Lewis Sumner
Vice President
Hatch Project Support

Southern Nuclear
Operating Company, Inc.
40 Inverness Parkway
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205.992.7279
Fax 205.992.0341

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Docket No. 50-366

HL-5692

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

Edwin I. Hatch Nuclear Plant - Unit 2
Licensee Event Report
Valve Position Error Results in Reactor Protection System Actuation

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv), Southern Nuclear Operating Company is submitting the enclosed Licensee Event Report (LER) concerning a valve positioning error which resulted in a reactor protection system actuation.

Respectfully submitted,

Lewis Sumner

H. L. Sumner, Jr.

OCV/eb

Enclosure: LER 50-366/1998-003

cc: Southern Nuclear Operating Company
Mr. P. H. Wells, Nuclear Plant General Manager
SNC Document Management (R-Type A02.001)

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. J. T. Munday, Senior Resident Inspector - Hatch

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NRC FORM 366 (06-1998) U.S. NUCLEAR REGULATORY COMMISSION

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 Information and 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 a document 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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)
Valve Position Error Results in Reactor Protection System Actuation

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(S) 05000
09	23	1998	1998	003	00	10	14	1998		DOCKET NUMBER(S) 05000

OPERATING MODE (9)	5
POWER LEVEL (10)	000

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)(vii)
20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(ix)
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)	X 50.73(a)(2)(iv)	OTHER
20.2203(a)(2)(iii)	50.36(c)(1)	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)
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 EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

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

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-space typewritten lines) (16)

On 9/23/1998 at 0040 EDT, Unit 2 was in the Refuel mode with all required control rods fully inserted, the reactor vessel head removed, and water level raised to accommodate refueling operations. At that time, licensed personnel in the main control room received annunciators indicating that the scram air header had low air pressure. About five minutes later, a full reactor protection system (RPS) actuation occurred on high water level in the scram discharge volume (SDV). At 0059 EDT, licensed personnel bypassed the high level trip on the SDV and reset the scram signal. At 0204 EDT, operations personnel discovered that an isolation valve, 2C11-F031A, to the scram air header had been closed. This valve was re-opened per the valve lineup procedure, pressurizing the scram air header. Only the control rod drive system was affected by this event. This event resulted from the inlet valve to the scram air header being closed. With this valve closed, the scram air header depressurized resulting in available control rods lifting off the full-in position into the overtravel position. This moved water to the SDV which, in turn, filled and produced an RPS actuation. Since control rods had already moved into the overtravel position due to the loss of pressure in the scram air header, the RPS signal had little or no effect. It could not be determined how valve 2C11-F031A closed. However, the event investigator found no reason to suspect deliberate tampering. Corrective actions for this event included re-pressurizing the scram air header and checking valves in the pneumatic lineup.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
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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 09/23/1998 at 0040 EDT, Unit 2 was in the Refuel mode with all required control rods fully inserted, the reactor vessel head removed, and water level raised to accommodate refueling operations. At that time, a licensed individual was performing verification for a valve lineup of the control rod drive (CRD, EIIS Code AA) system per plant procedure 34SO-C11-005-2S, "Control Rod Drive Hydraulic System." This evolution was part of a normal sequence of refueling outage activities in which portions of the CRD system had been removed from service for routine maintenance. At the time of the event, the CRD system was being returned to service.

During this time, licensed personnel in the main control room received an annunciator indicating low air pressure in the scram air header. The scram air header is a pressurized air volume whose function is to control the CRD hydraulic control units (HCUs). Normally, the header is pressurized, and the air pressure keeps certain pneumatic valves closed on the HCUs. When the header pressure is lost, these pneumatic valves open under spring force. When these valves open, accumulator pressure forces water under the piston of each CRD, driving the control rod into the core, and the area above the piston is automatically vented to the scram discharge volume (SDV). During normal plant operation, the pneumatically operated drain valves to the SDV are kept open by pressure from the scram air header. Hence, when the header is depressurized, these valves close under spring force.

In this event, the supply air was isolated from the scram air header. The nominal pressure is 70 to 75 psig, and the low pressure alarm is set to actuate at 67.1 psig. At 0040 EDT, the alarm was received in the main control room (MCR) indicating low pressure in the header. Pressure in the header continued to decrease, eventually reaching 18 to 20 psig. At that point, the scram valves began to drift open on the HCUs due to air pressure being insufficient to keep them closed. As they drifted open, water discharged from the CRDs began to enter the SDV as designed, and with the SDV drain valves closed, water level in the SDV began to rise. A couple of minutes later, alarms were received indicating water was being received in the SDV. A half scram signal resulted from this condition, as well as a control rod withdrawal block. At approximately 0045 EDT, a full scram signal was received on increasing water level in the SDV. Receiving this signal resulted in a full actuation of the reactor protection system (RPS, EIIS Code JC). The scram air header is completely vented, by design, upon receipt of a full RPS actuation signal. Hence, any scram valves which had not already opened did so at this time.

Since all required control rods were fully inserted into the core prior to the event, no reactivity change resulted from the scram signal. When the unit is shut down, the control rods are normally kept at the full

in position of "00." A scram then results in the CRDs being lifted off the "00" position into the "overtravel" position. This small amount of rod motion discharges water to the SDV. The discharged water includes water present in the over-piston area of the drive plus normal leakage past the CRD piston seals. At the time of this event, 51 CRDs were capable of being scrammed and discharging water into the SDV.

At 0059 EDT, control room operators bypassed the SDV high level signal and reset the scram per procedure 34AB-C71-001-2S, "Scram Procedure." No other actuations occurred as a result of the scram signal. At 0204 EDT, a licensed individual discovered that valve 2C11-F031A was closed when it should have been open. This valve is the inlet to the pressure regulator for the scram air header. With this valve closed, the header will depressurize resulting in the actuations described previously in this report. The valve was then opened at the direction of the Unit Shift Supervisor, re-pressurizing the scram air header and terminating the event.

CAUSE OF EVENT

This event resulted from valve 2C11-F031A being closed which isolated the scram air header from its normal supply. With the air supply isolated, the scram air header depressurized, opening the scram valves on 51 available HCUs. When the scram valves opened, the affected CRDs shifted to the "overtravel" position, draining water to the SDV and producing a full RPS actuation on SDV high level. The reason for valve 2C11-F031A being closed was not conclusively determined. Investigation suggested four possible ways in which the valve was closed.

First, one could assume an initial condition in which valve 2C11-F031A was just barely open, or "cracked," having been in this condition for some indeterminate period of time. The standard technique for verifying the position of a manual valve is to take the hand wheel a quarter turn closed, then a quarter turn back open. If the verifier went farther than the usual quarter turn, it is conceivable that he might have actually closed the valve because it was merely cracked open. Then, when he moved the hand wheel a quarter turn in the open direction, he merely took up the mechanical free play in the stem threads which did not result in re-opening the valve.

Second, the valve might have been inadvertently closed by the individual who was performing the verification for the valve lineup. This individual did not recall making any valve manipulations, however. If indeed the individual did close the valve, it was the result of a cognitive mistake.

A third manner in which the valve might have been closed involves a mistake made in some valve lineup unrelated to the one in question. Under this scenario, it is hypothesized that another person performing valve manipulations might have operated valve 2C11-F031A by mistake. This hypothesis was considered unlikely because the valve is clearly labeled and because access to the area where the valve is located was restricted at the time for radiological reasons. Furthermore, the licensed individual who was in the area at the time did not see anyone enter or leave the area during the time the event took place.

A fourth manner in which the valve could have been closed involves possible tampering. The event investigator found no reason to suspect that the valve had been moved as a result of deliberate tampering. This is based on the fact that a licensed individual was in the area at the time the event occurred.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This event must be reported per 10 CFR 50.73(a)(2)(iv) because an unplanned actuation of an engineered safety feature occurred. Specifically, the RPS actuated on high level in the scram discharge volume. This was a valid signal arising from the actual plant condition for which this ESF is designed.

The purpose of the CRD system is to control reactivity by positioning control rods in the core. The CRD system is comprised of 137 cruciform-shaped rods containing boron or hafnium, a hydraulic actuator and hydraulic control unit for each rod, two 100 percent capacity CRD pumps, and the necessary piping and valves. The CRD system has two basic modes of operation. The normal drive function is used to control reactivity for power production, and the scram function is used to drive all control rods rapidly and fully into the core to shut down the reactor. In the normal drive function, the system uses CRD pump pressure to move one rod at a time in small increments or notches. The CRD system does not have the capability to withdraw more than one control rod at a time. The scram function works by positioning pneumatic scram valves such that the under-piston area of the CRD is exposed to HCU accumulator and reactor pressure, and the over piston area is vented to a pipe known as the scram discharge volume, which is at atmospheric pressure at the beginning of a scram. The pneumatic valves are controlled by air pressure from the scram air header, maintained normally at 70 to 75 psig. When pressure in the header is reduced to 18 to 20 psig, the scram valves open and the control rods are driven into the core. The HCU for each control rod contains a high pressure accumulator which helps initiate the scram function. When the unit is at power, reactor pressure provides the motive force to complete the scram. When the reactor vessel is depressurized, the HCU accumulator ensures the rod can be fully inserted on a scram signal.

In this event, a valve was found closed which isolated the scram air header from its normal supply. The header then depressurized over the next few minutes. This resulted in the SDV drain valves closing and the scram valves opening as designed, causing control rods to move upward from the full in position into the overtravel position. This discharged water into the SDV which began to fill due to the drain valves being closed. When the SDV reached its setpoint for high water level, a full RPS actuation signal was generated. The RPS actuation completed venting the scram air header. If any control rods had not yet been scrammed, this signal would have completed the scram as designed.

At the time of this event, the CRD pumps were turned off, such that the only motive force in the system was the gas pressure in the accumulators. This was sufficient to complete the scram, as designed. There were no other equipment actuations associated with this event. When the mispositioned supply valve to the scram air header was identified, it was opened, which restored pressure to the header and closed the scram valves. Had this event occurred under other operating conditions, the control rods would have scrammed as designed, shutting down the reactor and placing the plant in a safe condition.

Based on this analysis, it is concluded that this event had no adverse impact on nuclear safety. This analysis applies to all power levels and operating conditions.

CORRECTIVE ACTIONS

The inlet valve to the scram air header was reopened. Additionally, several manual air valves in this system were checked to ensure they were free of binding or other abnormalities which could either impede proper operation or create the appearance of being open when they were closed. No problems were found.

ADDITIONAL INFORMATION

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

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

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

4. Previous Similar Events: One event has been reported in the past two years in which a mispositioned valve or other component resulted in an unplanned actuation of an engineered safety feature. This event is described in LER 50-321/1997-008. In that event, Unit 1 was in the Hot Shutdown condition and the main condenser (EIIS Code SG) vacuum breakers were opened. Normally, the Group 1 Primary Containment Isolation Valve (PCIV, EIIS Code JM) closure signal would be bypassed in this condition, preventing the PCIVs from closing on low condenser vacuum. However, in this case, personnel error and an inadequate procedure resulted in the bypass switches being left in the normal position. Hence, the Group 1 PCIVs closed on low main condenser vacuum when the condenser was vented, breaking vacuum. Corrective actions for that event included counseling personnel and revising procedures. Those actions would not have prevented the subject event because the nature of the causes was different and because no procedure problems led to the subject event.