified an instance where HPCI was inoperable due to water in the oil system. The root cause of this event centered on a tag out that did not adequately address the system or functional impact associated with the components that were tagged or removed from service. This resulted in a flow path for water to enter the HPCI oil system. The corrective actions for this earlier event would not have prevented the event reported in the current LER.

LER 2-2000-001 identified a similar issue where water was introduced into the HPCI oil system due to a clogged drain line. The corrective action from this LER of periodically cleaning the drain line was unsuccessful in that the line became clogged resulting in the current event.