

H. L. Sumner, Jr.  
Vice President  
Hatch Project

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August 4, 2003



*Energy to Serve Your World<sup>SM</sup>*

NL-03-1625

Docket Nos.: 50-321  
50-366

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

Edwin I. Hatch Nuclear Plant  
Licensee Event Report  
Broken Reactor Protection System (RPS)  
Neutral Bolt Results In RPS Bus Trip

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv)(A), Southern Nuclear Operating Company is submitting the enclosed Licensee Event Report (LER) concerning a trip of a RPS bus due to a broken neutral bolt.

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

Sincerely,

A handwritten signature in cursive script that reads "H. L. Sumner, Jr.".

H. L. Sumner, Jr.

HLS/IL/daj

Enclosure: LER 50-321/2003-001

cc: Southern Nuclear Operating Company  
Mr. J. D. Woodard, Executive Vice President  
Mr. G. R. Frederick, General Manager – Plant Hatch  
Document Services RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission  
Mr. L. A. Reyes, Regional Administrator  
Mr. S. D. Bloom, NRR Project Manager – Hatch  
Mr. D. S. Simpkins, Senior Resident Inspector – Hatch

Handwritten initials "JE22" in a cursive style.

**LICENSEE EVENT REPORT (LER)**

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

Estimated burden per response to comply with this mandatory information collection request: 60 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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,

<b>1. FACILITY NAME</b> Edwin I. Hatch Nuclear Plant - Unit 1	<b>2. DOCKET NUMBER</b> 05000-321	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Broken Reactor Protection System (RPS) Neutral Bolt Results In RPS Bus Trip

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)
06	09	2003	2003	001	0	08	08	2003		05000
									FACILITY NAME	DOCKET NUMBER(S)
										05000

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

**12. LICENSEE CONTACT FOR THIS LER**

<b>NAME</b> Steven B. Tipps, Nuclear Safety and Compliance Manager, Hatch	<b>TELEPHONE NUMBER (Include Area Code)</b> (912) 537-5880
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**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
X	JE	CBL5	GE	Yes					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>		<b>15. EXPECTED SUBMISSION DATE</b>			
YES (If yes, complete EXPECTED SUBMISSION DATE)	NO X		MONTH	DAY	YEAR

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

On 06/09/2003 at 0445 EDT, Unit 1 was in the Run mode at a power level of 2763 CMWT (100 percent rated thermal power). At that time, the "A" Reactor Protection System (RPS, EIIS Code JE) bus (1C71) tripped while the RPS MG Set (1C71S001A) continued to run with the output breakers closed in. The design of the RPS is "fail-safe" in that loss of power or control signal causes systems powered by the RPS power supply to change states to their emergency configurations. Thus, the trip of the bus caused Group 2, Group 5, and inboard small-bore Group 1 Primary Containment Isolation System (PCIS, EIIS Code JM) valves to receive an automatic isolation signal. The Main Control Room Environmental Control System (MCRECS, EIIS Code VI) entered the pressurization mode; both units' Standby Gas Treatment Systems (SGTS, EIIS Code BH) initiated; the Primary Containment Hydrogen and Oxygen Analyzers (EIIS Code IK) isolated. Also, the Reactor Water Cleanup (RWCU, EIIS Code CE) system, the Fission Product Monitoring (FPM, EIIS Code IJ) system, and the operating Steam Packing Exhauster tripped.

Licensed personnel verified the proper plant response to the initiating signal per procedure 34AB-C71-002-1S, "Loss of RPS." By 0607 EDT, licensed personnel energized the RPS bus from its alternate supply and affected systems were subsequently returned to their normal lineups. The cause of the RPS bus trip was determined to be a broken neutral RPS cable bolt located in panel 1C71-P001. The broken bolt was removed and replaced with a new bolt.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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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 (EIIIS Code XX).

**DESCRIPTION OF EVENT**

On 06/09/2003 at 0445 EST, Unit 1 was in the Run mode at a power level of 2763 CMWT (100 percent rated thermal power). At that time, the "A" Reactor Protection System (RPS) bus (1C71) tripped while the RPS MG Set (1C71S001A) continued to run with the output breakers closed in. As a result, Reactor Protection System (RPS) bus "1A" trip power was lost to the logic systems the RPS bus powered including the RPS trip logic, the Main Control Room Environmental Control System (MCRECS) initiation logic, Primary Containment Isolation System (PCIS) trip logic, and Steam Packing Exhauster trip logic. All affected systems responded per design on the loss of power, producing a half scram signal, PCIS valve isolations, MCRECS pressurization mode initiation, and other actuations.

As a result of the Reactor Protection System (RPS, EIIIS Code JC) bus "1A" lost power causing some Group 2, Group 5, and inboard small-bore Group 1 Primary Containment Isolation System (PCIS, EIIIS Code JM) valves to receive an automatic isolation signal. Those valves open at the time of the event closed per design. Also, the Main Control Room Environmental Control System (MCRECS, EIIIS Code VI) entered the pressurization mode; the Primary Containment Hydrogen and Oxygen Analyzers (EIIIS Code IK) isolated; and the Reactor Water Cleanup (RWCU, EIIIS Code CE) system, the Fission Product Monitoring (FPM, EIIIS Code IJ) system, and the operating steam packing exhauster tripped.

Loss of power to Standby Gas Treatment (SGT, EIIIS Code BH) system logic components resulted in isolation of the secondary containment and the initiation of the Unit 1 and Unit 2 SGT system trains.

By 0607 EDT, licensed personnel energized the RPS bus from its alternate supply and affected systems were subsequently returned to their normal lineups.

**CAUSE OF EVENT**

The cause of the "A" Reactor Protection System (RPS, EIIIS Code JE) bus (1C71) trip was determined to be a broken bolt for the neutral RPS cable located in panel 1C71-P001. Preliminary analysis of the bolt failure indicated that it was the result of tensile overload. The tensile overload of this bolt was most likely the result of a combination of stresses induced on the bolt from torquing and cable strain from the electrical conductor secured by the bolt. Metallographic examination of the bolt showed no unexpected grain structure or material conditions.

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

**REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT**

This event is reportable per 10 CFR 50.73 (a)(2)(iv)(A) because unplanned actuations of engineered safety features (ESFs) occurred. Specifically, several ESFs actuated in response to a trip of RPS power supply bus "A."

The RPS power supply system is designed to supply stable 120-volt AC power to a variety of plant instrumentation systems including the Process Radiation Monitoring System, the Neutron Monitoring System, the Reactor Protection System, the Primary Containment Isolation System, and the Offgas Radiation Monitoring System. A high degree of power stability is achieved by using two motor-generator sets to condition the power supplied by the RPS power supply system. The electrical output of each motor-generator set energizes one of two RPS busses.

In this event, the "A" Reactor Protection System bus (1C71) tripped because of a broken bolt for the neutral RPS cable located in panel 1C71-P001. Upon loss of power or control signal, systems powered by the RPS de-energize to their "safe" configuration (i.e., they initiate their emergency or accident functions). All systems affected by this event responded per design for a power interruption, and this was verified by licensed personnel immediately after the event occurred. No unexpected actuations occurred. Had a design basis accident occurred during this event, all affected plant systems would already have been in their emergency configurations and no further automatic actuations of these particular systems would have been required to mitigate the accident.

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.

**CORRECTIVE ACTIONS**

The broken silicon bronze bolt for the neutral RPS cable located in panel 1C71-P001 bolt was removed and replaced with a new stainless steel bolt per Maintenance Work Order (MWO) 10302706. A stainless steel bolt was used to ensure that the strain caused by the conductor securing this bolt would not cause another tensile overload. The risk associated with reducing the amount of strain exerted on this connection from the electrical conductor was determined to be unacceptable during plant operation so it was decided that this work would not be performed until the next refueling outage. An MWO (10302759) to reduce this strain during the next refueling was generated.

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

**ADDITIONAL INFORMATION**

There have not been any previous similar events reported in the last two years in which a trip of RPS bus resulted in unplanned safety system actuations.

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

**Failed Component Information:**

Master Parts List: 1C71-P001

Manufacturer: GE

Manufacturer Code: G080

Model Number: 238X928RJG1

Type: RPS Power Cable

EIIS System Code: JE

EIIS Component Code: CBL5

Root Cause Code: X

Reportable to EPIX: Yes